The interaction between building layout and display layout in museums

A thesis submitted to the Bartlett Faculty of the Built Environment,
University College London,
in candidacy for the Degree of
Doctorate of Philosophy
Department of Architecture

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London
June 2007

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Abstract

A key issue, theoretical as well as practical, in the design of museums and galleries is how the layout of space interacts with the layout of objects to express an intended message or realise a specific effect. This issue can be addressed against the background of a coherent body of literature which, using the space syntax theory and method, offers a certain rigour in the analysis of spatial layouts, and within the context of a smaller, less systematic body of object layout studies which, focusing on curatorial intent, looks only obliquely at space. It is the intention of this thesis to try to develop a synthetic overview of spatial and object layout within a single theoretical framework, seeking to contribute to a better understanding of museum morphology.

This combined framework is built through a series of paired case studies of European museums and galleries specially selected, and designed to allow the pursuit of specific theoretical questions. The aim of these case studies is illuminative and explorative rather than exhaustive, since each case study is intensive and requires a protracted period of field work. The analysis sets out from the conspicuous similarities between each pair of museums, which set the background for exploring critical differences with respect to the layout of space and objects, and as manifested in the observable patterns of visiting. The ideas generated from this analysis are then used to describe the main dimensions of variability of spatial layout, display strategies and visiting patterns. On this basis, the study proposes a theoretical model that relates these dimensions of variability, and shows them to derive from a set of basic principles, given as possibilities to be explored and combined. Depending on the way museums use these principles, it is possible to distinguish between museums that intend to convey a pre-given meaning and reproduce information, and museums that aim at creating fields of possible meaning and producing a richer spatial structure.

Table of Contents

Acknowledgements

This thesis is literally the result of a five-year research but essentially the product of an obsessive interest in art museums dating much longer than this, and marked by the search of a way of looking at museums neither as buildings nor as exhibits but reading them as something more complex than each of these on its own. The theoretical ideas on which this research is founded are due to Professor Bill Hillier. So first I wish to express my debt to him for his theory of space, a true acknowledgement of his influence on my way of thinking. No less fundamental to the present work was his invaluable guidance as the principal supervisor of this thesis, his intellectual enthusiasm and curiosity, a constant inspiration for me, and more importantly, his faith in my insights, and tireless generous encouragement.

Similarly, I must express my deepest gratitude to Ros Diamond, secondary advisor of this thesis, for providing me with insightful advice, sharing with me her original ideas, giving me friendly encouragement and warm support and finally, for rendering our discussions not only stimulating exchanges of arguments but also, pleasant meetings. No doubt my working with these two people was an additional reason why the adventure of researching into museums gave me real happiness.

I am much indebted to museum curators and to the staff of the museums in which I carried out the research. I am especially grateful to P.Fortheringham and R.Cripps at the National Galley, P.Wilson at Tate Modern, P.Warner at Tate Britain, A.di Lieto at Castelvecchio, J.Lavoine at Pompidou Centre, and Th.Schmidt in Wohlert Arkitekter, for providing me with the building plans and the permission to use them; to A.Sturgis, Exhibitions and Programme Curator at the National Gallery, A.di Lieto, Architect at Castelvecchio, P.Wilson, Director, Projects and Estates, and F.Morris, Senior Curator, at Tate Modern, B. Leal, S.Cazenave, Y.Dabiens, and D.Schulmann, Curators, at Pompidou Centre, P. de Jonge, Director, and T.van Kooten, Curator, at Kröller-Müller Museum, K.Degel and K.Kjeldsen, Curators, at Louisiana Museum, for generously giving their time for interviews; and finally, to the staff of the Archive Departments of the above

museums, particularly I.Hunter and M.Watton at the National Gallery, and N.Mamod at Pompidou Centre, for facilitating my research and making available archival and photographic material.

I also owe a special word of thanks to Adrian Forty, Professor of Architectural History, The Bartlett, UCL, and Irit Rogoff, Professor of Visual Cultures, Goldsmiths College, University of London, for making helpful suggestions at some key stages of this research.

I wish to acknowledge the intellectual contribution of other writers on this subject, an appreciation that, I hope, is reflected in the following pages. And I want also to note that I feel fortunate to be part of the space syntax community and have the opportunity to share experience and views with academic staff members and research students with similar theoretical concerns, yet diverse research interests.

I am especially grateful to the Graduate School and The Bartlett Faculty of the Built Environment, UCL, for contributing to the costs of my last two research trips, to Holland and Denmark respectively.

Finally, from all those, family, friends and colleagues, to whom I feel debt of gratitude because their support contributed to this thesis in more personal ways, but it would take too long to list, four names cannot escape mention. Barbara Pezzini, for her willingness to offer advice and assistance, already on our first meeting; Ava Fatah, for sharing my research interests, giving me helpful tips and finding solutions to problems I thought insurmountable; Tina Sklepa, for her faith and kindness to me, her generous friendship, unconditional assistance and enduring optimism. And above all, to Marisa Tzortzi, for both her intellectual help and emotional support, and most fundamentally, for acting as the competent reader and constructive critic of every version of this text as soon as it was written. The thesis is rightfully dedicated to her.

List of Figures

List of Tables

'Maybe the only program that one can make is… to say how does one make architecture today rather than how does one make a museum.'

P. EISENMAN 1996[1]

'The art of exhibiting is a branch of architecture'

PH. JOHNSON 1931[2]

How does architecture affect our experience of museums? How does it relate to the '*art of exhibiting*'? Intrigued by these questions and guided by the belief that space can be seen as the content of the museum building, as important as the objects themselves, the thesis aims to investigate a key issue, theoretical as well as practical, in the design of art museum and galleries: how the layout of space interacts with the layout of objects to realise a specific effect, express the intended message or create a richer spatial structure. To fully understand this interaction entails answering three critical questions: Does the spatial design makes a difference, and if so, what kind of difference? How does it relate to the curatorial intent? What dimensions of our experience of museums are determined by the way galleries and objects are organized spatially?

Since the mid-twentieth century museums, as a building type, have moved away from the developments established in the nineteenth century, and are currently challenging our idea of a particular form of the building, surprising us with their heterogeneity and increasing innovation. [**Figure 1.1-1.3**] Museums can now be conversions of industrial or other type of buildings –as diverse as train stations, [**Figure 1.4**] hospitals and power stations; they can be designed by a group of architects [**Figure 1.5**], or created by a single artist, [**Figure 1.6**], seeking original or dramatic expression of the relation to art. Preoccupied with this recent museum reality, architectural literature addresses extensively the spatial design of museums, aiming at understanding how innovative and

experimental projects have evolved within the context of ideas defined by the history of museum architecture. Turning to this body of literature (reviewed in Chapter 2), as the background against which our first question can be developed, we can easily see that the emphasis is placed on the visual form of museum buildings and the efforts of most architectural authors, as for instance Brawne (1965), Searing (1986, 2004), Newhouse (1998), and Montaner (2003), are directed towards suggesting a range of typological distinctions -from geographical categorizations to conceptual thematic groupings. But typological arguments, interesting and significant as they are, do not fully engage the more theoretical questions addressed in this thesis, which seek to link spatial strategies to functional and experiential properties of museum layouts. Though some authors, like Huber (1997) and von Naredi-Rainer (2004), place the emphasis on the spatial organization of museum buildings, they address circulation, gallery sequence and other spatial issues as separate considerations, and as a consequence, spatial implications remain general or are not explicitly discussed at a global level.

In contradistinction to such accounts, this thesis will attempt to show that architecture affects the way we experience museums by the way in which the building organizes space in particular ways, and constructs a set of relationships among galleries -determining the way they are explored and used-, among objects -affecting the way they are perceived and appreciated-, and among visitors -creating possibilities for co-presence and encounter. It is on this ground that the thesis will then try to address key architectural questions: Do museums, despite the variations in forms and the interchangeability of buildings in terms of function, have, however abstractly describable, certain spatial themes in common which are essential for their functioning and which perhaps provide the underlying principles of organization (Hillier and Hanson 1984; Hillier 1989) on the basis of which experimental designs can happen? And if they do, what theories can we develop that account for these common spatial themes? The aim is to capture a number of crucial features of museum space which are of interest not only for themselves but also with respect to their effects on the spatial arrangement of the collection, the second critical issue for this thesis.

No doubt the problem of space in museums and its effects on the perception and reading of their collections has been increasingly given special attention in the literature on the display of art. Krauss (1990) and Duncan (1995), in their influential papers on the spatial structure of MoMA, were the first to integrate the issue of space, as context of presentation and as ordering of objects, in a socio-cultural context. They argued that the building layout and the spatial arrangement of objects are manifestations of ideology and social meaning, and, like a '*script'*, determine visitors' experience. The issue has been repeatedly taken up since, especially by Staniszewski (1998), Noordegraaf (2004) and Newhouse (2005), authors who looked at how the transformations in layout principles over time in particular museums reflect changes of aesthetic ideas, cultural discourses and political issues.

However, the existing literature, though rich in theoretical background, does not provide any rigorous account of exhibition layouts and, more importantly, does not look with consistency at the architectural side of the issue of display and its relation to the overall spatial structure of the museum, but makes only the most general references to space. This fact partly accounts for the intention of this thesis, to develop a model of the main dimensions of variability of object layout styles. The intention becomes all the more intriguing, when set against the growing curatorial tendency to regularly re-arrange the permanent collections of museums in order to present them as temporary exhibitions, and the ever-increasing variety and complexity in the presentation of works -from thematic arrangements (as, for instance, in the case of the Groninger Museum, the Netherlands), [**Figure 1.7**] to the quite unexpected grouping of objects on the basis of the date of their acquisition (as in the case of the Municipal Museum of Fine Arts, Bilbao). [**Figure 1.8**]

These observations also suggest that the attempt of this thesis differs from the approach of most of the art historical writing in two respects. First, it is mainly directed towards the analysis of the object display from the point of view of its spatial dimension, seeking to identify those design choices which have a critical value in respect to the way spatial qualities can be used to support the impact of objects and structure a particular experience. Second, it has always been thought,

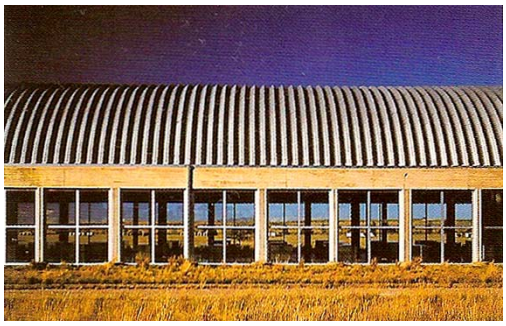
^ **FIGURE 1.1**
The Guggenheim Museum, Bilbao, Spain
(F.Gehry,1997)

^ **FIGURE 1.2**
The Arken Museum of Modern Art, Denmark
(S.R.Lund,1996)

^ **FIGURE 1.3**
Bonnefanten Museum, Maastricht,
The Netherlands (A.Rossi,1995)

^ **FIGURE 1.4**
The Orsay Museum, Paris, conversion of
a train station (G.Aulenti,1987)

^ **FIGURE 1.5**
The Groninger Museum,
The Netherlands (A. Mendini, Ph.Starck
and Coop Himmelblau, 1994)



^ **FIGURE 1.6**
The Chinati Foundation, Marfa, Texas
(D.Judd, 1994)
[*Newhouse* 1998,p.116]

^ **FIGURE 1.7** Installation view of the collection at the Groninger Museum (2004)

^ **FIGURE 1.8** Installation view of the collection at the Museum of Fine arts, Bilbao (2000)

that the spatial arrangement of objects can be used to express a conceptual structure physically; but the thesis raises also the key question: Can the reverse also happen? Can the arrangement of objects be used to enhance the spatial structure, to create an architecture of space? Setting out from the belief that the influence of space on the display can extend as distinct from the organization of knowledge and beyond the informational function, we will seek to demonstrate that besides reproducing information, the mediation role of space can contribute in generating independent effects, in the sense that space helps to focus attention not only on each individual object, but also on their arrangement as a message in its own right.

However, it should be noted that, though the focus is on the spatial dimension of the object pattern, the thesis will not discuss the contributions of lighting, the effect of material textures, or any other aspects of space that would relate to and affect the perception of the works, elements that self-evidently concern curators and exhibition designers; nor will it address questions of what visitors actually learn from displays, though attention is concentrated on understanding how the museum is telling the story of art. Rigorously assessing the effectiveness of how museum displays transmit their intended message would be unnecessary from the point of view of the present argument, as the thesis limits itself to the description of structures that can potentially be perceived and understood by visitors.

The attempt to deal in conjunction with the two layers of organization in museums -of space and display- is manifested in the exhibition design guides (Royal Ontario Museum 1976; Hall 1987; Dean 1994), approached here as another immediate context of this study. One of the main contributions of this body of literature is that it places the emphasis on the effects of different possible design choices on visitors' behaviour and experience. However, it deals separately with functional needs, as diverse as technical issues, visual articulation of displays and design of labels. By considering functional requirements in a generalized way, design guidance is more about the application of a predetermined strategy to a theoretical space and object, rather than a theory of design possibilities and alternative solutions in relation to specific intentions. Such an approach is helpful

when it comes to reproducing strategies but does not encourage the invention of new ways of handling spatial or other considerations.

Similarly to the exhibition design guides, the aim of this thesis is to try to develop a synthetic overview of spatial and object layout in museums within a single theoretical framework. But in complete contrast to the normative approach of the design guidance, the thesis works towards developing an analytic theory based on the direct, in-depth study of museums. Rather than seeking some set of rules for arriving at the best arrangement of objects, or guidelines for successfully designing a museum, the theory is proposed as '*a tool of thought*' (Hillier 1996) aiming to develop a better understanding of the morphology of museum buildings and its likely effects on dimensions of museum experience, explain how museums might be different and why they work the way they do. But to understand the spatial structure of buildings is closely related to the possibility of systematic comparisons; and in turn, to be able to make accurate and systematic comparisons between different spatial layouts requires a language of spatial description. Such a language is provided by Space Syntax.

Space Syntax is a theory of space and a set of analytical, quantitative and descriptive tools for analysing the layout of space in buildings and cities developed by Hillier et al, at UCL, in the mid 1970s. As it will be fully analysed in Chapters 3 and 4, space syntax techniques allow us to objectively describe museum layouts as configurations of spaces, identify and measure their key structural properties and thus render visible powerful differences between museum buildings or between parts of the buildings as spatial elements. The reader must be warned, however, that the thesis uses space syntax in a slightly distanced rather than a committed way. At the same time, since no methodology for object layout has been proposed which approaches the space syntax method in consistency and rigour, syntactic concepts will also provide a more rigorous spatial framework for the analysis of display strategies and enable us to bridge between the two layers of organization in museums.

There is an additional dimension to this methodological choice: the spatial properties of museum layouts can be related to observed aspects of space use, potentially extending our knowledge of the morphology of museum buildings.

Thus we can ask questions often omitted from the dominant literature on museums: How is the museum working? How do people use the layout and interact with it? To what extent can the organization of galleries in sequences and the arrangement of objects in space account for the observed morphologies of movement and space use patterns? Can they generate a potential for social encounter?

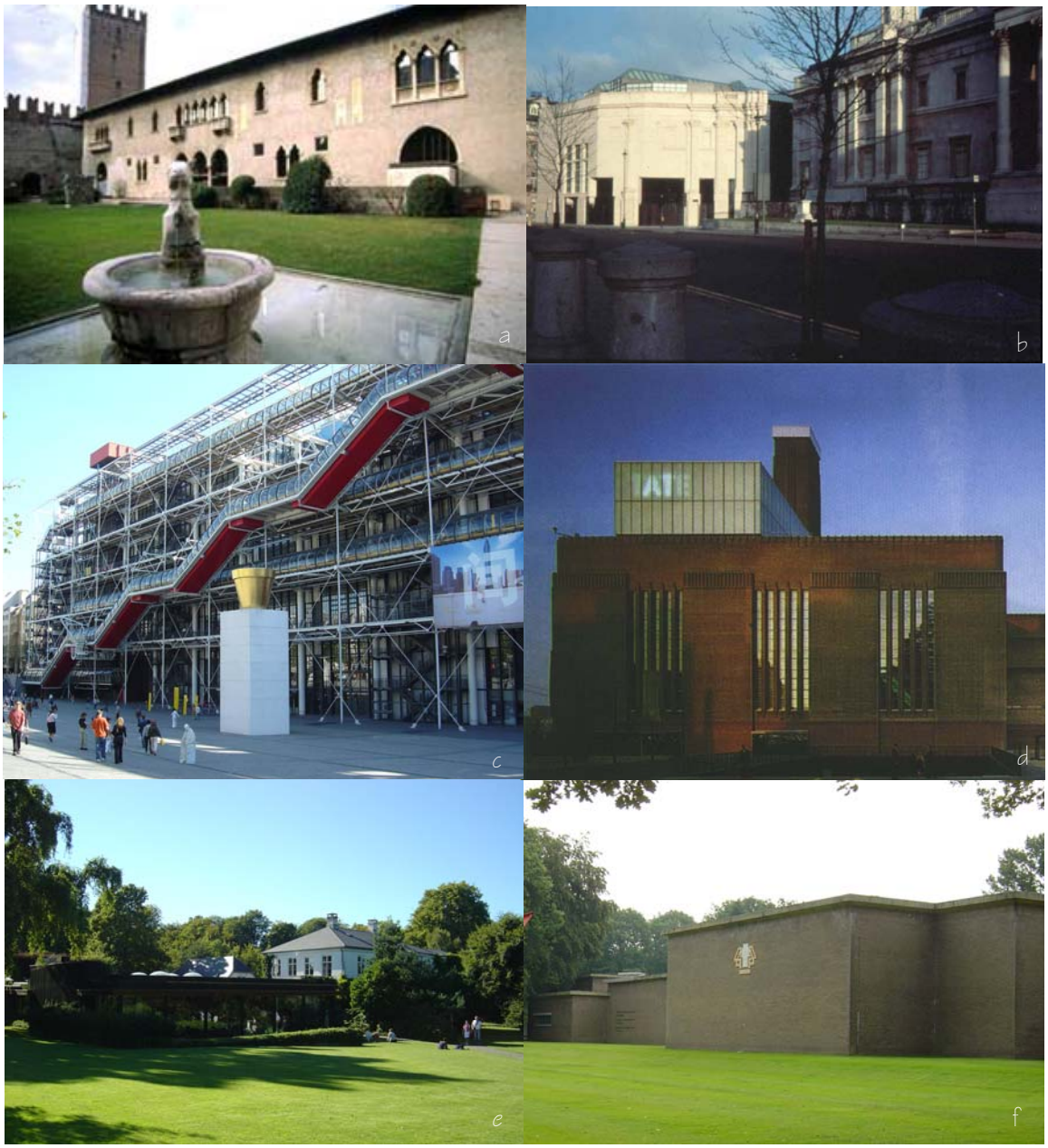
These questions are addressed against the theoretical background of syntactic research. Accumulated syntactic studies have established the *theory of layout*, the idea that, in most circumstances, the spatial structure of a layout can create and transform patterns of movement and, through movement, it can also modulate the degree of 'natural co-presence' and the opportunities for encounter among those using the layout.[3] These basic ideas of space syntax are of particular interest for this research, for two main reasons: first, the accommodation of movement in museums is closely related with the way people explore galleries and objects, and are exposed to information; second, its by-product -the social dimension- is central to our experience of museums, where being co-present with other people is part of the experience of looking at art. This clear link between spatial layout and functioning, with a special emphasis on its social and pedagogical implications, has been established over the past two decades by a number of studies of museums which will be reviewed in Chapter 3 (Hillier et al. 1982; Peponis and Hedin 1982; Pradinuk 1986; Choi 1991, 1999). However, one other aspect of the theoretical background developed through these studies merits closer consideration since it constitutes our basis for further development. It has been argued (Huang 2001) that what defines the museum as a spatial type is two spatial elements that recur often enough to be characterized as *genotypical themes*: a *gathering space* for setting out from and returning to, and related to this, a layout of gallery spaces, organized into a more or less *visitable sequence.* Building upon this idea, the thesis will attempt to formulate the range of possibilities in respect to the above *spatial themes*, not with the aim to enumerate cases, but with the intention to identify those layout choices which have strategic value with respect to the function and the use of museum. Because it will be proposed in the final discussion that it is the different interpretations of a set of common spatial themes

that accounts for the underlying pattern of differences, functional and experimental, we find in museums.

Significantly, this argument will also provide us with the ground to extend the *theory of layout* described earlier, adding another critical dimension to our experience of museums. More precisely, it will be suggested that in parallel to the experience of exhibits, there is the largely *non-discursive* [4] experience of space, before we begin to consider the experience of other people.

As argued earlier, the intention is to work towards developing a theory, an intention that requires empirical knowledge and comparative study of a range of real cases in order to arrive at theoretical conclusions. The background of earlier syntactic studies allowed us to focus on an illustrative and intensive, rather than extensive, sample, and provided the theoretical starting point for the organization of the case studies. It should be noted, however, that the selection of cases, while being theoretically informed by earlier museums studies, was largely the result of a certain amount of instinctive wayfinding, leading to cases that we felt might be rewarding and would help to formulate the questions.

Museums and galleries were selected from different time periods (designed between 1938 and 2000), and European countries, while a variable was held constant: that they were all art museums that house permanent collections (which are either arranged permanently or reconfigured on a regular basis), and their spatial design was conceived with specific collections in mind. [**Figure 1.9**] In addition, it was thought important to focus on museums that explore different possibilities of laying out space and objects: museums that provide variety in terms of spatial layout -selected museums vary from grid to sequence systems; variability of spatial arrangements of objects -besides the traditional chronological grouping of works, the sample includes museums that propose a different point of view, thematic displays or visual arrangement of objects, as well as museums in which the exhibition layout constitutes the development of a theoretical argument; and, more importantly, museums that use different strategies in terms of the relationship between architecture and art -from big national museums where each element, space and display, retains its autonomy, to museums where the arrangement of objects becomes an integral part of the design of space.



^ **FIGURE 1.9** Views of the museums of the sample: (a) Castelvecchio, (b) Sainsbury Wing, (c) Pompidou, (d) Tate Modern, (e) Louisiana and (f) Kröller -Müller

Limiting the sample and range of buildings investigated in the thesis was dictated by the intensive nature of the investigations and the protracted period of field work required, discussed in detail in chapter 4. Out of the observational studies -which entailed systematic representations of visitors' movement and space use patterns-, it was possible to confirm the variability of visitor patterns in museums and develop a model of its main dimensions. However, it should be pointed out that, this part of the study did not constitute an aim in its own right, but was seen as a method with some claim to objectivity -in the sense that the observable patterns are repeated by different people- for researching into the spatial functioning of museum buildings. Besides, the small number of illuminating cases precludes general conclusion with statistical validity.

The data collection and analysis was then followed by analytical work which included methods of spatial analysis based on the theory of space syntax (analytical representations of spatial relationships, systematic numerical analysis of spatial properties). On this more objective foundation, the thesis built an interpretative and critical argument, using more conventional observations for describing experience, including the appreciation of art.

It becomes clear that the intention of the case-study approach was to specially select museums which, through intensive multi-dimensional study of layout, object display and visitor behaviour, would begin to expose the dimensions that needed to be investigated. The selected museums were analysed in pairs which, as it will be shown progressively, led to the surprising nature of some of the contrasts identified by the analysis. The logic behind this approach was that each pair allows the in-depth exploration of a syntactic theme in a contrasting way; so by engaging different questions or dealing with similar spatial themes in opposing ways, each paired comparison contributes to developing the next stage of the argument, while adding up to the overall spatial hypothesis, that spatial structure is a powerful variable in museum experience.

The first paired analysis of the Sainsbury Wing, the extension to the National Gallery, London and the Castelvecchio Museum, Verona (Italy), introduced the critical issue of the thesis, the problem of the interaction between spatial design and display layout. The two museums illustrate the two opposing strategies of

relating space and objects: at the Sainsbury Wing, the spatial potential is used to support the impact of objects, while at Castelvecchio, the arrangement of objects is used to elaborate space.

The pair of the Tate Modern, London, and the Museum of Modern Art at the Pompidou Centre, Paris, allowed a comparison in search of the effects of strategic differences. These two museums share in common similar spatial themes -like the idea of the main axis or the organization of spaces into manageable sequences- as well as the use of space to reflect pre-given ideas, in their intention to tell the story of twentieth-century art. The different interpretations that the two cases offer with respect to the above, result in an enhanced pattern of encounter at Pompidou and an emphasis on the intellectual exploration at Tate Modern.

The third contrasting pair, the Kröller-Müller Museum, Otterlo (The Netherlands) and the Louisiana Museum of Modern Art, Humlebaek (Denmark), allowed looking at the issues previously raised in a comprehensive way. The conspicuous similarities between the two museums –both founded by collectors, and set in an attractive natural setting, layering art and nature- set the background for exploring surprising differences, the most fundamental being the two radically different types of information that space communicates, symbolic, in the Kröller-Müller Museum, and aesthetic, in the Louisiana Museum.

Such comparisons across a diverse sample of museum buildings enabled us to extract the abstract from the concrete. In some sense, our stance approaches a scientific method.[5] We first identify the critical differences between museums with respect to the layout of space and objects, and show that there are some consistent underlying relations between these differences and the patterns of visitors' experience and space use. Then we ask how do these 'regularities' arise, in other words, we try to develop a theoretical understanding of the principles that account for these differences. These principles, it will be proposed, act like constraints that govern the field of possibility in designing museums and exhibitions, in other words, form a system of limits within which architects and designers develop morphological strategies, and invent new ways of designing. Fully set out in the final chapter, this argument, it is suggested, can account for the heterogeneity of museum design and explain why museum buildings are

functionally interchangeable. Looking back at the opening statement of the chapter, it can also provide an answer to Eisenman's argument: it is not the functional programme of the building that constrains architectural form; yet, museum design is developed against some background of lawfulness, but this lies in the relation between the spatial form of the building and its function. The aspiration of this thesis is precisely this, through the clarification of this lawfulness to arrive at a better understanding of the morphology and function of museums.

Outline of the thesis

Having briefly discussed the broad theoretical themes of the thesis, we will outline its structure to help follow the flow of the argument and briefly present the main findings of the empirical and analytical parts of the research.

Chapter 2 reviews and discusses the theoretical literature on the spatial layout of museums and the display of art collections. It sets out from the literature on the twentieth-century museum architecture with the aim to clarify to what extent architectural studies deal systematically with spatial aspects of museum architecture, and on what comparative basis, they have made analogies between different spatial layouts. Reviewing the work of those authors who propose typological distinctions based on spatial criteria, the chapter identifies an absence of clear distinctions and systematic comparisons between different museum designs, and a lack of precise understanding of their functional differences. It is significant, however, that the dominant literature (Brawne 1965, 1982; Markus 1987, 1993; Huber 1997) acknowledges the importance of the configuration of circulation and its critical effects on three functional aspects: the spatial movement of visitors, the viewing of objects and the expression and creation of potentially social relationships. The art historical writings (Duncan and Wallach 1978; Mainardi 1987; Staniszewski 1998; Barker 1999) come to complete the argument, by emphasizing the strategic role of the critical spatial dimension in the presentation of art collections. Interestingly, art historians (Duncan and Wallach

1980; Duncan 1995; Noordegraaf 2004) establish the notion of *script*, the idea that the organization of space, in conjunction with the museum architecture and the spatial arrangement of objects, can express and reflect a particular view of art –a key idea that informs our study. For this reason, the display layout of museums like the MoMA, the Boijmans van Beuningen, and the Orsay Museum, are discussed in chapter 2 as cases in point. However, this body of literature does not deal precisely with the object layout nor does it propose any kind of methodology for its analysis. The discussion then moves to the exhibition designs of the '*International avant-gardes*' of the first half of the twentieth century and the '*Italian School*' of the fifties, which illustrate the idea that the spatial arrangement of objects can be used not only to reproduce pre-existing ideas, but also to generate something new. The last section of the chapter brings the narrative to the present, by discussing the recent developments in the museum display reality, as the background against which the curatorial strategies adopted by the museums under consideration are better understood and their spatial implications, evaluated.

Chapter 3 directs attention towards the theory and method of Space Syntax. It discusses the basic analytical concepts and techniques of space syntax that allow us to describe layouts as configurational systems, to formulate clear distinctions between one layout and another, and capture their key structural properties. By looking at space in the syntactic way, we can begin to see how it is shaped by social and cultural ideas but also how it shapes patterns of use. To illustrate the latter, the chapter focus on a specific study, the analysis of the Tate Gallery, one of the most studied buildings by Space Syntax Laboratory. In addition to the account of the original study (1996), which has become the standard method of research into museum layouts in a syntactic way, the second part of this chapter discusses extensively the results of the follow up study (2002), carried out by the researcher. The aim of the study was to evaluate the likely functional effects of layout changes on patterns of visiting. But, as it will be shown, it did more than this. It set the stage for the thesis, providing the necessary research experience, and the theoretical starting point: how a simple, but structured layout creates an exploratory pattern of visiting with a sense of dense encounter. Therefore, though

the Tate Britain is not included in the main case studies, since the research methodology has considerably changed since, it will be systematically used in the comparisons and the theoretical conclusions. In the last three sections of the chapter, the syntactic literature on museums is reviewed, with the aim to show how the accumulated studies informed our research by providing us with an understanding of the morphology of museums and its implications on patterns of visiting. More precisely, syntactic research established the critical role of spatial layouts in creating and transforming patterns of movement and exploration and in generating opportunities for encounter between visitors. The review ends with the most recent studies, which make apparent an increasing emphasis on the microstructure of museum space, rather than the overall spatial layout. They ask questions about how the spatial arrangement of exhibits affects our cognitive experience or relates to the symbolic function of museum, interestingly intersecting our research aims.

Chapter 4 introduces the theoretical and methodological approach of the study. It begins by presenting, in the first section, the two key ideas on which the theoretical framework of the thesis is founded, and discusses their possible applicability to museum analysis. The first idea is the dialectic between *order-randomness,* recurrent in the syntactic literature. The second point of departure is the fundamental concept of *information* as established by the '*Mathematical theory of communication'* (Shannon 1948) that addressed the way a message can be transmitted, independent of what the meaning of the message is. These concepts allow the distinction between the *long model role of space* -in cases where everything is more or less specified and space is used in a *conservative* mode to reproduce something already known- and the *short model role of space* -where space, less governed by rules, is used in a *generative* mode allowing new things to happen. The second and the third sections of the chapter shift the attention to the proposed methodological framework, by bringing the discussion to the empirical part of the research -as, for example, the reasoning behind the data collection strategies, and the proposed space use variables- and then, to the analytical part -that is, the syntax measures used in this study. The chapter

concludes by briefly explaining the master data tables which are numerical summaries of the intensive studies of the selected museums and will be used as the informative background to the following case study presentations and the final comparative review.

Chapters 5–7 constitute the analytical part of the thesis. Each paired comparison between the case studies begins with a brief account of the evolution of the museums and then explores progressively three kinds of morphologies: of space, display and visitors' movement and exploration. This multi-dimensional background is then used to understand how the interaction between spatial design and display layout affects the character and the quality of experience.

Chapter 5 reports the comparative analysis of the Sainsbury Wing and the Castelvecchio Museum. Though a prima facie strange pairing, the two museums were selected to optimize theoretical relevance. They accommodate collections that, though they vary considerably in scale and importance, overlap chronologically. Moreover, they constitute cases where building design and exhibition set up were developed in parallel. But what was felt to be of critical importance for the theoretical aims of this thesis is that they differ emphatically with respect to the way they relate building design and exhibition set up, and more significantly, that they illustrate two almost opposite layouts - a grid and a sequence.

More precisely, setting out from the programmatic intentions of both architects and curators and then looking carefully at how the building is currently working, the study of the Sainsbury Wing argues that the power of space seems to override designers' intentions when it comes to the morphology of visitors' movement and exploration. This is further reinforced by the fact that the syntactic properties of the layout account for the observed patterns of space use. Moving to the display layout, the analysis suggests that the Sainsbury Wing exemplifies the case where the exhibition design uses and exploits the qualities of the setting in order to maximize the impact of objects, and emphasize the value of the whole collection, while enhancing a sense of the public aspect of the visit. At the opposite extreme lies the Castelvecchio Museum. The visitor travels along a single path with no

option of changing the course, but the way in which objects are organized locally powerfully counteracts the strong sequencing and more surprisingly, structures an exploratory nature of the path within the rooms. Placing the emphasis on what happens along the route seems to have an effect on the visitor culture, by slowing it down, and encouraging encounters between local groups of visitors, engaged in the exploration of objects. Moreover, the fact that objects are manipulated to enhance and articulate space, renders the visit first and foremost an architectural experience, a spatial event. The main conclusion that emerges from the analysis is that building design and exhibition set up can work together to create a richer spatial experience, and conversely, that their relation can create unanticipated problems that detract from the quality of experience.

Chapter 6 studies comparatively Tate Modern, and the National Museum of Modern Art, at the Pompidou Centre, but recurrent cross references to Tate Britain -as it is the spatial model of Tate Modern, and has an apparently similar spatial structure to Pompidou- are illuminating and contribute to the development of the argument. Unlike the previous pairing which were spatially opposites, Tate Modern and Pompidou seem at first quite similar: both constitute big scale national museums of modern art, that are developed vertically (on two floors each) in buildings-landmarks in the urban context, with distinctive entrance spaces that act like a kind of 'piazza' extending to the street; their layouts are neutralized to accommodate the annual re-arrangement of their collections; and the list of similarities would be longer if we were to include curatorial strategies. But it is precisely the fact that they resolve similar spatial issues in contrasting ways that makes them even more different from each other.

Looking at the two museums comparatively, it is argued that at Pompidou the dense network of spatial and visual relationships generated by the way spaces are organized, enhances co-presence of viewers and of objects. However there is a certain degree of compulsion: the main axis acts as a social gatherer but the pattern of co-presence seems enforced rather than dynamically generated since it is an 'unavoidable' reference point; similarly, the display layout allows shorts cuts and encourages cross-links and comparisons, but these are made between works

which are organized chronologically, in a rather canonical way. By contrast, at the Tate Modern opportunities for exploration are reduced. The layout forms two rings of spaces with few local choices that guide visitors' movement. Moreover, the object display is characterized by a high degree of conceptual intervention by the curator and the links between works, thematically organized, are already set up. Interestingly, these strategic differences between the two museums are crystallized, at Pompidou, in the variety of movement and space use patterns which are powerfully modulated by the properties of the layout, and at Tate Modern, in the equalized movement patterns and the uniformity of the visiting pattern on the whole. It seems that deciding on a particular way of telling the history of the twenty-century art has critical implications which extend beyond the informational character of the experience.

Chapter 7 focuses on two small scale museums, the Kröller-Müller Museum and the Louisiana Museum of Modern Art, which illustrate how the close interaction between the design of the building and the organization of the display can reflect the particular ideology of the founder, and express his/her specific view of art and concept of the museum. Interestingly, their analysis constitutes in effect a synthesis of oppositions, in complete contrast to the previous two -Pompidou and Tate Modern.

At the Kröller-Müller, the hermetic building, the rigidly structured spatial layout, coupled with the order and homogeneity of the display are used to express a didactic view of how exhibits should be experienced and embody a particular conceptual structure. The pedagogic intention -explicitly formulated by the founder and clearly reflected in the high viewing rates- comes to the fore, with the spatial and social experiences in the background. The opposite aspects are identified at Louisiana. The extrovert complex of interconnected pavilions set in an asymmetric arrangement at the perimeter of a park opens up the exploration dimension by allowing significant circulation choices, and more importantly, generates a dense pattern of encounters and enhances the inter-visitor social experience. The experience seems highly exploratory, not only in spatial but also in intellectual terms, as illustrated by the object display, which places the

emphasis on visual groupings and poetic juxtapositions. The idea of the museum as place of pleasure is reflected in the high repeat visiting, implying that the visit becomes integral part of people's everyday life, as envisaged by the founder. The chapter concludes by suggesting that in the first case, a *building* is designed to convey *symbolic* information, whereas in the second, a *place* is created to articulate an *aesthetic* experience.

Chapter 8 After a brief characterization of each case study, with special attention to observed visitor behaviour, the final chapter proposes to describe the principles that account for the similarities between museums despite the heterogeneity of their spatial design and the differentiated scale and nature of their collections. These are described in terms of the key contrasting issues involved in the design of museums -the contrast between *gathering space and viewing sequence*, the contrast between *informational and social dimension*, and the contrast between *spatial design and object display*. On this ground, the final chapter proposes to see museum space as a set of formal potentials within the framework of limits and possibilities created by a number of basic concepts.

Pursuing the analysis a step further, a common theoretical framework for space and objects that also relates the different dimensions to our experience of museums is proposed. On this basis, a distinction is drawn between museums that intend to convey a pre-given meaning and reproduce information, and museums that aim at creating fields of possible meaning and producing a richer spatial structure. The chapter concludes by identifying further research directions, both in methodological and theoretical terms.

Notes

[1] See Eisenman 1998, p. 39.

[2] Johnson 1931 cited Johnson 1979, p. 49.

[3] Accordingly, it was shown that the reduction in the predictability of the pattern of movement from the layout is strongly associated with the loss of '*intelligibility*'. See Hillier et al. 1987c.

[4] To use Langer's term (1951) for what we can communicate by means of words, as opposed to what can be conceived through a kind of semantic other than language, characterized as '*non-discursive*' or '*presentational*' form. For a further discussion on the absence of a language of space see Hillier 1996.

[5] For the question of architecture as both an analytic science and as a creative art, see Hillier 1996, Chapter 2.

Chapter Two
Literature review

Introduction

This chapter reviews the literature on the spatial layout of museums and the display strategies of art collections. Its purpose is to clarify the extent to which previous work has contributed to an understanding of the problem of organization of space and the way in which it relates to the display layout.[1] Though the focus is on the exhibition space, the review does not include studies on museums that deal with the exhibition effectiveness; nor does it make an attempt to deal directly with what visitors learn. These intentions would require a different perspective which is beyond the scope of this thesis.

The first part of the chapter (sections 1-2) is devoted to the architectural literature, and moves from the general discussion of museum buildings to a close examination of issues of space organization. Precisely, it begins with the review of typological approaches and comparative studies on museums, as a means to determine on what basis architectural authors have described and compared museum buildings and layouts. Then it brings into sharper focus the problem of the configuration of circulation, discussed from the point of view of its three functional implications, as they emerge from the literature. The first implication concerns the way it affects visitors' movement and exploration; the discussion is structured around the variety of circulation patterns and the importance of intelligibility in the layout. The second implication refers to the way the arrangement of space in sequences determines the viewing order of exhibits; and the third concerns the way the spatial structure embodies and sustains social relationships.

The second part (sections 3-5) shifts the attention to the art historical literature. Taking up the relation between organization of space and arrangement of the collection suggested earlier by the architectural studies, it addresses how space can be used to support the narrative and reflect particular theories of art history, as illustrated by key studies. This in turn raises the question whether space can be used creatively, independently of pre-given ideas, a question discussed with

respect to the innovative exhibition designs of the international avant-gardes of the first half of the twentieth century and the '*critical display*' advanced by the '*Italian School*' of the fifties. The final section brings the narrative to the present, asking to what extent the recent developments in display strategies have critical spatial implications.

2.1 How are museum buildings interpreted and compared?

How can we deal with spatial aspects of museum architecture? Can museums buildings be objectively compared? How can we describe the fundamental differences between one museum design and another? It would seem that it is all too easy to talk about these issues, given the rich literature on museum architecture that follows the ever-increasing realization of museum buildings. Yet there are rarely attempts at a rigorous account of museum space or a clear understanding of the relationship between museum layout and its functioning. Most authors, like Brawne (1965), Levin (1974), Searing (1986, 2004), Mack (1999), Magnago Lampugnani (2001, 2006), von Moos (2001), Montaner (2003), Hourston (2004), von Naredi-Rainer (2004), intrigued by the surprising heterogeneity and the increasing innovation that characterize museum reality, since the disruption of the idea of museum building typology in the mid-twentieth century, tended to mainly emphasize the formal dimensions of museum architecture; and seeking to put a kind of order in this heterogeneity, they suggested a range of typological distinctions, which can be as diverse as the geographical categorizations established by Brawne, and the conceptual thematic groupings, advanced by Levin. Precisely, Brawne (1965, p.74) suggests that the Scandinavian museum design places the emphasis on the relation with the setting ('*it has tried to emphasise the museum as a natural part of the civilized life, a place of enjoyment to be visited regularly of a number of activities')* as opposed to the Italian museums that are particularly interested in the display techniques. A different concern characterizes the museum buildings in France, Germany, Austria and Switzerland, the intention '*to achieve a rather anonymous, neutral space which would be highly flexible in use*' (Brawne 1965, p. 94). On the other hand,

Levin (1974, p.27), in his PhD thesis, distinguishes two museum types based on the following concepts: *the museum as a temple,* which includes not only museum buildings designed as neoclassical temples or renaissance palaces, '*but any museum form which is the product of a designer's desire to enshrine art'* (i.e. the Guggenheim Museum, New York), and the concept of '*the museum as a showroom'* expressed by the commercial type of building (i.e. MoMA). [2]

In search for some clues about the spatial description of museum buildings, we will look more closely at those distinctions which are mainly based on architectural and spatial qualities, and focus on the most recent literature. This decision is not intended to disclaim the importance of influential studies, like Pevsner's historical survey (1976).[3] But, for the purposes of our argument, it seems that it the most recent work that will permit a total picture of how twentieth century-museum buildings are interpreted, and bring to light the current tendencies in museum design.

Architectural principles

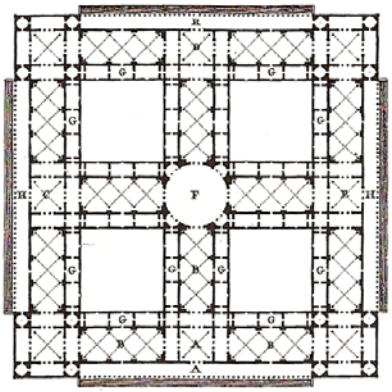
Among the authors that adopted architectural criteria to compare museum buildings, Searing (1986, 2004), von Moos (2001), Montaner (2003), and von Naredi-Rainer (2004) proposed two categories of museums based on the spatial layout, *the museum with traditional enfilades,* and *the 'open' museum;* and to these, they added two categories defined by broad architectural criteria, '*the museum as converted monument*' and the '*museum as a sculptural architecture'*. According to the authors, the paradigmatic example of the first type was the design proposal for a museum by J.N.L. Durand (1802-1805), [**Figure 2.1**] which also established the main characteristics of the museum spatial structure in general: the central rotunda or courtyard, and the surrounding enfilade of galleries. L. von Klenze's Glyptotek in Munich (1815-30) [**Figure 2.2**] and Schinkel's Altes Museum in Berlin (1823-1830) were viewed as derivations of this archetype. [**Figure 2.3**] As for more recent examples, Searing (1986, p.18) argued that three key museum buildings of the twentieth century were reminiscences of the '*Durandesque tradition*'*:* the Guggenheim Museum, New

York (1943-1959), with '*the great central top-lit space*' and '*the profile of the spaces where one circulates and simultaneously views works of art*'; [**Figure 2.4**] the Neue Staatgalerie in Stuttgart (1977-1984), with the rotunda with the missing dome, which is surrounded by an enfilade of galleries on three sides; [**Figure 2.5**] and the High Museum of Art in Atlanta (1980-1983), with the central atrium that, '*Meier has trimmed (it) down to a quadrant –modern incompleteness versus preindustrial wholeness*' (Searing 1986, p.22), and the exhibition spaces surrounding it, differentiating thus the two functions, moving and viewing. [**Figure 2.6**]

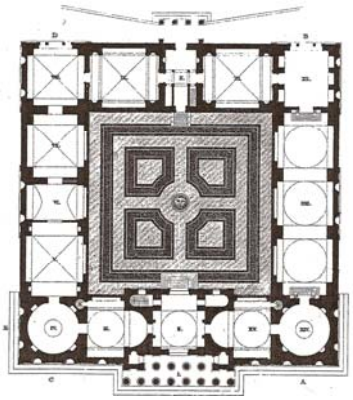
The second museum type, the *open museum*, it was argued, derived form the great expositions buildings of the mid-nineteenth century (as, for example, the Crystal Palace, London), which established the transparent form that enclosed open space. The shift was first made apparent at MoMA; as Searing pointed out, '*the container, once a temple or palace, had become a simple box*' (Searing 2004, p.20). But the most illustrative examples of this type are the New National Gallery in Berlin (Mies van der Rohe, 1962-1968, see below) and the Centre Pompidou (Piano and Rogers, 1972-1977), one of the case studies of this thesis (see chapter 6); both exemplify the concept of the ' "*universal space*" *-an interior free from bearing walls, making possible the ideal of infinite flexibility*' (Searing 2004, p.20). For von Moos (2001, p.21), this type of building expressed the ideology of the modern museum:

'As a space 'without characteristics', the 'open' museum of the sixties, is in many ways the archetypal modern museum, hailed as 'democratic' and user-friendly by its proponents', he wrote.

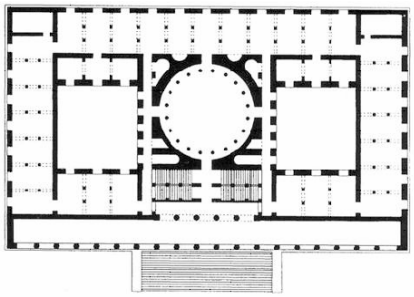
Similarly to the first, the third type, the *museum as a converted monument,* was also seen as being rooted in the classical tradition of the royal and ducal palaces. According to von Moos (2001, p.20) it is exemplified by the Vatican, the Louvre, and the Uffizi. Based on this proposition, the author went on to argue that '*the conversion has been the rule rather than the exception in museum development*'.



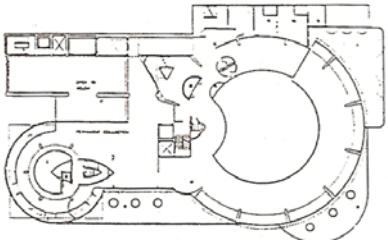
^ **FIGURE 2.1**
The project for a museum
(J-N-L.Durand, 1802-1805)
[*Basso Peressut* 1999, p.15]



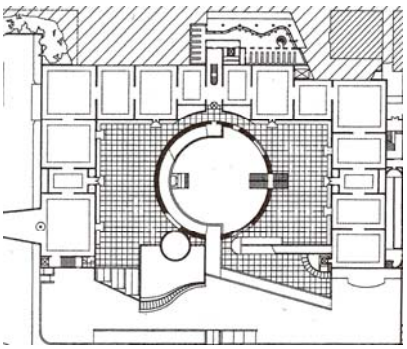
^ **FIGURE 2.2**
Glyptotek, Munich
(L. von Klenze,1815-30)
[*Basso Peressut* 1999, p.16]



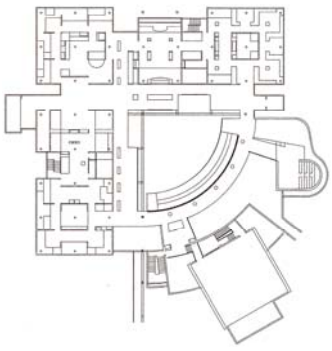
^ **FIGURE 2.3**
Altes Museum, Berlin
(K.F. Schinkel, 1823-1830)
[*Magnago Lampugnani* 2001, p.19]



^ **FIGURE 2.4**
Guggenheim Museum, New York
(F. L. Wright, 1943-1959)
[*Wright* 1987, p.253]



^ **FIGURE 2.5**
Neue Staatsgalerie, Stuttgart
(J. Stirling , 1977-1984)
[*Basso Peressut* 1999, p.39]



^ **FIGURE 2.6**
High Museum of Art, Atlanta
(R.Meier, 1980-1983)
[*Peponis* 1997b, p.174]

Searing (2004, p.23), on the contrary, did not identify any historical precedent for this museum type, and considered the use of existing buildings a new phenomenon that appeared in the 1970s. The fact that it became one of the most common practices (examples include the Orsay Museum in Paris, [**Figure 1.4**] the Hamburg railway terminal building in Berlin and the Tate Modern in London, analyzed in chapter 6) was interpreted by the author

'*as a means to avoid the tendency of the purpose-built structure to upstage its contents, and to refocus attention on the primary goal of the gallery –the showing of art'*.

Authors (von Moos 2001; von Naredi-Rainer 2004) concur with the idea that the fourth alternative type, the '*museum as a sculptural architecture'*, includes recent museums the design of which is inspired by organic shapes, and is best exemplified by the Guggenheim Museum in Bilbao. [**Figure 1.1**] Yet, it is intriguing that they had diametrically different views on the character of the interior space that defined this museum type. Von Moos (2001, p.21) suggested that this kind of architecture brought with it an innovative approach to the spatial layout.

It '*implies'*, he said, *' a redefinition of the sequence of museum spaces in the sense of a series of organic or expressive spatial forms that can no longer be defined in terms of traditional concepts'*.

The contrary is the case, for von Naredi-Rainer (2004, p.201):

'*even the Guggenheim Museum in Bilbao, which is considered to be the epitome of that 'plastic architecture' that breaks with all architectural conventions also has a sequence of rooms linked in enfilade on a square or rectangular ground plan'*.

This divergence in views brings us to our next argument. Looking at museums from a formal point of view can be useful in identifying historical references and formal analogies between innovative museum projects and nineteenth-century predecessors. But it leads to changes of perspective, overlappings and blurred

distinctions, when museums meet different criteria or defy precise categorization.[4] Moreover, such an approach is marked by a scarcity of objective and well-defined criteria and by the formulation, on the contrary, of subjective assessments. To illustrate this argument we suggest returning to the proposed comparison between two museums of the first type, Schinkel's Altes Museum and J. Stirling's Staatgalerie, on the grounds of the common central rotunda. A number of authors, such as Colquhoun (1984, pp.18-31), Vidler (1989, pp. 41-59) and Sheehan (2000, p.188-189), repeatedly pointed to key differences between the two museums, among others the fact that whereas Schinkel designed a central space that connects to the galleries, Stirling created a closed space, accessible from the surrounding streets but not from the galleries.

'*In the Altes Museum…the rotunda acts as the main orientating space…In the Staatsgalerie. ..it is impossible to penetrate into the rotunda on the central axis of the building…The rotunda….becomes an event along a promenade architecturale –part of a temporal and picturesque sequence, which one 'discovers' as one might the central core of a labyrinth. The geometrical centre of the building has become a kind of negation -an absence rather than a presence.'* (Colquhoun 1984, p.20)

It follows that formal comparative criteria do not provide a clarification of museums' fundamental functional differences. On the contrary, it seems to us that what matters is not so much that the two museums share in common a spatial element of a particular form, but that they are defined by the common idea of a recurrent space in the spatial sequence which is essential for their functioning.

Thematic groupings

So the question raised next was: are there any different approaches to museum typology that look for abstract common ideas rather than specific architectural qualities? We suggest turning to two architectural authors, Basso Peressut (1993, 1999) and Newhouse (1998), who adopted a strategy that differs from the formal typology discussed earlier and is particularly relevant to our concerns. First they identified the main tendencies in contemporary museum reality and then looked at

how these were realized in museum architecture and space, through specific examples of museums.

To Basso Peressut**,** the field of contemporary museums is mainly characterized by three tendencies: the change of the concept of the museum as institution, the consolidation of the museum as a social space, and the ephemeral character of museum displays. He argued that the first phenomenon is exemplified by the Centre Pompidou: beyond its role of conservation and display, it functions as '*a dynamic communication machine*' (in the terms of the architect, R. Piano), as clearly reflected in its architecture. This phenomenon can also be accounted, according to the author, for the contemporary tendency for:

'*a museum architecture which tends to be less a repetition –or a variation- of a recognizable type and, on the contrary, is proposed as a 'unicum', an original and unrepeatable sign and gesture, innovative and differentiated, an urban and territorial landmark'* (Peressut 1999, p.41).

The second tendency, the emphasis on the concept of the museum as a '*social loisir',* is reflected in the integration of public spaces in museum buildings. For example, the central transparent spaces on the ground floor of the Centre Pompidou and of the Carré d' Art, Nîmes (N.Foster, 1984-1992) seem to continue to the piazza outside, indicating the opening up of the museum to the urban space. People moving outside, in the piazza, and visitors exploring the interior of the museum appear like performers on the same stage.

The third phenomenon, the tendency of contemporary museums to regularly re-arrange their collections leads, according to Basso Peressut, to the need for open space and flexibility. It is precisely this need that explains the proliferation of re-used industrial buildings or newly built museums designed to resemble renovated industrial architecture, as for example, the new addition to the Museum of Fine Arts in Winterthur, Switzerland.

Some of the arguments put forward by Basso Peressut, are also found in Newhouse's key study '*Towards a new architecture'* (1998). The author proposed thematic groupings of museums while taking also into account their architectural qualities. For example, setting out from Searing's argument that the Centre Pompidou derived from the architecture of the London's Crystal Palace, she

proposed an additional similarity: the two buildings illustrated the pleasure principle, the concept of the museum visit as a leisure activity[5] -an observation which recalls Basso Peressut's idea of the museum as a social *loisir*.

But what essentially differentiates her approach from that of Basso Peressut is her intention to deal in conjunction with container and content. The nature of the collections and the curatorial intent were given equal importance to the architectural features. She proposed the group of '*museums as environmental art'*, to include museums such as the Guggenheim Museum, Bilbao, the F.R.Weisman Art Museum, Minneapolis, both designed by F.Gehry, and the Jewish Museum Extension, Berlin, by D.Libeskind, based on the argument that in addition to the exploration of a new formal language (a similarity repeatedly found in the literature), these museums could be seen as manifestations of the integration of art and architecture. [6]

'*The new museum is intended to show work by artists who are responding to the spaces or existing art that can interact with the spaces in a dialogue that goes beyond the contextualism of classic or postmodern architecture.'* (Newhouse 1998, p.223)

More interestingly, Newhouse (1998, p.260) emphasized a new dimension in the museum experience introduced by this kind of integration:

'(it) attempts to make art once again a vibrant part of life and a powerful aesthetic experience rather than a didactic tool or remote object of veneration'.

What is of particular interest in this approach adopted by Basso Peressut and Newhouse is the intention to look deeper into the museum morphology for ideas and themes, an intention that, as we have seen, allows for more flexibility in making comparisons between seemingly different museums, and more importantly, brings out intriguing similarities which relate to their functional and experiential aspects. Rather than comparing the Guggenheim Museum, New York with the Altes Museum, Berlin, Basso Peressut made an analogy between the Guggenheim and the New National Gallery, Berlin (see above). He identified an interesting similarity within a system of critical differences that characterize the

two museums: the collective character of the intended experience and the theatricality of the setting. In that sense it is argued that this approach can be paralleled to the intention of this thesis to develop a theory that looks for common spatial ideas, or *generic themes*, that seem to underlie the variety of morphological strategies in museums.

The art historical point of view

To complete the discussion of museum typology, we suggest digressing for a moment to turn to a body of the art historical literature, which, interestingly, proposed distinctions[7] of museum buildings on the grounds of spatial criteria. Art historians like Krauss (1996, p.341-348), Greenberg (1996, p.362-363), and Grunenberg (1999, p.43-46), established the idea that there is an interesting opposition between *modern* and *postmodern* museum, arguing that they differed in terms of: the relationship between interior and exterior, the spatial homogeneity (or heterogeneity), and the visual organization of gallery spaces. If the main characteristics of the *modern* museum were the neutral character -suggested both by the exterior and interior-, and the invisibility -expressed by the windowless galleries and the restricted visual fields from one space to the other-, the opposing features marked the *post modern* museum; that is, the split between interior (usually classical and elegant) and exterior (usually irregular and industrial), the visual interrelationships between galleries, and the variety of spaces in terms of size and shape.
Specifically addressing the viewing experience in the *post-modern*, Krauss (1996, p.347) noted that:

'*the reigning idea.. is the vista: the sudden opening in the wall of a given gallery to allow a glimpse of a far-away object, and thereby to interject within the collection of these objects a reference to the order of another. The pierced partition, the open balcony, the interior window –circulation in these museums is as much visual as physical, and that visual movement is a constant decentring through the continual pull of something else, another exhibit, another relationship, another formal order, inserted within this one in a gesture which is simultaneously one of interest and of distraction: the serendipitous discovery of the museum as a flea market.*'

On this basis, she proposed the characterization of the *post modern* museum as '*museum without walls'*, and argued that it was best exemplified by H. Hollein's projects, the Municipal Museum Abteiberg, Mönchengladbach (1982), and the Museum of Modern Art, Frankfurt (1991). [**Figure 2.7a-b**] Significantly, this argument begins to suggest the critical implications of the spatial design on the viewing of art, extensively addressed by the art historical literature (see below).

Looking back at the attempts of categorizations and comparisons between museums proposed by the literature, it is clear that museums seem to escape easy classification through their heterogeneity. Dealing with spatial aspects of museum architecture in a generalized and inconsistent way, architectural typologies fail to formulate clear distinctions between one type of museum and another and address their functional differences. But also seeking to build groupings upon pre-given ideas -whether formal themes, spatial or other considerations- seems rather constraining in comparison to interrogating the museum space itself, and unable to provide a clarification of the common ground in very different kinds of architectural experimentation.

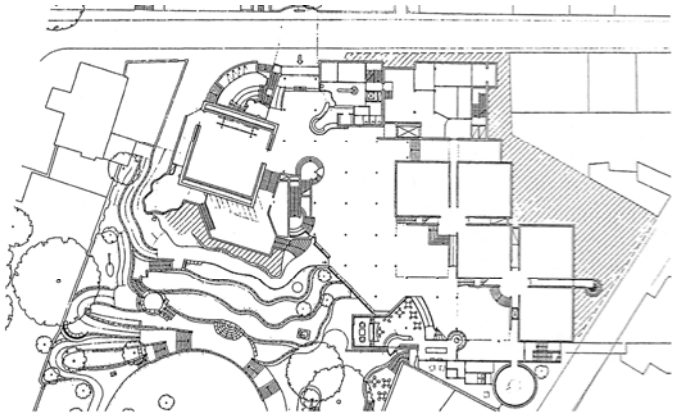
2.2 The configuration of circulation

Since the preceding review made clear that the dominant literature is biased towards an emphasis on museum buildings as formal themes, it is not surprising to find that it pays little attention to issues of spatial organization and its functional implications. This argument is clearly formulated by Brawne (1982, p.9):

'*The word "museum" will often evoke a particular character of buildings, rarely however, a particular space organization.'*

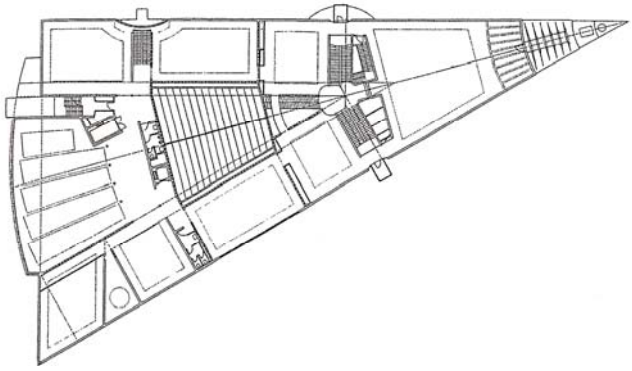
There is however one issue of spatial organization that is given special attention in the literature, and this is the problem of configuration of circulation**.** Circulation as a notion intrinsic to museum design has been widely acknowledged. Authors, like Brawne (1965, p.13) and Huber (1997, p.33), argued that the expression of the route can define the whole museum design, proposing the square spiral ramp

a



^ **FIGURE 2.7a** Museum Abteiberg, Mönchengladbach, Germany
(H. Hollein, 1982)
[*von Naredi-Rainer* 2004, p.139]

b



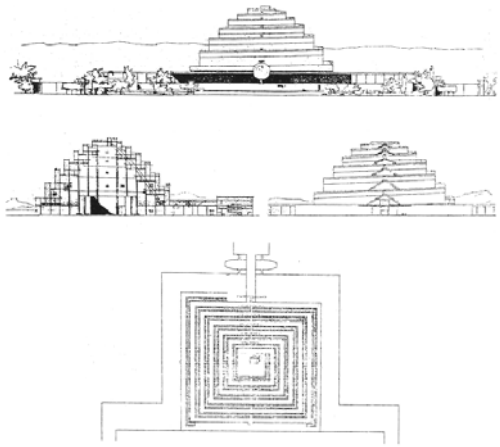
^ **FIGURE 2.7b** Museum für Moderne Kunst, Frankfurt, Germany
(H. Hollein, 1991)
[*von Naredi-Rainer* 2004, p.137]

in the project of the Musee Mondial by Le Corbusier [**Figure 2.8**] and the spiralling ramp of the Guggenheim Museum, New York [**Figure 2.9** and **2.4**] as cases in point. A more recent, but equally illustrative example is provided by the Kunsthal in Rotterdam, designed by R. Koolhaas. [**Figure 2.10**] A spiral ramp which starts from the street level traverses the whole building leading to the roof, and becomes the dominant architectural theme. Koolhaas (2002, p.7) affirmed: '*the concept of the building is a continuous circuit'*. The idea that the organization of circulation in a museum is first and foremost a concept seems to permeate the writings of Italian authors, like Binni and Pinna (1980, p.113-115) and Huber (1997, p.29-38). To support her argument, the latter pointed out (1997, p.33) that the etymology of the word 'itinerary' derives from the Latin adjective '*itinerarius'*, which means 'of a journey', suggesting that the idea underlying the construction of a route is that *'of discovery, of story'*. [8]

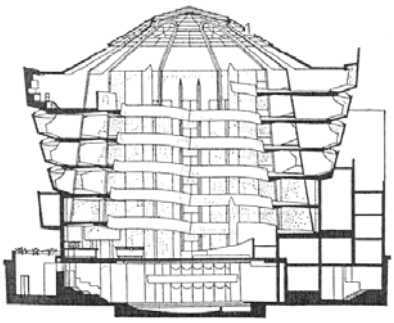
But besides such general observations, are there some specific issues associated with the problem of circulation in museums, explicitly addressed in the literature? What aspects of the visiting experience are seen to be affected by the organization of circulation? With respect to this, it is around three basic questions that the literature is centred and the following review, organized: how the arrangement of space into sequences, relates first to the way people move around and explore the galleries, second, to the viewing of objects and third, to the way the museum works as a social space.

Spatial movement of visitors

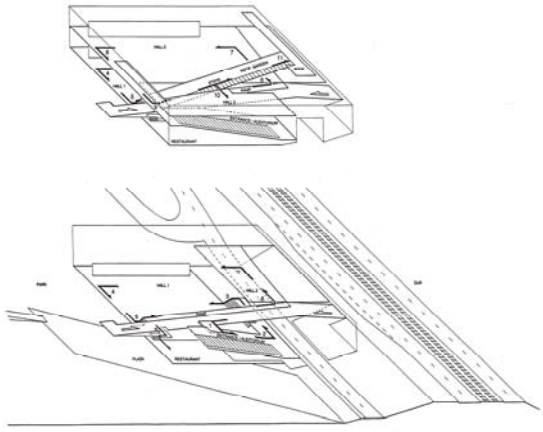
To answer the first question, the relation of the arrangement of space into sequences to the accommodation of visitors' spatial movement, we need to begin by looking at how the spatial arrangement is described in the literature. There seem to be four patterns of circulation that recur with some consistency: the *single sequence* of spaces, *variations in the single sequence* which allow a measure of choice, the *matrix circulation pattern* and the *free plan circulation*.



^ **FIGURE 2.8** The Musee Mondial project
(Le Corbusier, 1929) [*Basso Peressut* 1999, p.23]



^ **FIGURE 2.9** The Guggenheim Museum, New York
(F.L.Wright, 1959) [*Brawne* 1982, p.13]



^ **FIGURE 2.10** Kunsthal, Rotterdam
(R. Koolhaas, 1992) [*Koolhaas* 2002, p.6]

The emergence of the *single sequence* was associated with the need of creating a viewing order of objects. It is no accident, argued Brawne and Huber, that if we look at the plans of the earliest spaces designed specifically for display (as, for example, the long gallery at Sabbioneta, Mantua), and the first buildings converted to museums (like the top floor galleries of the Uffizi), long and narrow rooms arranged in enfilade were seen as the ideal spaces for seeing objects in sequence. Brawne explained (1982, p.11):

'*Our experience of an exhibition is … always some kind of a mosaic built up in our minds as the result of serial viewing: it is after all impossible to comprehend a whole museum or even the exhibits within one space at a glance. This is fundamental to the museum design and gallery spaces.'*

The single sequence remained the dominant principle until the nineteenth century[9] -closely linked to the concept of order and the chronological view of the history of art-, and has been repeatedly adopted since.[10]

Brawne usefully draws a distinction between the concept of the single sequence and that of linear continuity, arguing that the former does not necessarily imply the latter. The sequence of corridor-like interconnected spaces at the Louisiana Museum of Modern art, Denmark, (one of our case studies analyzed in chapter 7), and the spiral arrangement of spaces at the Guggenheim Museum, New York, are different in terms of extrinsic properties; yet, both are similar in terms of spatial relations, since their constituent spaces are arranged so as to structure a continuous sequence. He concluded (1982, p.13):

'*What matters in all these plans is not so much their geometric configuration as the relationship between spaces in terms of continuity and linearity.…In this sense, a straight line and a spiral…..are identical. It is the relationship in terms of topology which directly affects the circulation routes and thus the functioning of the museum.'*

This distinction between geometry and topology proposed by Brawne is particularly relevant to our approach to space, as one of the main propositions of the thesis is that it is the inter-relations between the spaces that make up the layout that affect the functioning of the museum more than the geometric properties of space.

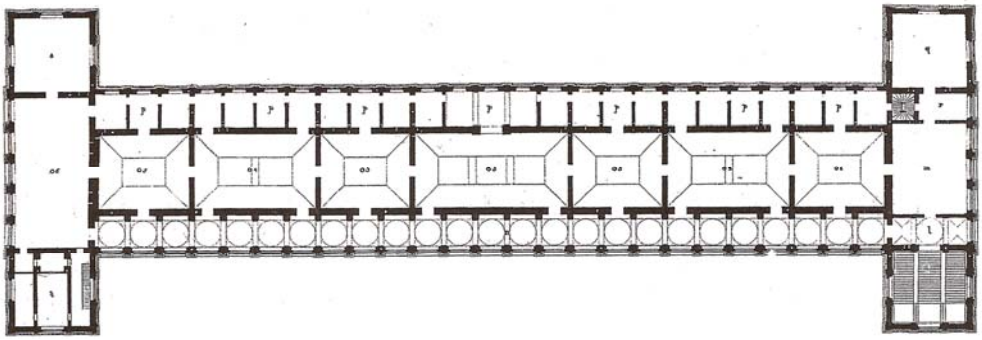
The shift from the single sequence to a variation that offered a degree of choice was first manifested[11] in Klenze's plan for the Alte Pinakothek in Munich (1826-36). [**Figure 2.11**] The large gallery spaces linked in enfilade were complemented by two parallel series of spaces connected at certain intervals to the main galleries. Klenze clearly explained his intention as follows:

'*I wish to allow the possibility of arriving at any particular school without going through another, and for this purpose, I have a corridor running the whole length of the building, which communicates with each separate room*' (cited Gilman 1918, p.399, note2).

The notion of choice was further developed in the twentieth century by H. van de Velde. Like Klenze, van de Velde argued that in a layout where each gallery is devoted to a school, rooms should be autonomous, directly approached from a central space so that visitors were not forced to pass through other spaces to access one particular gallery (1932 cited Huber 1997, p.48). His concept was realized in the 1935 design of the Kröller-Müller Museum, the Netherlands (also analyzed in chapter 7). The circulation system of the Kröller-Müller allows, as we shall see, either a more or less continuous viewing, by moving though the individual spaces, or a selective viewing by branching off from the main axis to see the selected spaces (Brawne 1982, p.14).

Again Brawne pointed to the critical similarities in the range of different possibilities in relating a single main route with auxiliary paths.[12] In the van Gogh Museum, Amsterdam, for example, the main circulation space that makes the link between the galleries and generates secondary paths, takes the form of a staircase, whereas in the Uffizi galleries, Florence, it becomes a corridor space (Brawne 1982, p.14). This reinforces the point made earlier, that the configuration of space is more important than its geometry.

In parallel to these two patterns, a third alternative type is proposed in the literature (von Naredi-Rainer 2004, p.41) the *matrix circulation pattern*. It describes the sequence of spaces that does not allow a dominant direction, but '*offer (visitors) a number of equal alternatives for continuing their way.*'[13] It is



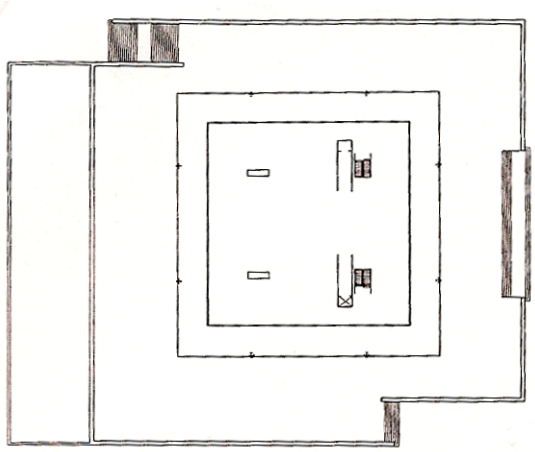
^ **FIGURE 2.11** Alte Pinakothek, Munich (L. von Klenze, 1826-36)
[*Basso Peressut* 1999, p.16]

often argued that the complexity of spatial relations that characterize the matrix circulation pattern can cause confusion and disorientation to visitors. But it is also acknowledged that this pattern has the potential to create a variety of vistas and structure relationships between spaces that seem to flow into each other, as in the case of the Municipal Museum Abteiberg: the grid-like connections placed in the corners of the spaces and the eccentric alignment of the galleries makes it a paradigmatic example of this circulation pattern.

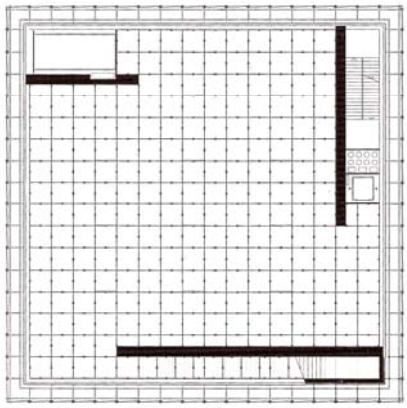
At the opposite extreme from the above patterns -where the visitor is, in most cases, more or less constrained to a particular sequence-, lies the *circulation of the free plan*, which theoretically allows a plethora of routes. Movable screens and panels, or the works themselves, are used to articulate the spatial structure, as for instance in the case of the New National Gallery, Berlin [**Figure 2.12**] and more recently, the Kunsthaus, Bregenz, Austria. [**Figure 2.13**] Like the traditional enfilade that is associated with the chronological view of art, the free plan circulation, which sets no constraints to visitors' movement, is seen as a manifestation of the concept of the democratic museum and the rejection of didacticism. The original design of the Museum of Modern Art, Pompidou Centre (discussed in chapter 6) illustrates this point. [**Figure 2.14**] The intention of the first director of the Museum, P. Hulten, was to structure a labyrinthine route through the works, which did not suggest any direction of movement. Hulten (1974) argued that the display layout resembles a city, with interlocking spaces, squares, paths and dead-ends, where the visitor is allowed to wander around freely, even if this means risking losing his or her way.

Intelligibility of spatial organization

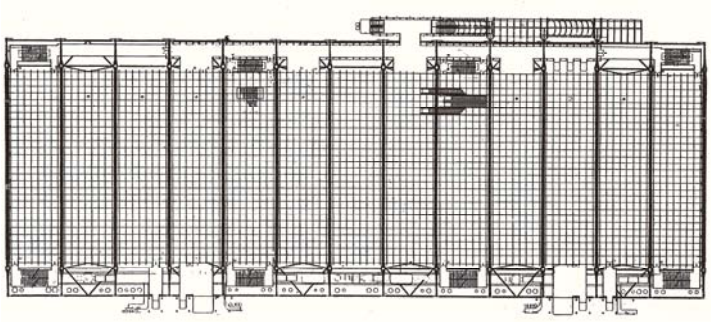
Closely related to the organization of spatial sequences is the idea of intelligibility of museum layouts. How can the spatial arrangement be understandable and encourage easy wayfinding? The most detailed argument was made once again by Brawne (1965, 1982 and 1992).[14] He set out from this idea that museums are like cities in that they are both experienced though movement:



^ **FIGURE 2.12** New National Gallery, Berlin
(M. van der Rohe, 1962-1968) [*von Naredi-Rainer* 2004, p.199]



^ **FIGURE 2.13** Museum of Fine Arts, Bregenz (P. Zumthor, 1997)
[*Magnago Lampugnani* 2001, p.119]



^ **FIGURE 2.14** Centre Pompidou (R.Piano and R. Rogers, 1972-1977)
[*Richard Rogers* 1985, p.94]

'*..the typical museum experience is one of viewing images in sequence, that sequence being sensed by a walking observer meeting static objects. It is in some way close to the way in which we experience a building or town... '* (Brawne 1982, p.10)

More importantly perhaps, he transposed concepts of Lynch's theory for the city (1960) to the architectural environment, arguing that spatial devices, which provide visual order and are essential for the orientation of the moving observer in an urban context, can also became useful tools in the orientation of the visitor in a museum building (Brawne 1965, p.14). He used, for example, the concepts of '*districts'*, '*edges'*, and '*landmarks'*. The *'districts'* refer to the sections of the building that can be 'read' as separate, spatial or visual, units, and thus become divisions that can be easily grasped by visitors; the *'edges'*, refer to the linear spatial elements that can act as boundaries between different parts of the building, to emphasize the distinction between one part and another, while linking them into a coherent whole. Finally, the visual elements that play the role of points of reference –as for instance views to the outside- are defined as '*landmarks'*. Interestingly, these concepts advanced by Brawne can be usefully applied to the spatial organization of the Castelvecchio Museum, analyzed in chapter 5. The museum is articulated into four separate sequences each on different levels ('*edges'*), and a series of short, outdoor passages organises the individual episodes with solidity into a whole, while providing a pause between its parts ('*districts'*).
Similar ideas of space manipulation are repeatedly articulated in design guidance, in which the organization of circulation is a focal point, and much discussion centres on the usefulness of spatial and visual cues in structuring visitors' movement. For example, the manual for museum planning by the Royal Ontario Museum (1976), suggested architectural features, such as an interior court or even a central column, as landmarks and orientation points; Hall (1987) proposed, in her '*design grammar'*, strategies, what she called '*idioms*, like the *punctuation* or the *alert*, which are analogous to Brawne's concept of *districts* and *landmarks* respectively. But the approach taken by this body of literature differs to a certain extent from that of this research; this is the reason why we only make a general reference here.[15] It seems that that this body of literature does not explicitly deal

with questions central to this thesis: how do visitors use and understand the layout? Can the spatial layout of the museum itself act as their main navigational aid to visitors? Though intelligibility and wayfinding are a major focus of concern, most of this literature tends to propose general principles applied to a theoretical space, and is mainly concerned with features that are incorporated in the layout as an aid to visitors' orientation. Instead, this study seeks to arrive at an abstract understanding based on a prior empirical knowledge and analytical work. For instance, as we shall see in the following chapter, the study of the Tate Britain will significantly contribute to clarifying how the spatial layout of the gallery can have an effect on people by shaping their pattern of movement and, through this, the pattern of natural co-presence in space.

Viewing order of exhibits

We have seen earlier that the discussion of circulation patterns underlies the idea of interdependence between spatial sequences and viewing order of exhibits. In order to pursue the argument further we may return to the work of Brawne (1965, 1982) and Newhouse (2005), two architectural authors who have stressed the importance of the construction of the path on the perception, encounter and impact of objects.
Brawne (1965, p.13) defined the experience of museum as:

'*a series of images seen in sequence. This series can be organized and the juxtaposition of events within the sequence deliberately manipulated*'.

This suggests that there is an intention in the organization of the space and that this has critical implications for the realization of the curatorial intent and the way visitors are exposed to information. Brawne's argument was based on the work of E.H. Gombrich (1972, p.51-52) who had extensively addressed the critical importance that the relationships between paintings as they are hung and, by implication, as they are seen in a sequence, have in the field of art. Therefore, Brawne concluded, since the paintings previously seen affect the way the viewer perceives the ones to come, the choice of one particular route through the

museum and not of another, or the free or controlled circulation, are to a large extent determinant of the awareness and the visual impact of objects.

A similar argument was put forward by Newhouse in her recent '*Art and the Power of Placement*' (2005). She demonstrated, through specific cases, how the context and placement of a work of art affected its perception. Relevant to her concerns was the example of the Winged Victory (Nike) of Samothrace. Tracing the history of its placements in the Louvre Museum, the author showed how the most recent changes in the layout and by implication, in the pattern of circulation at the global level, had critical effects on the way people became aware of the statue of Nike. Upon entering the museum from the old entrance, visitors had to follow the prescribed sequence, and the sculpture, positioned at the top of a grand staircase, as '*a solo display*', was *'the first major moment they encountered'* (2005, p. 45, 61) On the contrary, the creation of the new main entrance through the pyramid, which provided choice of routes, deprived visitors of the effect of the gradual approach of the statue and its initial dramatic impact, since the viewing order was not controlled. These ideas will be pursued much further in the review of the art historical writings.

Social functions

In complete contrast to the above effects of the configuration of circulation on patterns of movement and viewing, the third implication, the social function, is rarely made explicit in the literature. This does not mean that the idea of the social character of the visit is uncommon in the architectural and design literature (Basso Peressut 1993, p.29; Miles 1988, p.23) nor that the social aspect of space is absent from the museum discourse.[16] But the rich theoretical background is not coupled with rigorous references to layout or precise description of the spatial arrangement and its social effects. One of the few authors who described and analyzed museum buildings using space syntax techniques, to render explicit their social meaning is Markus (1987, 1993), to whose work we will pay closer attention here.

Markus studied different types of buildings -from asylums to libraries and museums- to show that buildings through their spatial configuration contain social information, or in his terms, '*buildings are not primarily art, technical or investment objects but social objects*' (Markus 1993, p. xix). He distinguished (1993, p.25) two kinds of social relations: of power and bonds, both '*made concrete through bodies in space; in space of buildings and towns'*. Power relations are always accompanied by bond relations, which are their exact opposite: while the former are about possessing '*finite resources*' (from land and materials to knowledge), the latter are about sharing these resources. Buildings express power relations by subdividing spaces, restricting choices, making some spaces less accessible or more segregated than others, in order to '*control interfaces between people and between them and objects such as museums exhibits*' (Markus, 1993, p. 23). On the contrary, by connecting spaces, buildings produce bond relations, so as to allow communication and encourage encounters between individuals or groups.

This fundamental relation between spatial layout of museums and patterns of co-presence and encounter among visitors will be extensively addressed by the syntactic studies reviewed in the following chapter, and powerfully confirmed by the findings of the analytical chapters. Markus was mainly concerned with the way social ideas become embodied in the museum building, which is in essence the other side of the same argument -the social function of museum space.

Hierarchal systems of society, he argued, are expressed through prescriptive texts (design briefs, for example), artistic, or other kind of theories, and reproduced in the spatial structure of buildings. The explicit function of the museum as a building type is after all the classification of knowledge. The spatial organization of the museum, by means of degrees of accessibility of spaces, or number of alternative routes to a space, enables the presentation of objects in a certain category, or class, within a sequence, according to a given theoretical position. He explained (1987, p.468):

'*the grouping of art or museum objects by 'school', period of production, material, place of origin, or by function, and the act of locating such classes of*

objects according to specific rules about their position in an ordered universe, is a spatial mapping of scientific or artistic theory.'

Interestingly, it is precisely this idea that underlies the notion of the museum layout as a *script*, advanced by the art historians (see below).

To conclude this section on the problem of configuration of circulation as it emerges from the architectural literature, we could argue that it introduced key effects of the organization of space in aspects of museum experience. The review might seem, however, to lack coherence and seeking to link different considerations together. But this reflects the absence of a systematic methodology for dealing with spatial organization in museums and the lack of an overall theory that brings the different functions –movement, viewing and encounter- together into a single framework. It is of particular interest in this respect that the analysis of the Sainsbury Wing, in chapter 5, will clearly demonstrate that a problem in the spatial design can have far reaching implications: the layout of the gallery determined a movement pattern which worked differently than planned, and this, in turn, affected the way visitors explored the displays which was not in accordance with the curatorial intent.

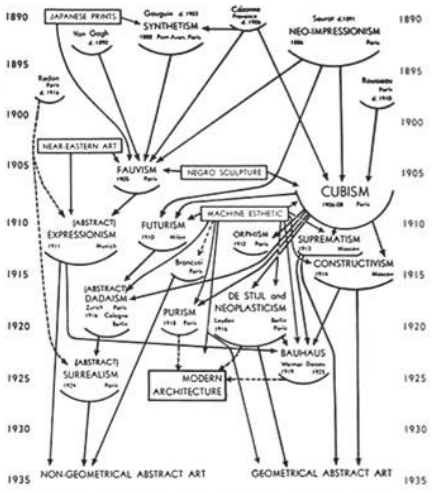
2.3 Does the art historical writing offer an account of the spatial dimension in the organization of objects?

As previous sections made clear, the link between arrangement of circulation and arrangement of objects is acknowledged by the architectural literature. Then the question is to what extent does the art historical literature address the issue of display from a spatial point of view? If for a long time -especially in the first part of the twentieth century- the presentation of art did not receive special attention, the growing interest of art historians in understanding works of art in relation to the context of their presentation and as part of an ensemble -exhibition or permanent display-, has rendered the installation design a distinctive, focal theme within the discipline of art history. There is a substantial body of literature (O' Doherty 1986; Carter 1990; Greenberg et al. 1996; Barker and Thomas 1999, Putnam 2001) that seeks to render explicit that the display layout is a critical

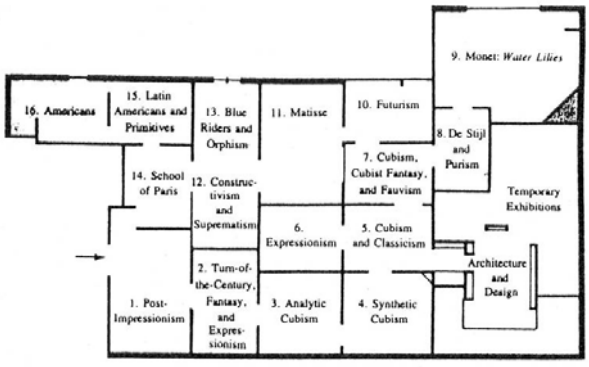
mediator of the meaning of objects, and addresses extensively how museums reflect changes in the social, political or cultural context, and produce different kinds of art histories.[17] But the intention here is to draw out the major relationships between the two layers of organization - of space and objects - as recorded in certain key studies that deal explicitly with the museum layout.

Mapping a theory of art

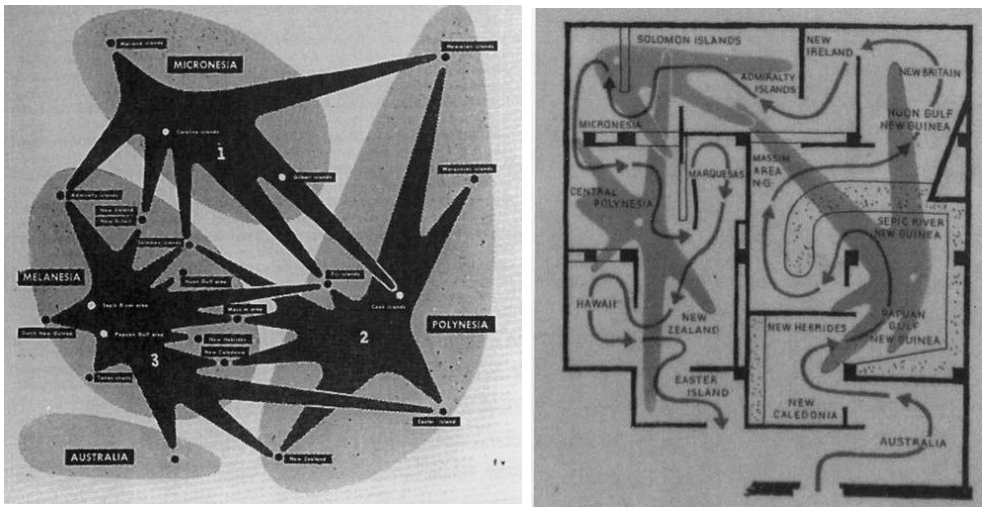
No example could illustrate most clearly the argument proposed by Markus -that authoritative texts become embedded in the spatial structure of buildings- than the diagram of the evolution of modern art created by A. H. Barr, founding director of MoMA in the 1930s.[18] [**Figure 2.15**] Barr argued that works of art can be classified into a school or style, and that the development of these styles can be represented as a sequence, with arrows showing how one originated from the other. This concept was one of the defining characteristics of much of the art historical writing of the twentieth century (Fernie 1995, p.179). But what is more important is that Barr's view of art was mapped in the order and the sequence of spaces at the early exhibitions of MoMA (Platt 1988; Grunenberg 1994, 1999).
This issue was specifically addressed by Duncan and Wallach (1978; 1980), who advanced the idea of the museum as a socio-cultural structure. In their seminal paper '*The Museum of Modern as Late Capitalist Ritual: An Iconographic Analysis*' they critically analysed the 1939 layout of MoMA [**Figure 2.16**] and demonstrated that the subdivision of the original open space in small rooms, deprived of views out and long vistas through spaces, structured a well-defined main route which determined the viewing sequence and echoed Barr's ideology (1978, p. 35). More precisely, the main route was dedicated to the principal moments of the history of modern art, as defined by Barr's organizing chart, and unfolded as a succession of artistic styles, beginning with Cubism and ending with Abstract Expressionism. Works considered as being outside the mainstream of modern art history were displayed in dead-end spaces or galleries off the main route. In contrast, key works were framed by doorways that emphasized their importance, and were placed in striking positions, in easily accessible spaces.



^ **FIGURE 2.15** The 1936 chart of the evolution of modern art by A. Barr [*Fernie* 1995, p.180]



^ **FIGURE 2.16** The 1939 layout of MoMA [*Duncan and Wallach* 1978, p.37]



^ **FIGURE 2.17** Diagrams for the 1946 exhibition '*Arts of the South Seas*' by d' Harnoncourt [*Staniszewski* 1998, p. 112]

It seems quite striking that even recently, the Chief Curator of Painting and Sculpture at the MoMA, J. Elderfield, discussing the re-installation of the collection in the latest extension of the museum (2004, p.21), associated the current spatial layout with a particular view of art. He noted:

'*Now the galleries are not laid out in a prescribed order, but are set side-by-side…each gallery is conceived autonomously, being devoted to a single subject, explored over the period of its greatest flowering';*

and he pointed out that:

'*Rather than suggesting modern art is one thing, this display implies that it is a composition made of individual achievements, the product of individual artists, styles and movements. Displayed in individual galleries, they function as the arguments and counter-arguments in the continually disputed history of what it means to make modern art.'*

The notion of 'script'

Duncan and Wallach (1980) extended the argument much further by suggesting the notion of '*script'*: the idea that the museum, through its architecture, its layout of spaces, and arrangement of displays, provides a programmed experience, resembling a ritual process, which is performed by visitors' movement. The works of art, they argued, become part of an '*iconographic programme'* (1980, p. 451) which is defined by authoritative texts, in that instance, theories of art history (like Barr's chart of modern art).
Duncan (1995) discussing this idea more extensively in her book '*Civilizing rituals. Inside Public Art Museums*', she observed:

'*Museums offer well-developed ritual scenarios, most often in the form of art-historical alternatives that unfold through a sequence of spaces. Even when visitors enter museums to see only selected works, the museum's larger narrative structure stands as a frame and gives meaning to individual works'* (1995, p.12).

On these grounds, she argued that there is an analogy between museums and ceremonial buildings, such as palaces and temples, and furthering the analogy to the curator, she suggested seeing

'*the situation of a museum curator as analogous to that of a medieval church official responsible for planning the iconographic program of a cathedral.*' (1995, p.107)

Setting out from Duncan's notion of script, Noordegraaf (2004) analysed the changes in the display layout of the permanent collection in a single institution, the Boijmans van Beuningen Museum, Rotterdam, since its opening in 1849. She contended, supporting the arguments of Duncan and Wallach, that the architecture and the layout of the building, the order and the arrangement of objects, as well as the various display techniques and means of visitor guidance, '*coin directions for the use of the museum by its visitors*'. But unlike Duncan who suggested that visitors enact a '*ritual scenario*', Noordegraaf argued that the museum is '*the product of both its designers and its user*s' and that visitors with their viewing habits, have an active role in shaping the museum space and can even cause layout changes, the '*revision of the script*'. [19]

The main thrust of Noordegraaf's work was drawing a distinction between three types of script during the twentieth century: the '*visitor-orientated museum script*', the '*invisible script*', and the '*hybrid museum script*'.[20] The first model emerged in the early twentieth century, when the museum was seen as instrument for educating the public. In terms of display strategy, the emphasis was placed on showing masterpieces, organized in spacious and symmetric arrangements. This model, she continued, disappeared in the post war museum, characterized by the '*invisible script***'**. In the latter, the exhibition space, open and flexible, with white or off-white walls, divided by movable panels, and marked by the absence of decoration and structural elements, aimed at making visitors forget the mediating role of museum presentation, and establishing a direct, unmediated contact between viewer and work of art. Finally, during the last two decades of the twentieth century, the '*hybrid museum script*' succeeded to the '*invisible script*'. The characterization '*hybrid***'** was based on two key features of the contemporary museum, as seen by the author: first, the lack of an overall model, both in terms of spatial and display layout; and second, the combination and co-existence of different modes of presentation, even within a single museum -as it was the case with the Boijmans Museum.

Exhibitions as 'manifestations' of ideas

Duncan's approach inspired also the influential work of Staniszewski (1998) '*The Power of Display*' in the sense that she integrated the issue of display into a socio-cultural context. Analyzing the installation design of paradigmatic exhibitions at MoMA (ranging from exhibitions of modern art to exhibitions which served political propaganda), Staniszewski demonstrated that they were essentially '*manifestations*' of ideas, aesthetic concepts and political issues. Though Staniszewski was mainly concerned with the installation as representation more than as a mode of presentation, she showed clearly that the exhibition layout, the spatial and visual relations between spaces, become tools for the expression of the curator's particular theoretical concept or intent. The comparative analysis of two exhibitions, organized at MoMA by Barr and his successor, R. d' Harnoncourt, illustrated the point. More precisely, Staniszewski opposed the linear structure of the 1936 exhibition *Cubism and Abstract Art*, designed by Barr (see above) to the display technique of vistas adopted by d' Harnoncourt at the 1946 exhibition *Arts of the South Seas,* dedicated to Oceanic cultures. The wide door openings and the structure of wall partitions created a series of overlapping vistas that aimed at revealing contrasts and affinities between objects and cultures and involved visitors in associating objects and making visual comparisons. [**Figure 2.17**] As d' Harnoncourt remarked, this method of presentation:

'*is based on the recognition that the field of vision of the visitor does not have to be limited to the units that are in the path of his immediate physical progress through the exhibition and that any given point vistas should be open to him into these sections of the exhibition that have affinities with the displays in the unit in which he stands.*' (cited Staniszewski 1998, p. 111)

Similarly to Staniszewski, Newhouse (2005) (as we have already seen) looked closely at the problem of installation of art, but from a different point of view. While the former was mainly concerned with the ideological space created by different types of installation, the latter investigated the ways in which spatial conditions affected the reception and perception of the works, regardless of any underlying social or political meaning. To illustrate this, we can take the example

of an exhibition of Egyptian art. The author analyzed its installation in different museums and argued that by adopting a different display methodology each museum influenced the nature of the works. For instance, the display which re-created the objects' original setting and evoked the conditions of their discovery, prompted visitors to consider the objects as archaeological evidence, whereas the display that presented the exhibits in a sparse, neutral setting, and on isolated, spotlit pedestals, conferred them the character of fine art.

The intimate relationship between the arrangement of space and the presentation of art is not only addressed within the context of comparative and historical surveys of past exhibitions, but becomes also a central matter of public debate in newly opened museums, as illustrated, for instance, by the widely discussed (House 1987; Mainardi 1987; Barker 1999) installation of nineteenth-century art in the Musee d' Orsay, Paris.[21]

In her detailed analysis of the display layout, Mainardi demonstrated that differences in the spatial arrangement conferred the two opposing artistic styles that marked the nineteenth-century art -the academic and avant-garde art-, different importance.[22] The academic art monopolized the processional-like central space of the ground floor, while the Impressionists were shown in the top upper galleries, in which the design of space detracted from the appreciation of art. Moreover, the fragmentation of space did not allow the direct juxtaposition of works of different ideologies and, by implication, neutralized any meanings that these might possess, allowing only an aesthetic delectation of the works. The whole argument was summed up by the historian House (1987, p.86) as follows:

'*this historical presentation is inextricably bound up with the physical presentation of the works in the spaces of the building: design and curatorial concerns cannot be separated.*'

House's argument as well as the plethora of art historical studies reviewed above, show that the problem of space is clearly understood and well embedded in the discussion of the presentation of art. This means that the initial question whether space is seen as variable in the display of objects leads to the question what kind of variable? In the cases analyzed so far we have seen that space has a

reflective potential, since it tended to realize a particular ideology and support a specific narrative. Can then the role of space extend beyond this function? Can it be used for designing with intent, independent from any preconceived concepts?

2.4 Can the arrangement of objects create a spatial structure?

This question can be tackled with reference to a particular exhibition theory that emerged in the early twentieth century, as an opposition to the '*white cube*' model (see below), seeking harmony between art and architecture. It began with the *international avant-gardes of the first half of the twentieth century* [23] but was further developed by the '*Italian school*' of the 1950s. What follows is proposed as a selective discussion of some useful clues about different possibilities of relating space and display, and traces of attempts where space was used creatively.

A dynamic spatial experience

In the early twentieth century, when the conventions of traditional museum practices radically changed, and the context of presentation of art received special attention, when the context became content, as O' Doherty argued (1986, p.15), a group of artists, designers and architects, all key figures of post-cubist movements, became particularly preoccupied with exhibition design. El Lissitzky, F. Kiesler, and H. Bayer, among others,[24] introduced radical innovations in exhibitions, which were then absorbed by museums. They argued that space should not be seen as the background to the display of art, but as the link between objects, and as important as the objects themselves.[25] Throughout the exhibitions and installations they designed they tried to integrate space and objects, to create an '*organic unity*',[26] a total meaning. The revolutionary design concept was theorized, in the 1930s, by Kiesler in his notion of '*Correalism*', '*the science of relationships*', and described as follows:

'*The traditional art object, be it a painting, a sculpture or a piece of architecture is no longer seen as an isolated entity but must be considered within the context of*

this expanding environment. The environment becomes equally important as the object, if not more so, because the object breathes into the surrounding but also inhales the realities of the environment no matter in what space. ' (Goodman 1989, p.83)

For the permanent display of Peggy Guggenheim's collection in her New York Gallery **'***Art of This Century*', Kiesler designed in 1942 four gallery spaces where he presented the paintings without frames, suspended from curved wooden walls (attached to the existing walls of the gallery) or supported by specially designed stands. Works could be manipulated, manually or mechanically, and adjusted to the desired viewing angle by the visitor, whose '*act of seeing -of receiving, was seen as a participation in the creative process no less essential than the artist's'* (Goodman 1989, p.63). To Kiesler, removing the frame from the paintings meant replacing it with another dynamic 'frame':

'*That is: the general architecture of the room. Painting became part of the whole and was no longer artificially isolated*', he argued.

Some years earlier Kiesler had designed his famous exhibition system, [27] termed '*T and L'*, which consisted of freestanding structures for the display of objects that could be adjusted to the viewer's eye level, arranged independently or grouped together, and adapted to the specific demands of a particular exhibition space. He observed (2001, p.96-97):

'(the painting) ceases to be a decoration on the wall and becomes a small solid island in space. It is a world in itself which the painter has conceived and the architect has anchored.'

The idea of the active role of the wall was also articulated by El Lissitzky, one of the leaders of the Constructivist movement, who argued (1970, p.139):

'I did not see the four walls as supporting or protecting screens but rather as an optical background for the painting'.

Lissitzky first realized his innovative ideas in his famous exhibition space, the *Proun* environment,[28] designed for the 1923 and 1926 International Art

Exhibitions: a cubic space designed as a visual unity that incorporated floor, ceiling and walls. He placed thin wood strips, painted white on the left side and black on the right, against the grey wall surface so that as the viewer moved though space, the walls appeared to change colour (Lissitzky 1970, p.150; Lissitzky-Kuèppers 1968, p.362-363);

'*Accordingly and depending on the position of the viewer, the paintings appear against a black, white, or gray background- they have been given a triple life'*, he argued.

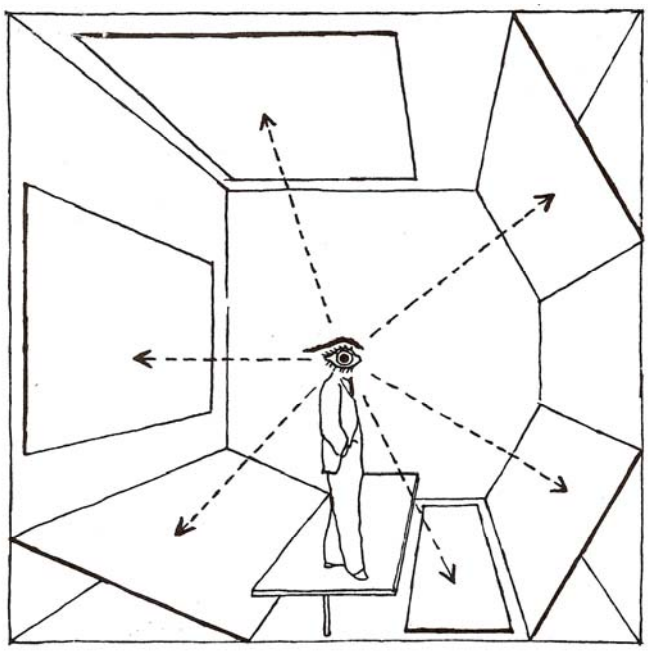
Thus, as he explained (Lissitzky 1970, p.151; Dorner 1958, p.17),

'*an optical dynamic was created as a result of the human motion'* since the viewer was '*physically forced to involve himself with the exhibition objects'*.

Like Kiesler, Lissitzky designed[29] in 1927-1928 a gallery space (the *Abstract Cabinet)* at the Hanover Landesmuseum for the display of New Art (from Cubism and onwards), which was a version of his *Proun* space.

Setting out from Kiesler's and Lissitzky's acknowledgment of the relationship between viewer and object, Bayer, member of the Bauhaus, explored further the way the viewer sees and receives impressions. He proposed possibilities of expanding the experience of the visitor, by extending his field of vision on all sides, instead of limiting it to the usual wall areas, establishing '*a sort of spherical perception*' (Celant 1996, p.380). As Cohen (1984, p.289) rightly pointed out, Bayer shifted the emphasis form the display to the viewer. This attempt was expressed in his famous '*Diagram of field of vision*' (1930), a drawing, which showed the viewer's head replaced by an immense eye scanning ceiling, floor and wall panels.[**Figure 2.18**]

What seems particularly interesting in these revolutionary design concepts is that they proposed a new spatial conception, and through their installations stressed the significance of the experience of space, and lead to an emphasis to the relationship between movement, placement of objects and viewer.



^ **FIGURE 2.18** 360^0 field-of-vision diagram by Bayer (1930)
[*Cohen* 1984, p.306]

'*Critical display*'

These ideas were further developed, and perhaps culminated, after 1945, with the '*Italian school*'; that is, architects like I. Gardella, F. Albini, C. Scarpa, and the Studio BBPR (L.B. di Belgioioso, E. Peressutti, E.N. Rogers) who became closely involved in the design of museums[30] and exhibitions. Theirs works, influenced by contemporary ideas of art, such as Croce's aesthetics and the theory of '*pure visibility*' (Whitehead 1997, p.37), were termed '*critical display*' or '*visual criticism*',[31] an approach to display which involved designing spaces for the specific objects on display (Ragghianti 1974, p.170), creating environments that heightened their qualities and contributed to revealing their meaning. Design of display and design of space become intrinsically interrelated. As Los (2002, p.28) noted:

'objects are part of the space in which they stand, so that it would be unthinkable to rearrange or remove them'.

In the museum displays and exhibitions designed by the Italian architects, works are carefully laid out, in asymmetric arrangements, dispersed in space. Sculptures are placed on stands to emphasize volumes and forms. Paintings are also treated as three-dimensional objects, freed from the walls, either mounted on easels -as for instance at the Correr Museum, Venice, and the Castelvecchio, both designed by Scarpa- or hung on metal rods -as in the case of the Palazzo Bianco, Genoa, designed by Albini. Panels -used as background to set off, with their carefully selected colours, unframed paintings sculptural fragments and small scale statues-, are positioned in space so as to alter its geometry while focusing attention to the works displayed.

B. Zevi summarized most clearly the approach as follows:

'*We had been accustomed to museums conceived architecturally on a monumental scale, a shell into which the works of art were inserted at a later stage. But now this concept is being reversed: the works of art themselves create the architecture, dictating the spaces, and prescribing the proportions of the walls. Each picture and statue is studied for the best possible view: it is then set in the necessary spatial quantity.'* (1958 cited Brawne 1965, p.30)

But as it will be extensively discussed in the case of Castelvecchio (see chapter 5) such an approach entails carefully created viewpoints and highly controlled approaches. This becomes even more complex, as the reading of the display involves both physical and visual movement. The viewer is encouraged to constantly shift positions, move around and among the objects so as to get a global picture and grasp the sense of the whole. As Guidi (1999, p.208) pointed out, the moving observer is required to look around as he looks ahead.
In his analysis of the work of Scarpa, Los (2002, p.30) explained the architectural design:

'*Scarpa's architecture functions as a system of symbols, as an architectural language, which, being a language, becomes a 'means' for the recognition/production of reality rather than the 'object' of such recognition/production. It seems important to me to bring out the reversal of architectural design vis-à-vis Functionalist ideology, according to which -by contrast- the work is what is set up by the search as a goal of understanding.*'

It can be seen clearly that there is another critical dimension in the interaction between space and display, when the attention is shifted from reproducing to producing meaning, and from informing to presenting. If the manipulation of space in the cases we have discussed earlier (for example, the MoMA, the Orsay Museum) aimed at re-expressing pre-given ideas, it is certain that in the examples analyzed here, it aimed at the exact opposite: works are presented in an unexpected manner so that visitors see the objects though a measure of surprise, and through this, the preconceived responses that the works might arouse are intended to be destroyed (Brawne 1965, p.14).

Perhaps we could see a similar idea underlying the distinction drawn by Miles (1988, p.4) between two exhibition design strategies: '*designing from the message upwards*' and '*designing from the gallery downwards*'. In the first instance,

'*design starts with an analysis of the ideas to be communicated and the methods used in communicating them'*.

In other words, the emphasis is placed on how to realize in space a particular message or ideology. This design approach leads, according to the author, to '*rigid layouts that channel visitors into circulation routes*', since the role of space is to restrict and to reproduce. In the other instance, the reverse is the case: the designer works down '*from the space to be filled, to the message to be communicated*', meaning that the attention here is focused on spatial concepts which are given priority over pre given concepts or messages. In contrast to the former, this approach allows using space in new ways, as we have seen for example in the cases of the avant-gardes of the first half of the twentieth century and the '*Italian school*' of the 1950s.

2.5 Recent changes in curatorial strategies and their spatial implications

The section that follows brings the narrative to the present. The aim is to look more closely at the latest developments in the museum display reality, characterized not only by the heterogeneity of spatial design (as developed in the first section) but also by the diversity of displays strategies. The discussion will focus on the most recent changes in curatorial practices, with two considerations in mind: first, that these changes have significant spatial implications, and second, that they are relevant to the museums under consideration and can provide a background against which their curatorial strategies will be better understood and interpreted.

Rejecting the idea of the neutral context

Almost in parallel to the exhibition theory developed earlier, the early twentieth century was marked by the ideology of the '*white cube*'. [32] Introduced by the MoMA in its 1929 opening exhibition, it became the dominant approach to display almost throughout the century. In complete contrast to its contemporary theory that aims at the synthesis of art and architecture, the '*white cube*' model proposes an invisible architecture that seeks not to interfere with the work of art.

Objects are presented in neutral and undecorated spaces, in a white background, isolated from everything that might detract from their appreciation.
But in the last years, the concept of an idealized neutral context does not hold anymore. As we have seen, it has been increasingly recognized (Mainardi, 1987, p.40; Elderfield 1998, p.134) that objects are determined by the context in which they are placed. More importantly, many art historians, like Duncan, Wallach, Grunenberg, Staniszweski, and Meecham and Sheldon (2000), questioned the alleged neutrality of the white cube. For example, Grunenberg (1994) interpreted it as an ambition for '*historical accuracy and objectivity*'; Duncan (1978, 1980) saw the neutralization of the original context of the works and the purely aesthetic mode of display as an intention to sacralize the museum space; Wallach (1992) questioned the exclusion of any reference to the outside world and interference with other works as a mode of viewing that suggests a sense of scientific detachment from the objects on display. Other authors, like Riley (1998, p.135), pointed out that a work of art was never meant to be seen in such context. Few, like Wigley, incorporated the issue in the wider discussion of the use of the white colour in modern architecture, arguing that white is: '*a way of seeing*' (2001, p.308).

'*The white surface'* he wrote *'does not simply clean a space or even give the impression of clean space. Rather, it constructs a new kind of space'*. (2001, p.7)

Interestingly, architects seem to concur with the rejection of the idea of the neutral context, expressed by art historians. Among others, Hollein (Papadakis 1991, p.41) argued that there is no neutral space, only characteristic spaces of a variety of sizes. Similarly, Tschumi (1998, p.42) observed that:

'*through the sequence and though the occupation of the space, the spaces themselves are never neutral'*.

But if the concept of a neutral context is widely rejected, the white walls as context for the display of art remain the standard, if not the dominant, method of exhibiting in contemporary museums. According to Grunenberg (1999, p.48), the fact that this model '*continues to be constantly reinvented and transformed to*

fit the latest developments in contemporary art and the latest museum concepts' demonstrates its success. However, there is a point that should be made in respect to this. If we look at contemporary display strategies in smaller and less well known European museums, we find a wide range of variation. For instance, innovative approaches are consistently adopted in Dutch museums, such as the Bonnefanten Museum, Maastricht (A.Rossi, 1995), [**Figure 1.3** and **2.19a**] or the Groninger Museum, Groningen (A.Mendini, Ph. Starck, Coop Himmelblau 1994), [**Figure 1.5** and **2.19b**] and the Royal Danish Academy of Fine Arts, Denmark, to name just a few examples. The intense colours of the walls, as well as the display of paintings in unexpected locations (i.e. above the doorways), or in atypical groupings (i.e. paintings of Hammershøi sparsely hung at the corners of the room), [**Figure 2.19c**] create a stimulating visual and spatial experience, and may be seen as a reaction to the standard method of exhibiting, to the simple, undecorated, white galleries that are everywhere and so have become invisible to most visitors (Celant 1996 p.381; Wigley 2001, p. xiv; Staniszewski 1998, p. 61, 66). Perhaps these examples can be seen as illustrating Brawne's argument, that:

'*museum display, apart from the quality of objects on view, is more than a case of the correct background or balanced illumination; it is the totality of the experience which becomes an event in its own right and within this totality, architecture, as space manipulation, must of necessity assume a positive function. To aim at an environment of nothingness is to abrogate architectural responsibility.'* (1965, p.10)

'Ahistorical' arrangement

Along with the '*white cube'* model, the MoMA introduced in 1929 the second major, and equally influential, shift from the traditional museum practices: it replaced the mid-nineteenth century principle of hanging by school, by the principle of hanging by movement, in other words, grouping works according to type and style, and on the basis of chronology.

Like the '*white cube*', the new principle has been extensively adopted by museums across the world. However, since the 1950s it became the object of a strong critique, and tends now, especially since the 1980s and 1990s, to be

^ **FIGURE 2.19** Views of: (a) the Bonnefanten Museum, (b) the Groninger Museum and (c) the Danish National Gallery

replaced by two new curatorial strategies: to favour the ahistorical arrangement of museum collections, and to present in depth a group of works by a single artist.

This break away with the evolutionary view of art has been increasingly acknowledged and critically analyzed by several authors. Krauss (1990), for instance, interpreted it as a move from the '*encyclopaedic*' to the '*synchronic*' museum. She observed that in contrast to the '*encyclopaedic*' museum which aimed at '*telling a story by arraying before its visitor a particular version of the history of art*', the '*synchronic*' museum focused on '*the intensity of experience, an aesthetic charge that is not so much temporal (historical) as it is now radically spatial*' (1990, p. 7).

A similar argument was made by Serota, Director of Tate. He argued (1996) that the new tendencies lead to the '*dilemma of the modern museum*' between '*interpretation'* and '*experience*'. Serota saw the historical hang as essentially an interpretation of the art by the curator, expressed through the selection of the works to be displayed and the juxtaposition of specific artists. On the contrary, presenting the oeuvre of a single artist in depth and showing it in isolation in a gallery, has, according to the author, a twofold effect: on the one hand, it reduces the interpretative power of the curator; on the other hand, it allows for a personal reading of the works by the viewer and a '*concentrated experience*' of the cumulative power of the oeuvre of the artist. Moreover, by being freed from the restrictions of a historical arrangement, the curator is encouraged to create new confrontations and '*subtle juxtapositions of* '*experience*'. This, in turn, can contribute, as Serota argued, to a better understanding of the twentieth-century art and the creation of a sense of discovery to the viewer. As one of the most fervent advocates of the ahistorical exhibition, Serota realized his ideas in the thematic opening displays (2000) at Tate Modern (see chapter 6), following the example of a few museums (MoMA, 1998) but also setting the precedent for others (Museum of Modern Art, Pompidou Centre, 2005, see below).

But the ahistorical exhibition has also been strongly criticised for being a non objective view of art. For instance, Meijers (1996) described it as a '*highly subjective manner of arrangement*' and argued that this approach, although it rejects the notions of evolution and style as '*constructs*' of art historians, equally

suggests '*a new unity*' created through correspondences between works. Meijers clearly formulated her opposition as follows:

'*The works of art are arranged on the basis of new truths which are presented as universals, despite their strong personal colouring. Regrettably, this essentialism closes the door which these exhibitions had seemed to open.*' (1996, p.19)

A similar idea underlies Spalding' argument (2002, p.87):

'*It is true*', he argued, '*that the view that modern art is progressing towards perfect expression, which was promoted by some Western museum of modern art until the 1990s, no longer hold sway. But that does not mean that history itself is invalid.… Without history we are adrift on a sea of personal preferences, in a barge of the curator's choosing, at the mercy of his or her predilections, with no overall sense of direction to steer by.*'

Another aspect of the ahistorical exhibition which has often been questioned is its effectiveness. Meijers (1996) and Lind (2000) pointed out that the affinities between works from different periods seen by the curator are not always obvious to the visitors. To the attentive viewers, they might seem superficial and confusing; while for the people who are not initiated in art, the experience might be limited to the visual impact of works. In response to this, Newhouse (2005) argued that a distinction should be drawn between a thematic installation which aims to instruct and that which intends to surprise. She also observed that an ahistorical exhibition can be effective if the groupings and juxtapositions of works are not determined '*by a theory in need of illustration*' or are based on iconography, but, on the contrary, derive from philosophical concepts.

It is of interest that in chapter 6, we discuss the latest thematic arrangement (2005) of the collection of Pompidou which will best illustrate Newhouse's point. The collection was structured as a set of conceptual themes (i.e. '*destruction*', '*disfiguration*', '*war*') that allowed the demonstration of the argument implied by the title of the exhibition, '*Big Bang*' (2005): that the artists of the twentieth century have led to the emergence of new artistic forms and innovative approaches by questioning and subverting the established ideas and values. [**Figure 2.20**]

From the artist's point of view

To complete the discussion, we will draw attention to new tendencies in the presentation of art, the increasing involvement of artists and the ephemeral character of museum displays, which are relevant to our concerns.

The phenomenon of the artist-curator, first appearing in the seventies, has been taking an increasingly central place in the contemporary museum. It is widely acknowledged that the museum is not anymore the ambiguous space of the late sixties, when artists (like Beys and Broodthaers) took a critical position on the institutional power of museums.[33] On the contrary, there has been reconciliation between the museum and the artists and, more importantly, artists have returned to the museum as '*a site of activity*' (Gorrin 1994, p.7), creating 'site-specific' works. As Riley (1988, p.9) argued, '*artists come into this space, reconfigure it, remake a generic space into subjectively oriented personal spaces*'. This has of course spatial consequences. By determining the way in which their work is presented, artists prevent any kind of manipulation of the individual object or space (Ammann 1983, p.15; Buren 1983, p.70). Often they take complete control of the exhibition space and '*escape the curatorial grasp*' by being entitled to make changes within the spatial limit of the monographic room (as in the case of the installation '*Container Zero*' in the monographic room of *J.P. Raynaud* in Pompidou). [**Figure 2.21**] But most frequently, they become actively engaged in the museum space by being invited to curate exhibitions using the collections of the museum, based on their personal criteria for the selection and arrangement of the works.[34] This wide practice, as Putnam argued (2001, p.154), offers unexpected groupings and juxtapositions, and allows for a personal reinterpretation of museum collections. Kosuth stated that the exhibitions curated by artists allow the viewer to take '*subjective responsibility for the "surplus" meaning that the show itself adds to the work presented in it*' (cited Meecham and Sheldon, 2000, p.205) suggesting that there has been a radical shift of the ideological responsibility from the curator to the viewer, an argument also put forward by Serota.

^ **FIGURE 2.20** '*Big Bang*', Centre Pompidou (August 2005)

^ **FIGURE 2.21** J.R.Raynaud, *Container Zero* (Centre Pompidou , August 2005): the artist is free to modify the content of his installation

Ephemeral displays

If the phenomenon of the artist-curator is spatially significant, in that it transforms the museum space into the '*terrain of the artist'*, the new tendency to reconfigure the permanent collections on a regular basis and present them as temporary exhibitions has certainly wider effects on museum architecture. Some authors, like Celant (1996, p.372-373), interpreted this tendency for ephemeral museum displays as a cultural phenomenon, arguing that '*this attitude encourages a culture that thrives on* '*display*'. He explained:

'*the present economy of culture thrives on this system, where the principal product is represented by "showing" and by "showing oneself" '*.

Others, like Riley (1988, p.10), expressed their concern about this new strategy; because it is quite likely that it will constrain architectural presence in museum space, as:

'*the only way to efficiently reprogram architectural space is to lessen the effect of architecture, which is to get rid of it –to create what I call a Dumpster architecture, which is totally transformable'.*

Intriguingly, this tendency comes in complete contrast to the artists' position; to them, the museum carries with it the dimension of permanence. For instance, the Swiss painter H. Federle, involved in the Herzog and de Meuron project for The Goetz Collection, Munich (1991-1993), pointed out that it is important to place works in galleries and know that they will always be there, what he defined as '*the topography of certain works of art, which characterize a place, a room*' (2000, p.29). In this respect, the Louisiana Museum (see chapter 7) best resolves these contrasting requirements. Despite the annual display changes, a constant remains: to permanently show the highlights of the collection in specially designed locations, so that people can return and always find them in the same place, in galleries that act as '*islands of memory*' (Elderfield 1998, p.231) and establish a sense of familiarity.

This concern for permanence may also be partly accounted for the design of museums by artists. D. Judd's Chinati Foundation in Marfa, Texas, is an

illustrative example. [**Figure 1.6**] The late American minimalist artist, disappointed by the installation of his sculpture in museums and highly critical of architecture, converted a complex of abandoned structures -from small houses to warehouses and military sheds- into exhibition spaces for the permanent display of his oeuvre, together with works of other artists. Judd (Noever 2003, p.87) argued that:

'*Chinati stands for the idea that the installation and exhibition of art must be supervised by the maker of it, the practising artist*',

and pointed out that the museums is planned with and for his sculptures:

'*The installation of my work'* he wrote in 1977, '*is contemporary with its creation…the space surrounding my work is crucial to it: as much thought has gone into the installation as into a piece itself'* (1999, p.186).

What emerges from the above discussion is a surprising heterogeneity in the current museum reality, in terms of exhibition authors (curators and artists), methods of display, and ways of looking at art. Well represented by the museums of the sample, it will lead to an overflow of questions: How do regular display changes relate to the existing spatial conditions of a museum? What are the implications of the recent tendency to favour thematic arrangements of objects on the design of museum space? Do specific arrangements require particular spatial conditions? questions that through further examination in relation to the case studies, are left for the final discussion of the thesis.

Conclusion

What seems particularly intriguing in the foregoing review is that the main issues involved in the design of museums have preoccupied both architects and art historians, implying that there is an overlapping of interests and concerns between the two fields, which, if anything, justifies the original intent of the thesis, and its attempt to develop a synthetic overview of spatial and object layout within a single theoretical framework.

But the review also makes immediately apparent the contrast between a substantial body of literature that deals with the curatorial intent in museums, as opposed to the absence of architectural studies on museum space. More precisely, the lack of a theoretical approach to spatial layout has become clear in the review of the typological approaches and comparative attempts, in which spatial criteria remain elusive or varied. It has been further emphasized by the fact that a rigorous description of space is not available, and, as a consequence, there is difficulty in providing a systematic explanation and an overall understanding of the effects of space on functioning. Moreover, if the role of the arrangement of space is addressed in respect to the explicit functional programme of museums -the accommodation of visitors' movement and the arrangement of objects-, its unprogrammed social effects are not covered well by the existing literature.

On the contrary, the art historical studies made an important contribution to the research, as they established that there is an inherent spatial dimension in the organization of museum collections, and provided firm evidence that space is a fundamental component in the perception and reception of art. In response to this, the thesis has two aims: first, to address museum display as a spatial issue in its own right, and describe precisely how the arrangement of space, by structuring sequences, relationships of communication and systems of visibilities, determines particular ways of viewing objects and reading displays, over and above their specific qualities; second, to offer an abstract understanding of how the layout of objects interacts with the layout of space, and derive a model of the variability of layout styles - rather than limiting the discussion to the context of specific cases. In this respect, it is of critical value that the review renders explicit that a key distinction must be drawn between cases where the spatial structure is used to support the conceptual structure and, therefore, acts to *conserve* pre-given ideas, and cases where the spatial structure is given priority over the conceptual and acts to *generate* something new, over and above pre-existing concepts. To develop further this distinction, and to fill some of the gaps that have emerged so far from the preceding discussion, we will now move to the review of the syntactic studies, which constitute the theoretical as well as the methodological framework of our research.

Notes

[1] Though syntactic studies on museums constitute an important part of this literature and contribute significantly to the understanding of how space signifies and how it intersects with discourse, they are discussed separately, in the following chapter, as being the fundamental background of this thesis, both in theoretical and methodological terms.

[2] This distinction can be paralleled to Pevsner's argument about the museum as monument and the museum as instrument (see note 2).

[3] A fundamental argument in Pevsner's work is the proposition that the mid-twentieth century museum architecture does not introduce '*new principles*', and that it characterized by the shift from the '*ideal of the museum as a monument in its own right*' to '*the ideal of the museum as a perfect place to show, enjoy and study works of art*' (Pevsner 1976, p.13). This argument is taken up by authors like Giebelhausen (2006, p.242).

[4] G.D. Lowry, Director of MoMA, argued that '*museums of modern and contemporary art are perhaps the most open of all museums to an evolving typology*' concluding that '*it may be impossible to develop a clearly developed typology*' (1998, p. 79-80).

[5] For Newhouse the Centre Pompidou exemplifies the '*museum as entertainment*'. She noted: it '*has also brought an enormous potential audience to the museum's threshold in an atmosphere of fun and expectation that has radically changed public perception of the institution*' (1998, p.199).

[6] For a similar argument about the '*spatial synthesis*' between the architecture and the art in the Guggenheim, Bilbao, see Zeiger 2005, p. 17.

[7] Within the context of the debate about the relationship between container and content, and whether architecture or art is taking centre stage, Colquhoun proposes an interesting dichotomy between the museum architecture that seeks to reconcile itself with its context, and the architecture that becomes a critique of its context, as in the case of Eisenman's projects. See Serra 2000, p.91.

[8] Maybe it is no coincidence that among our case studies, it is the Castelvecchio Museum that best illustrates this argument.

[9] Variations of this theme are found in the sequences of rooms in L.C. Sturm's project for an ideal museum (1704) and Durand's plan discussed earlier. (See Brawne, 1982, p.11).

[10] A number of authors -like von Moos (2001), Searing (2004, p.19) and Mack (1999, p.19) argue that there has been recently a return to the classical tradition of enfilade, and propose as illustrative examples the Neue Staatgalerie, Stuttgart and the Getty Museum, Los Angeles (1984-1997).

[11] See Pevsner 1976, p.129; Brawne 1965, p.13.

[12] The circulation patterns developed above are both categorized by von Naredi-Rainer as '*directed sequences of rooms*'. One argument that could counter against this categorization is that by grouping these patterns together, the author seems to overlook the key issue of control of movement. In respect to this, the patterns differ considerably, since the single sequence determines a strictly controlled circulation, whereas the combination of a main route with alternative paths provides a less rigid circulation.

The issue of control is taken into account by Matthews in his typology of arrangement of spaces in museums (see Matthews, G., 1991. *Museums and art galleries: a design and development guide.* Oxford: Butterworth Architecture). Unlike von Naredi-Rainer, Matthews draws a distinction between the '*linear procession'*, referring to the single sequence, and the '*core and satellite plan*', where the core controls the movement to the rooms radiating from it.

[13] It seems curious however that the author categorizes the layout of the Sainsbury Wing in the type of '*directed sequences of rooms*', and not in the '*matrix-like room layouts*', arguing that it consists of three linear sequences of space, rather than structuring a grid of spaces.

[14] In '*Architecture and the Art Gallery*' (1992, p.89-91) Brawne has gone further to emphasize how the configuration of a room structures the morphology of movement within that space. He opposes the effects of a centrally located door to the one that is in a corner position; in the first instance, he argues, the door creates a direct central path through the room, giving the spaces on each side an equal value; so the viewer is confronted with a conflict of choice in respect to movement left and right. On the contrary, in the second case, entering from a corner position means that the entire three-dimensional space is quickly revealed and apprehended.

[15] There is a considerable body of literature on practical design guidance. For example see Dean, D., 1994. *Museum Exhibition, Theory and Practice*. London; New York: Routledge. On the organization of the exhibition environment -i.e. individual displays and circulation routes- in order to provide orientation support to the visitor see Belcher, M., 1991. *Exhibitions in Museums.* Leicester; London: Leicester University Press, where previous research is briefly reviewed and discussed.

[16] Since the 1980s, Foucault's ideas about power and knowledge have been particularly influential in museum studies, as illustrated by a body of writing. For example, E. Hooper-Greenhill (1992) in the *Museums and the Shaping of Knowledge*, based on Foucault's distinctions between different '*epistemes'*, argues that the transitions from the 'cabinet of curiosities' to the museum of the 19th century are indicative of the changes in the conceptions of knowledge; also, T. Bennett (1995) in *The Birth of the Museum: History, Theory, Politics*, and mainly in the 'Exhibitionary complex' (1996), draws on Foucault's discussion of the idea of the '*panopticon'* -a model for self-regulating prison developed by the philosopher J. Bentham- to suggest that public museums in the 19th century had to act as '*organ of public instruction*', encouraging visitors to '*regulate themselves through self-observation*'. He explains that museums and international exhibitions created open spaces where visitors could observe while being observed, survey and be always under surveillance' and thus self regulation is achieved.

For a brief review of the body of cultural theory-influenced literature of museum-studies see Mason 2006.

[17] There is a body of literature which has established the new museological idea that the museum is a discourse and objects may take on different meanings in different contexts (for an extensive

discussion of the 'New Museology' see the collection of papers edited by P. Vergo 1989. *New Museology*, London: Reaktion. Among the authors that adopt the 'textual approach', M. Bal has extensively analyzed what she calls the '*language*' of the museum, '*spoken*' through the juxtaposition of paintings, the modes of display, and the effect of architecture, that creates different kinds of relationships between the museum and the viewers (see Bal 1992. *Double exposures: the subject of cultural analysis*. New York: Routledge; Bal 1999.The discourse of the museum. *In*: R. Greenberg and al., ed. *Thinking about exhibitions*. London; New York: Routledge, 201-218; Bal 2006. Exposing the Public. In: Sh. Macdonald, ed. *A companion to Museum Studies*. Maiden; London: Blackwell Publishing, 525-542).

On the theories of art expressed by the display of the works of art in the 19th century National Gallery, London, see C. Whitehead's extensive research *The Public Art Museum in Ninetieth century Britain: The Development of the National Gallery* (Aldershot: Ashgate, 2005).

[18] Barr prepared two different charts for the exhibitions '*Cubism and Abstract Art'* (1936) and '*Art in out time'* (1939).

[19] Noordegraaf illustrated this argument by the example of the Municipal Museum of The Hague. Because the 1935 layout did not determine a route, visitors tended to miss out parts of the museum. So it was decided to indicate the preferred route on the museum guide (2004, p.136).

[20] There is a fourth type of script, the '*exclusive script*', according which the nineteenth-century Boymans Museum was set up.

[21] The museum is a conversion of a railway station designed by G.Aulenti and opened in 1997.

[22] It has also been argued that, behind the curatorial strategy of the parallel presentation -though in separate installations- of the academic and avant-garde art, there is a political intention -the end of polarization in the French politics of that period.

[23] The term is borrowed form the work of Staniszewski (1998, p.310) to refer to '*the various groups and collectives that were formed throughout the twentieth century (such as Dada, Surrealism, De Stilj, the Bauhaus, the Soviet Projects, and the Situationist International)*'.

[24] A similar conception of space is also fundamental to the exhibitions designed by M. van der Rohe (see Riley and Bergdoll 2002). The reaction against neutral space was most powerfully expressed in the International Surrealist Exhibitions, in 1938 and 1947. For a more in depth discussion of these exhibitions see Altshuler, B., 1994. *The Avant-Garde in Exhibition. New Art in the 20th century*. New York: Abrams, 116-155; Dunlop, I., 1972. *The Shock of the New. Seven Historic Exhibitions of Modern Art.* London: Weidenfeld and Nicolson, 205-207.

[25] For a fuller discussion see Held, R.L., 1982. *Endless Innovations. Frederick Kiesler's Theory and Scenic Design*. Ann Arbor: UMI Research Press.

[26] Using the term of G. Celant (1996, p. 378).

[27] It was designed for the International Exhibition of New Theatre Technique (1924).

[28] '*Proun*' was an abbreviation of Russian words meaning 'project for the establishment of a new art'. It was first designed for the 1923 Great Berlin Art Exhibition and a later version, the '*Room for Constructivist Art'*, was created for the 1926 International Art Exhibition in Dresden (E. Lissitzky, 'Proun space, 1923' in: Lissitzky 1970).

[29] Lissitzky was invited by the innovative director of the Hanover Landesmuseum (1922-36). See Cauman, S., 1958. *The living museum. Experiences of an art historian and museum director – Alexander Dorner*. New York: New York University Press, 103-104, 109.

[30] Among the most representative examples of museums: the Palazzo Bianco, Genoa (1950-51), designed by F. Albini; the Museo Correr, Venice (1953, 1957-60) and the Palazzo Abatellis, Palermo (1953-54), by C.Scarpa; the Castello Sforzesco, Milan (1954-56, 1962-63), by L.B. di Belgioioso, E. Peressutti, E.N. Rogers. For a detailed presentation see Huber 1997.

[31] The term ('*museografia interpetativa'*) was used by C. Baroni and quoted in: Magagnato 1982, p.155; Domus 1997, p.14.

[32] The term '*white cube'* was coined in 1976 by the art critic O' Doherty, who first, in his influential essay '*Inside the White Cube: The ideology of the Gallery Space*' (1986) emphasized the implications of the neutral environment for the contemplation of art: '*the outside world must not come in, so windows are usually sealed off….. Art exists in a kind of eternity of display, and though there is lots of 'period' (late modern), there is no time*' (1986, p.15).

[33] For a short chronology of curatorial incidents in the 20th century see Green, A., 2000. A short chronology of curatorial incidents in the 20th century. In: G. Wade, ed. *Curating the 21st century*. Walsall: New Art Gallery; Wolverhampton: University of Wolverhampton, 155-165. Also brief but comprehensive reviews of artists' projects that take the museology as their theme, in order to heighten visitors' awareness of the role of museums in interpreting culture, are found in: Bronson, A.A. and Gale, P., eds. 1983. *Museums by artists*. Toronto: Art Metropole; J.-H.Martin's analysis of D.Spoerri's '*Musee sentimental*' -a project in which, Spoerri displays and classifies objects based on personal criteria and memories, questioning the role of the artist (Martin, J.H., 1995.The 'Musee Sentimental' de Daniel Spoerri. In: L. Cooke, and P. Wollen, eds. *Visual Display. Culture Beyond Appearances*. Seattle: Bay Press and The Dia Center For the Arts, 55-67); Gorrin 1994, p.1-22 (a discussion of an exhibition designed by F.Wilson which addresses the issue of race).

[34] According to J. Putnam (2001, p.18), Warhol's exhibition at the Museum of Art, Rhode Island School of Design, in 1970 set the precedent for this practice; but instead of selecting his favourite works of art, he displayed complete groups of types of objects as found in the store.

Chapter Three
Space Syntax

Introduction

Intended to complement the architectural literature reviewed in the previous chapter, this chapter aims to describe the way in which we can formulate clear distinctions between museums in respect to the organization of space, and provide an understanding of what effects derive from their spatial organization. To deal with space, the study adopts the theoretical and methodological framework associated with space syntax,[1] developed first at the Unit for Architectural Studies, and then at the Space Syntax Laboratory, University College London, for analyzing spatial layouts as *configurations* of related spaces, and describing their social origins and implications (Hillier and Hanson 1984; Hillier 1996). The chapter begins by introducing space syntax, in order to develop the system of concepts and techniques that we use in our analysis. Then it moves to the account of the detailed study of the spatial design of the Tate Gallery by Space Syntax Laboratory (1996), and the follow up study, carried out by the researcher (2002), with three considerations in mind: first, the Tate study best illustrates the theory of the underlying effects of museum space; second, it constitutes the standard method of researching spatial layout in museums in a syntactic way; third, it acts as a point of departure for this thesis by preparing the ground for the development of the methodological framework, and beginning to expose the key dimensions to be explored.

Syntactic studies of museums are critically reviewed in the rest of this chapter. Organized in a broadly chronological framework, the review sets out from key studies that explain how space syntax can be used as a tool for exploring design alternatives and making strategic choices. It then proceeds to discuss the critical effects of museum layouts on the way people explore the galleries, become exposed to objects, and come in contact with each other. The review ends with the most recent papers that deal with the influence of spatial design on visitors'

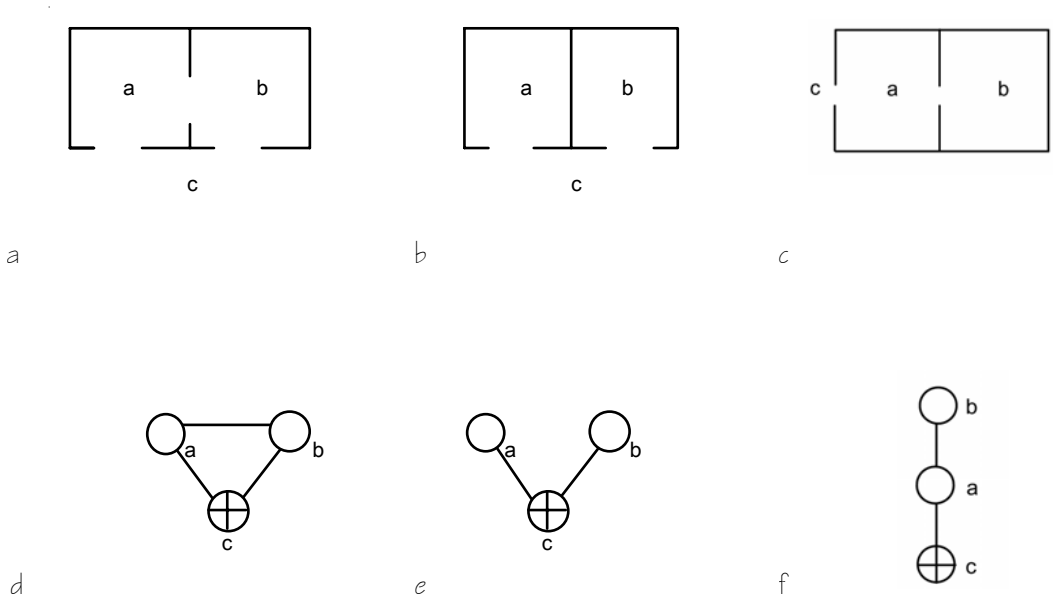
cognitive experience and visual perception, making thus apparent a shift in the syntactic literature from a persistent concern with the problem of the overall museum layout to an increasing interest in the microstructure of the gallery space and the spatial arrangement of exhibits.

3.1 A model for the representation and analysis of spatial layouts

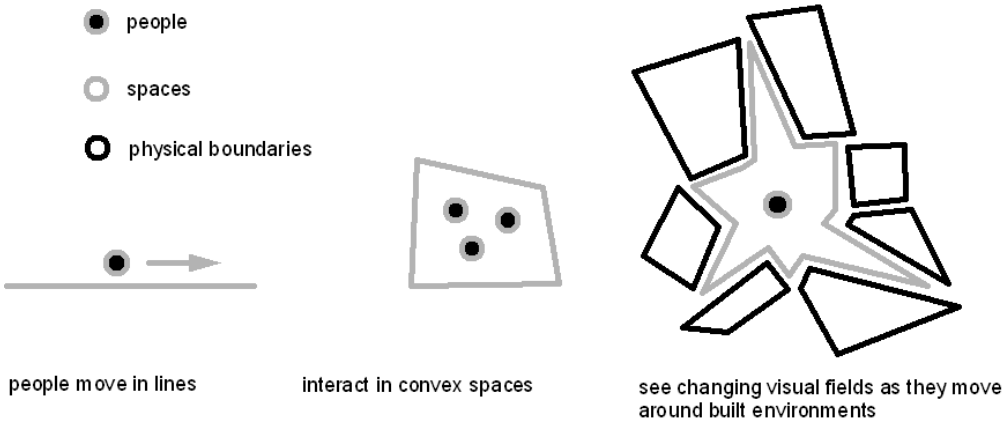
Space syntax is built on the basic idea that the way layouts are used or how they function is not about the properties of individual spaces, but about the complex relations between spaces and how they affect each other -what is called *configuration* (Hillier and Hanson 1984; Hillier et al. 1987b; Hillier 1996, 1998). As opposed to the metric or geometric properties of space which can be perceived directly (as, for example, the size or shape), the configurational properties (for instance, the overall location of a space in the layout) are more abstractly comprehended. For example, in **Figure 3.1** the two spaces *a* and *b* are different depending of whether both of them are directly connected to the outside, space *c*, [**Figure 3.1a**] or only one of them is related to *c*, so that it is necessary to pass through space *a* to get to space *b* from space *c*. [**Figure 3.1c**] It becomes evident that it is the configurational properties that make spaces more different from each other than their dimensions or shape. But to describe how a space relates to all others, a *configurational language of space* is required.

Representation of spatial configuration in buildings

Fundamentally configurational analysis means defining the spaces of a complex. From this follows the second basic syntactic idea, that space is not seen as a background, but as an intrinsic aspect of human activity. So space syntax techniques represent space in the way people occupy and experience it as part of their everyday life (Hillier 1999; 2005). People move through space in lines, interact with other people in convex spaces and experience space as a series of differently shaped *isovists*, or visual fields. [**Figure 3.2**] There are accordingly



^ **FIGURE 3.1** (a-c) Spaces *a* and *b* are different depending on whether both of them or only one of them is related to space *c*; (d) Spaces *a* and *b* are in *symmetric* and *distributed* relation with respect to *c*; (e) Spaces *a* and *b* are in *symmetric* and *non-distributed* relation with respect to *c*; (f) Spaces *a* and *b* are in *asymmetric* and *non-distributed* relation with respect to *c*. [*Hillier and Hanson* 1984, p.148]

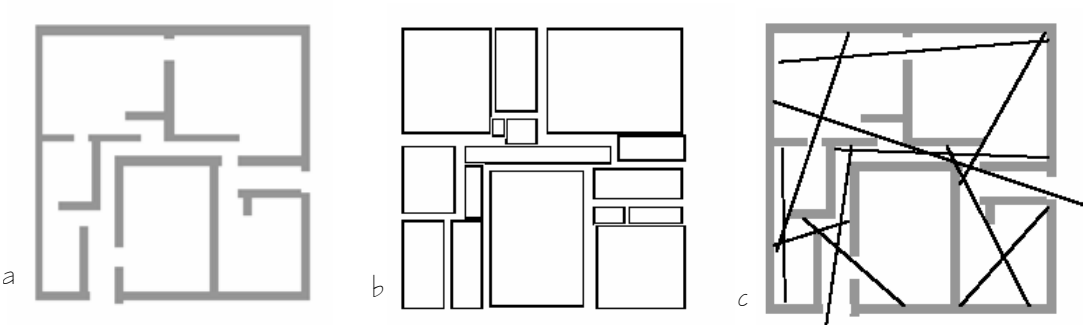


^ **FIGURE 3.2** Space is not a background but an intrinsic aspect of human activity [*Hillier* 2005, p.5]

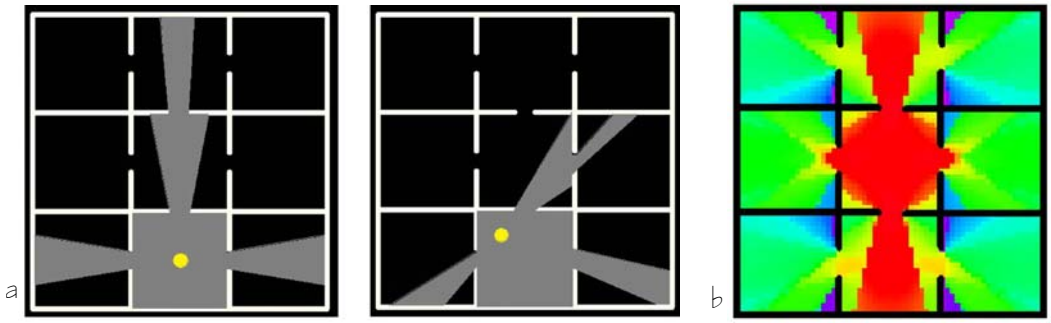
three fundamental ways in which we can break up the layout in its constituent spatial elements that represent visually the organization of space in the building: the convex, the axial and the isovist map, depending in what aspect of functionality we are investigating (Hillier 1996, 1999, 2005).

Buildings can be looked at as *systems of convex spaces* -a space being convex when every point is visible and directly accessible to every other point. A convex map is the fewest and fattest convex spaces[2] that are needed to cover the whole layout. [**Figure 3.3b**] Buildings can also be seen in terms of axial organization. An *axial map* shows the fewest and longest straight lines which cover all the convex spaces and make all connections of permeability between them. It represents the global scale, the overall relationship across spaces.[3] [**Figure 3.3c**] For the study of complex buildings -for instance, religious buildings, work environments, and more importantly, museums-, it has been found useful to combine convex and axial analysis into *convaxial* representation,[4] in which rooms are treated as linked to all spaces to which there is a direct visual connection (see below). A third way of representing a layout is the analysis of visual fields, the *isovist map* (or Visibility Graph Analysis). It derived from Benedikt's idea of an isovist, defined as a polygonal shape visible from a vantage point in space (Benedict 1979). [**Figure 3.4a**] Analyzing the plan as a pattern formed by the visual fields that we see from each point in space, [**Figure 3.4b**] we can describe the complexity of routes from a point to all others within the layout, and show most clearly the pattern of differentiation between the different points that make up the layout.[5]

Analyzing spatial configurations means also representing the spatial relationships in a building by a *graph*, in which the spatial elements are the nodes and the relations of direct permeability, the links. If we return to **Figure 3.1**, we can easily visualize the difference between spaces *a* and *b* in relation to *c*, by *justifying* the graph from a particular point -that is, place the circle that represents the root (or the outside of the system, treating this conventionally as a single space) on a baseline and then align all the other spaces above that, according to how many spaces deep they are from that point. Thus **Figures 3.1d** and **3.1e** are justified graphs of **Figures 3.1a** and **3.1b** respectively. The justified graphs have the



^ **FIGURE 3.3** The convex (b) and the axial (c) map of a simple layout (a)

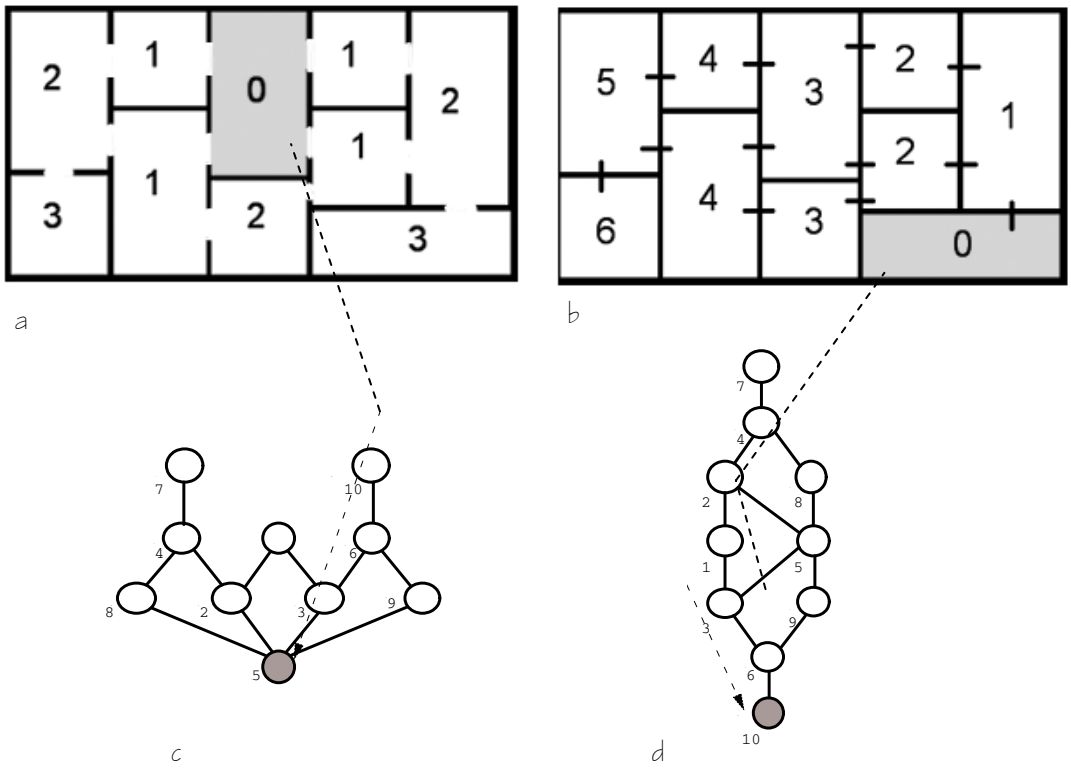


^ **FIGURE 3.4** (a) Examples of visual fields (shown in grey) from a vantage point (shown in yellow); (b) Isovist map (the most accessible locations are coloured red, then orange, yellow and green, through to blue and deep blue for less accessible).

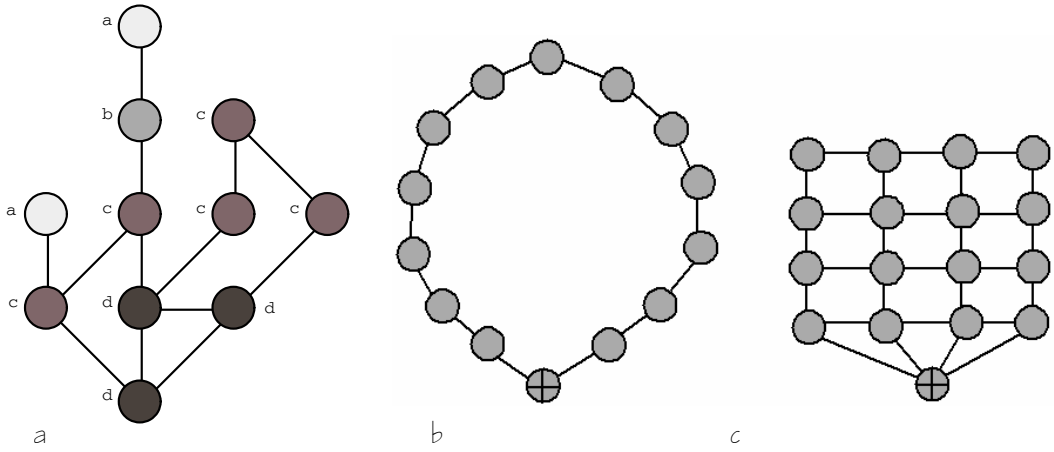
advantage that they render obvious basic syntactic properties, as for example, the properties of *symmetry* and *asymmetry,* depending on whether both spaces or only one of them is related to the outside (Hillier and Hanson 1984, chapter 4; Hillier 1996, chapter 1); or the properties of *distributedness* and *nondistributedness*, depending on whether there is one route from each space (*tree* system), or rings of circulation (*ring* system). **Figure 3.1d** shows *a* and *b* in a *symmetric* and *distributed* relation with respect to *c*, while Figure **3.1f** shows the two spaces in an *asymmetric* and *non-distributed* relation with respect to *c*. These properties will turn out be highly relevant to how museum buildings function.

The key to spatial configuration in buildings is that within the same building, space has different configurational properties when looked at from different points of view (Hillier et al. 1987a; Hillier 1996, 2005). For example, if we take the simple layout in **Figure 3.5a-b** and mark all spaces according to their *depth*, or topological distance, from the grey space marked with a zero (for 0-depth), we have a choice of 4 spaces one space away -so marked 1- then, 3 spaces two spaces away, and 2 spaces three away. If we add them up, we have a picture of the depth of all spaces in the pattern from that particular point, in other words, how many other spaces must be passed through to get to all others. The *total depth* of the grey space from all other spaces is 16. But if we start in the corner grey space marked 0, we have one space 1-deep, two spaces at depths 2, 3 and 4, and one each at depths 5 and 6, giving a total of 30. We can also make this visually clear by drawing the *justified graph* from the chosen space, as shown in **Figure 3.5c-d**. The concept of depth is one of the most important relational ideas in space syntax and the basis of some key syntactic measures (see below).

On the basis of the j-graph, we can also assign each space in a layout a *typological* identity, according to its embedding into a local complex. [**Figure 3.6a**] An *a-space* is 1-connected, in other words, a dead end; so it has no through movement potential and is an occupation space. A *b-space* is a non-end space in a *tree*, but on the way to a dead end, so all movement through a *b* must eventually go back the same way. A *c-space* is 2-connected and lies on at least one *ring*; by implication, it has one alternative way back and so movement can go round one



^ **FIGURE 3.5** Spatial layouts are different when seen from different points within them. This can be made visually clear by drawing the *justified graph* from the chosen space [*Hillier* 2005, p.7]



^ **FIGURE 3.6** (a) The *abcd* typology of spaces according to their embedding in the layout. (b-c) The two extreme possibilities in laying out space in museums: the single ring of spaces (b) and the maximally connected grid (c) [*Hillier and Tzortzi* 2006, p.296,298]

other way. A *d-space* is more than 2- connected and lies on at least two rings, and so tends to be naturally a movement space. This kind of analysis of configurational space-types is usually called the *space type analysis* and is particularly helpful in understanding the functioning of museum layouts (Hillier 1996, p.318-321; Hillier and Tzortzi 2006, p.299). This can be simply demonstrated by looking at the two extreme possibilities: at one extreme, is the single ring of spaces, in which every visitor has to go through the same sequence in the same order. This is a powerful way to use space that maximizes the control of the visitor and has little social potential. [**Figure 3.6b**] At the other extreme is the grid in which each space connects to all of its neighbours, and tends to form a complex which is difficult both to understand and to visit in an orderly sequence. However, this pattern minimises the control that the layout places on the visitor, and probably means than every visit is a new experience. [**Figure 3.6c**] As we shall see, museum layouts are mainly made up of *c-*, or sequence spaces and *d-*, or choice spaces, and it is the ratios between this pair of space-types, and the way they are arranged that critically affects the experience of the visitor.

Quantification of spatial configuration

Furthermore, we can refine the configurational analysis and achieve much greater precision through the quantification of the configurational relations between each space and all, or some others, measured on the basis of the convex, axial and isovist representations analyzed above. The most obvious local measure is *connectivity*; it indexes the number of direct connections from a space. The basic syntactic measure is *integration*, which, on the other hand, describes space as a pattern of global connections, and is based on the concept of depth. We have seen earlier that the amount of depth in a spatial system can be visually shown by the justified graph. This is also the basis of the degree of *integration* of that space in the system:[6] it expresses how many spaces distant a particular space is from every other space in the system. [7] The higher the *integration value* of a space, the more directly connected to other parts of the system; the lower the value, the less integrated the space, or more *segregated* and indirectly connected to other spaces.

In other words, integration does not describe metric distance, but the relations between each space and all the others in the layout.

There are two ways in which we can make this visually clear. First, with the justified graph representation; we can immediately see in **Figure 3.7** that the layout looks more or less integrated from different point of view; second, by assigning colours to spaces according to the integration values, from red for most integrated through to blue for least. This constitutes an essential feature of space syntax analysis, to make underlying patterns, not easily seen in the plan, intuitively clear. Using colours to index numerical values also brings immediately to surface the '*integration core*' of a layout, meaning a given proportion -usually the 10%- of the axial or convex spaces that are most integrated.

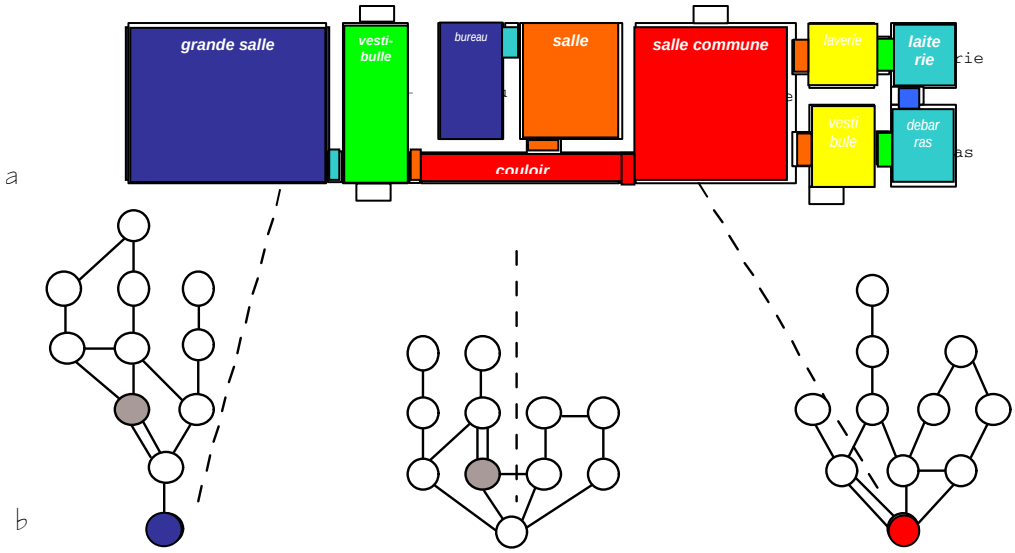
Another basic configurational property which refers to the total layout system (and not to the constituent spaces as well, as for instance *connectivity* or *integration*) is *intelligibility*. It is the fundamental relation of any spatial system, the relation of part to a whole. *A* spatial system is *intelligible*, or understandable, when what can be seen from individual spaces in the layout gives a reliable guide to the position of that space in the layout as a whole (Hillier et al. 1983). So *intelligibility* is defined as the degree to which the pattern of *connectivity* of all spaces of the system correlates with the pattern of *integration* values.

What follows from this brief introduction to space syntax concepts is that the basic strategy of syntactic analysis consists in identifying and representing the constituents elements of a layout -as lines, convex spaces, isovists or as one of the *abcd space types*- and measuring the configurational properties of the constituent spaces or of the total layout system. This strategy allows us to differentiate one space from another within the same layout, and to formulate clear distinctions between one kind of spatial layout and another. More importantly, by bringing the underlying spatial *structure* to the surface, syntactic analysis allows us to interpret spatial configuration. How this happens is the theme of the following section.

Interpretation of spatial configuration

To facilitate the presentation of the argument, we suggest introducing an idea, central to space syntax theory, the two-way relation between space and social activity (Hillier and Hanson 1984; Hillier 1985). It is argued that a spatial layout can *reflect* social patterns, but it can also *create* them by shaping a pattern of movement and co-presence in a layout. Syntactic analysis can in effect be used in both ways: to show how a spatial layout is constituted as a *dependent* variable, by retrieving the social information built into the spatial layout of a building; and to investigate how it acts as an *independent* variable, by assessing the impact of the spatial layout on how people use a building (Hillier et al. 1987c; Hillier 1996, 2005). This concept of the duality in the use of space, already suggested in the previous chapter, will be shown to be of critical importance in understanding the spatial logic in museums.

More precisely, the basic strategy of syntactic analysis is first to identify the key *structural* features of the layout (through the techniques analyzed above) and then to relate them either to the ways in which spaces are categorized ('living room' or 'early baroque' are equally categorizations of space) or with the observed aspects of space use within them (Hillier et al 1987a; Hillier 1993, 1996). In the first instance, we can see, for example, how cultural differences are expressed though the layout of rooms in domestic space. If we look at the French rural house shown in **Figure 3.7**, we find that the *salle commune*, used for everyday living, is the most integrated space, much more integrated, for example, than the *grande salle* for formal receptions. In other words, the *salle commune*, or the *grande sale*, is not just a space with certain furniture and facilities, but also a certain configurational position in the house. If there is a common pattern to the way in which different functions are spatialized in the house across a sample of houses - for example, from a particular region- then it can be argued with quantitative rigour that the spatial layouts of houses can *reflect* and *embody* a social and cultural pattern.[8]



total depth from grande salle:31 **total depth from outside**: 18 **total depth from salle commune**: 21

^ **FIGURE 3.7** The relations between each space and all others in the rural French house are made visually clear in two ways: (a) by shading spaces according to their *integration* values, (b) by making the chosen space the '*root*' of a justified graph. [*Hillier* 2005, p.7-8]

We recall that a similar idea underlies the argument advanced by a body of the art historical literature (reviewed in the previous chapter), that the spatial arrangement of objects in museums reflected specific theories of art. Some of the syntactic studies on museums reviewed in later sections will come to confirm and enrich this idea through specific cases.

But this is not all that space does. Space syntax research has shown that the spatial layout affects the functioning of buildings and cities. A key outcome, both at the buildings and urban level, is that the pattern of movement -a critical phenomenon, since both buildings and cities are fundamentally about movement-, is determined by the pattern of integration, meaning that the most integrated spaces are statistically associated with higher densities of movement. Specifically in urban layouts,[9] it has been found that the pattern of integration of streets determines the diffusion and density of pedestrian and vehicular movement over and above the impact of other factors, such as the local properties of the space or the location of facilities. This ability of space to generate or modulate movement has further implications, regarding, for instance, land use or safety. But more importantly, it has a social by-product: it determines the degrees of natural co-presence in the urban space, in other words, the precondition for social encounter. This has led to the suggestion (Hillier 1987c, p.248; 1989, p.18) that space generates its own form of community, a '*virtual community*' based on mutual awareness, rather than active interaction. Hillier et al. (1987c, p.248) described it as follows:

'*the field of probabilistic co-presence and encounter generated by an urban layout has a definite and describable structure, one which varies greatly with the structuring of space; …..We suggest it should be called the virtual community: community, because it is a form of group awareness in a collectivity; virtual because it has not yet been realized through interaction among its members. The virtual community is the product of spatial design.*'

But, as extensive research has shown, the degree to which movement and encounter are predictable from integration is to some degree a function of the intelligibility of the layout[10] (Hillier et al 1987c, p.235; Peponis and Wineman 2002, p.278-279).

This fundamental relationship between space and movement, or encounter, patterns has also been tested and expanded through studies in a range of building layouts. The study of factory layouts (Peponis 1983, 1985) showed that the encounter among workers is associated with the spatial integration; similarly, analysis of work environment -offices, editorial floors (Peponis and Stansall 1987) and laboratories (Hillier and Penn 1991; Hillier 1996), indicated that the levels of social and professional interaction were a function of space organization. More importantly, previous syntactic findings have established that the potential for informal encounter between visitors in museums is a function of the space organization -what is called *churning* effect, meaning, agitating though mixing people on local and global paths (Hillier et al. 1996; Hillier and Tzortzi 2006), the equivalent of the '*virtual community*' in museums. Nowhere is this clearer than in the Tate Britain study to which we will now turn.

3.2 The Tate Britain study

The Tate Britain study best illustrates the key syntactic idea, that the layout itself can be the prime determinant of how people use a building and move around in it. The Tate also constitutes the most studied building in a syntactic way, since its layout has been repeatedly analyzed as it has evolved in the last decade, and used to test out new forms of spatial analysis as they developed (Hillier et al. 1996; Hillier 2005).[11]

Tate Britain was originally built in 1897, but has evolved gradually, from 1899 until 2001, with additions and extensions.[12] Space Syntax Laboratory was commissioned by the Tate, in July 1995, in developing and evaluating design proposals for the latest expansion and remodeling of the building. The aim was to ascertain the likely impact of the proposed additions (a new basement level entrance) and changes to the existing layout, and how they might affect the patterns of visiting and the *spatial culture* of the gallery.

Previous visitor surveys had shown that visitors valued the informal and relaxed atmosphere of the Tate, and tended to visit quite impromptu and to repeat visit. These were clearly key factors in the success of the Gallery in spite of its

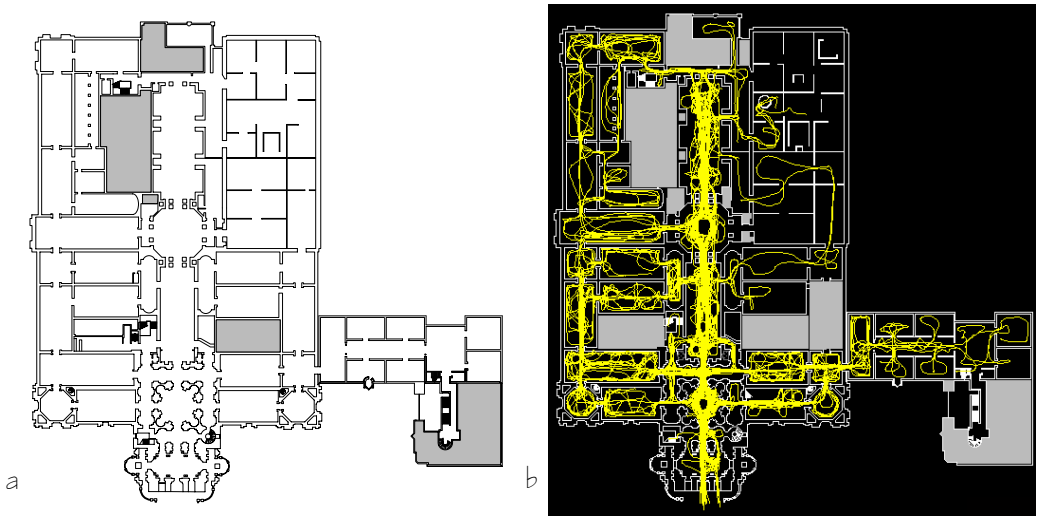
somewhat remote location. The puzzle was how the formalised neo-classical layout of Tate Britain [**Figure 3.8a**] could have created what seemed to be a distinctly informal visiting culture.

A model for researching into the spatial layout of museums

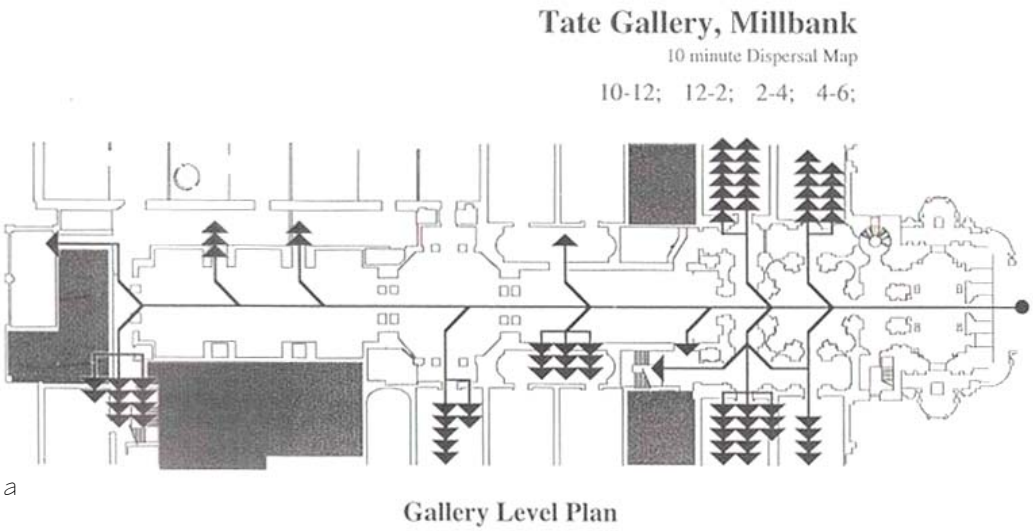
The initial task was to observe how the gallery worked and then try to predict what the effects of the remodelling would be. This entailed a thorough study of movement and space use, an approach that has become the standard method for researching spatial layout in galleries and museums in a syntactic way.

First, to understand the pattern of movement, which previous studies had concluded was random, the routes of 100 people were recorded for the first ten minutes of their visit. [**Figure 3.8b**] The *tracking data* showed that upon entering, visitors quickly diffused into many, but not all, parts of the gallery. Many moved along the central axis of the building from the main entrance and then turned into one of the shorter cross axes, but with a strong bias to the left side galleries. Many other also turned immediately right to go the Clore Gallery (the 1987 addition), but, although this led to high flows in the main access spaces in the Clore, there was a comparative paucity of visits to the immediately adjacent dead-end spaces. [**Figure 3.9a**]

These observations were followed by a much denser study of movement and space use. Since, for the most part, the layout of Tate Britain takes the form of room-like spaces with entrances, which often, though not always, are aligned in sequences, counts of visitors crossing each threshold were made throughout the day, [**Figure 3.9b**] so that dividing the result by two (because each visitor both enters and leaves the space) gives a mean occupation rate for each space. Space averages were then divided by 60 to give flows per minute, which are easy to visualise. Separate counts and plots were also made of how many people were standing, viewing exhibits -or sitting-, in each space, by 'taking mental snapshots' of each space[13] again throughout the day. Each space could thus be indexed with a *moving* rate, a *viewing* rate and a *total occupancy* rate (by combining the figures



^ **FIGURE 3.8** The 1996 plan of Tate Gallery (a) and the traces of hundred people entering the gallery and moving for first ten minutes (b) [*Hillier et al.*1996]



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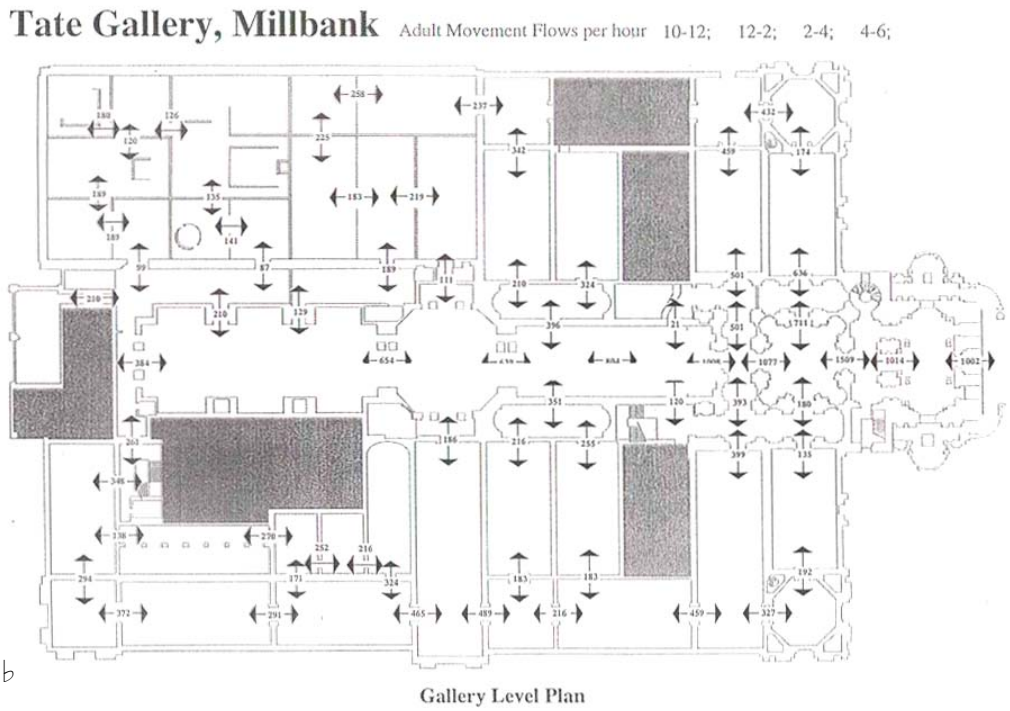
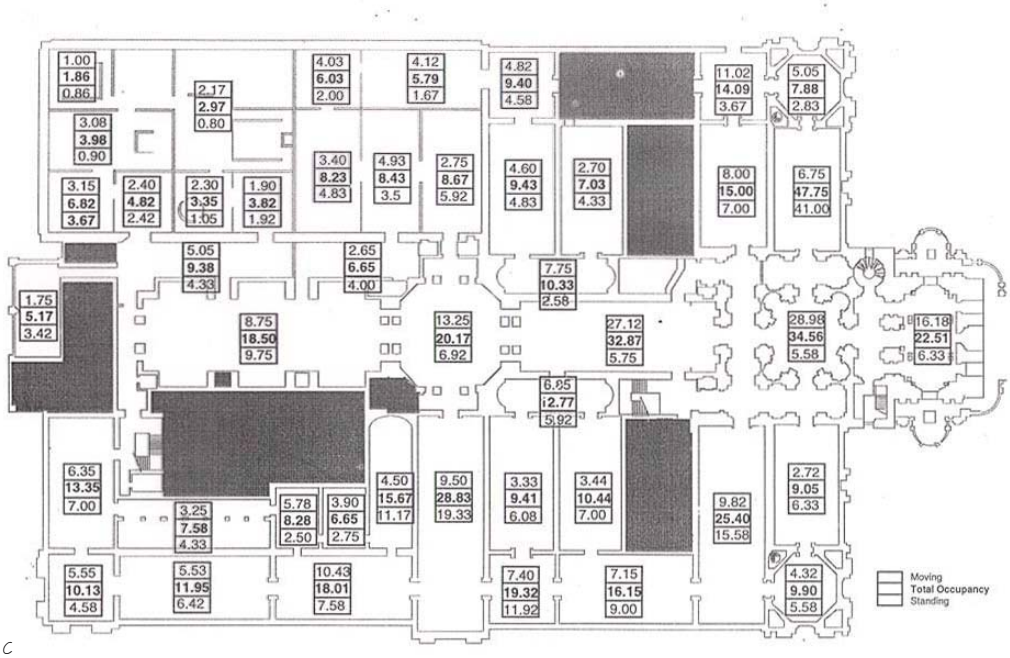
^ **FIGURE 3.9a** A map showing to where people are moving from the main axis in the Tate Gallery throughout the day [*Hillier et al*.,1996]



^ **FIGURE 3.9b** A map showing the movement flow of visitors per hour in the spaces of the Tate Gallery throughout the day [*Hillier et al.*,1996]



^ **FIGURE 3.9c** A map showing the all day average room rates per minute at the Tate Gallery [*Hillier et al.*,1996]

for viewing with those for moving, in order to facilitate comparisons between spaces). [**Figure 3.9c**]

The empirical investigation showed that to a surprising degree, the main feature of the pattern established in the first ten minutes of visits turned out to be reflected in the all day movement pattern. Furthermore, simply comparing viewing and moving rates for each space showed clear patterns. For example, in the parts of the main axis closest to the entrance, moving predominated over viewing, not only because visitors were on their way to destinations deeper in the gallery, but also because these parts of the main axis were also used for cross movement between different parts of the gallery. At the far end of the main axis, viewing and moving were in balance, but with much higher rates of viewing. In other spaces, it was clear that there was much more viewing than moving.

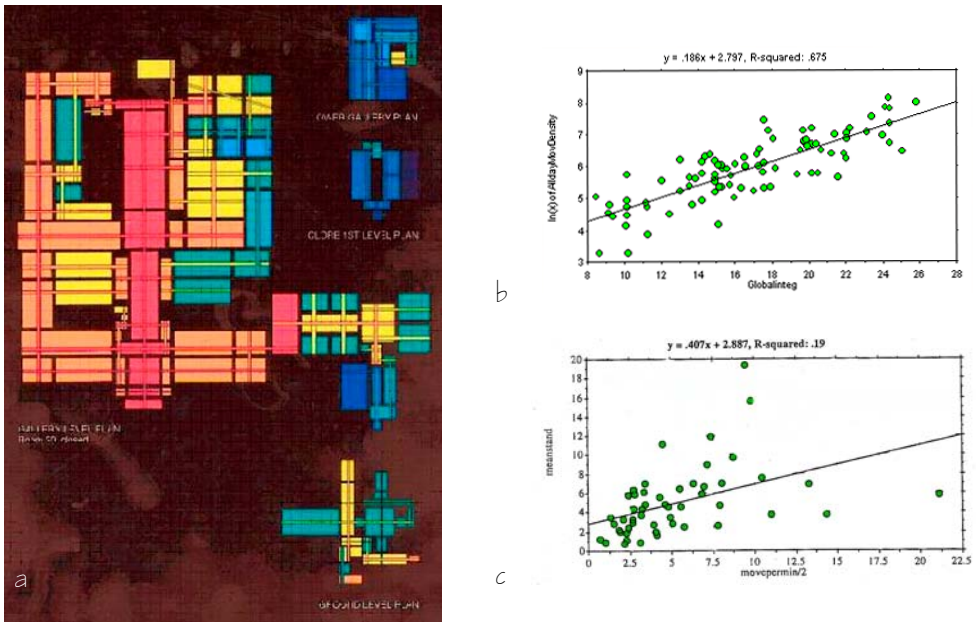
The next step was to correlate the observed movement rates with the numerical integration values of the rooms, measured on the basis of different ways of representing and analysing the layout. A statistical correlation, or an *r-square* of .393 (on a scale from 0-1, with 0 meaning no relations and 1 a completely deterministic relation) was found with *convex integration,* in which rooms were simply related to neighbours to which they had direct access; one of .555 with the *axial* representation, in which rooms were analysed as lines of movement through spaces; and one of .68 with a *convaxial* representation. [**Figure 3.10a**] This high level of the *convaxial* correlation, shown in the scattergram[14] [**Figure 3.10b**] demonstrates that the gallery was being read by visitors in the way it was designed, that is, as rooms linked visually through entrances in *enfilade*. [15] But is also suggests that the way space was represented turned out to be critical to developing the understanding of the building.

The number of visitors viewing exhibits also correlated best with the *convaxial* measure, but much less well than movement. However, correlating the numbers of people moving with those viewing in each gallery showed clearly that some rooms were getting much higher viewing rates than would be expected from the movement rates, and in others, the contrary was the case. Looking closely at the scattergram shown in **Figure 3.10c** and using the regression of movement against viewing as a baseline, it was possible to see how far each room was attracting

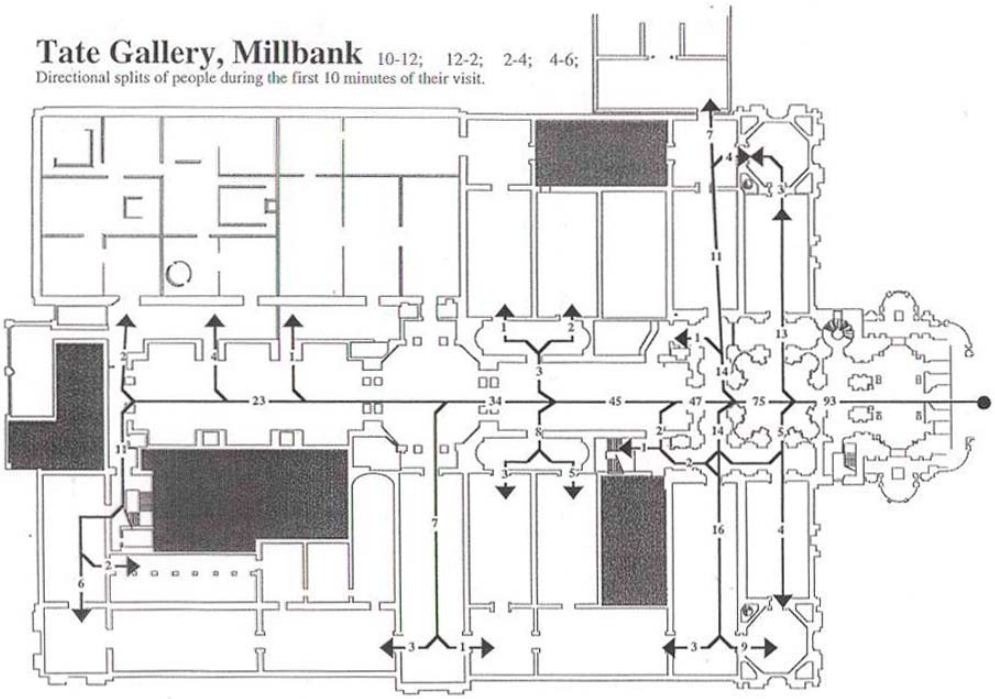
viewers over and above what would be expected from the movement rates. Among the spaces that had higher viewing than moving were the key spaces to the left of the main axis, that showed Victorian painting (room 9), Surrealism and Abstraction, with the works of Dali being a strong attraction (room 15), and the Pre-Raphaelites (room 10). The difference could thus be used as an index of the relative attractive power of the exhibits in those rooms, and further analysis was able to show that there was an underlying curatorial tendency to place more attractive exhibits in more integrated locations. So it was possible to test how far curatorial intent was tuned to the propensities of layout.

The analysis, as developed above, showed directly the power of the building to shape what went on in it through spatial layout. The key question was, then: What made the gallery work this way? In fact, the spatial analysis had already made the reason clear by bringing to light an *integration core* [**Figure 3.10a**] which linked the main entrance through the main axis to the deeper parts of the building, and structured access both to the galleries from the entrance, and between galleries in different parts of the building. The axis, and the ways in which the galleries were related to it, thus played a key role both making the layout *intelligible* as a whole (this was numerically confirmed), so that visitors by wandering about could easily retrieve a picture of where they were. This layout structure which organises movement both in and out of the gallery and within the gallery is called a *shallow core*, and has the emergent social function we referred to earlier, the mixing of people on local and global paths. [**Figure 3.11**] An integrating point in the layout gathers and distributes movement in different parts of the building, but also links the entrance area, so that that people moving within the gallery are continually brought into *co-presence* and *re-encounter* those moving in and out of the gallery, and those they have previously encountered. These encounters feel like random events but are really a predictable effect of the layout that constantly disengages people from each other and then, with a certain probability, brings them together again.

This effect is also related to a key aspect of a gallery layout, the way it balances and relates its *c*- and *d-spaces*, since there is no possibility of enlivening the sense of encounter if there is not enough choice in the layout. As argued in the previous



^ **FIGURE 3.10** (a) The composite axial/convex analysis of the Tate Gallery; Scattergrams plotting movement rates against: (b) the convaxial integration values and (c) the viewing rates [*Hillier et al.*,1996]



^ **FIGURE 3.11** A map showing the directional splits of where 93 people are moving to the first ten minutes of their visit to the Tate Gallery [*Hillier et al.*,1996]

section, the more *c-spaces*, then the more constrained the visitor onto particular sequences and the less the social potential; the more *d-spaces*, then the more there is choice and potential for exploration and dense encounter. The Tate (as it was during that time) consisted of about two thirds *d-* and one third *c- spaces*, a pattern which offered enough, but not too much, choice of pathways for visitors, and at the same time rendered the gallery socially exiting. These properties of the layout also explained how an informal, and apparently highly random, pattern of visiting, with a sense of dense encounter, arose from a simple, structured layout.

A theoretical and methodological point of departure

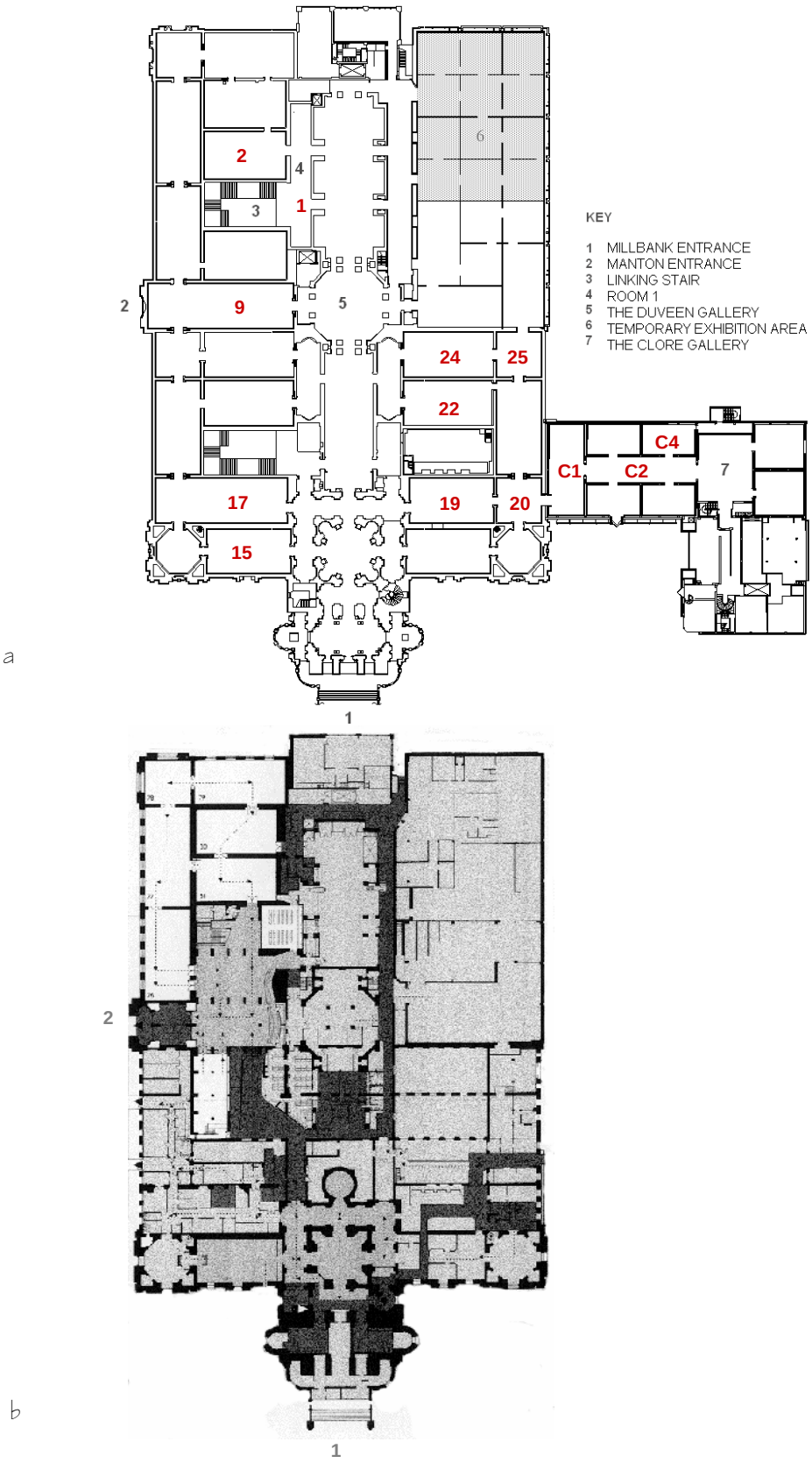
The new spatial design[16] -as developed by John Miller+Partners- was completed in November 2001. It included mainly opening a lower level of galleries with a new main entrance along the south side of the building[17] and refurbishing the galleries of the northwest quadrant of the main gallery. [**Figure 3.12**] It was then decided to carry out a follow up study, in March 2002, shortly after the reopening of the museum, to evaluate the functional effects of remodeling changes and analyze its success or failure in maintaining and complementing the existing *spatial culture* of the gallery. Against the background of the previous study, it was thought essential first to understand how the new design was working and how visitors were actually using the Tate and moved around in it, and then try to investigate whether the spatial layout was still responsible for the functioning of the gallery.

The new design led inevitably to the split[18] in use between the two entrances: the new Manton Entrance was on average used by 33% of visitors, while the Millbank still attracted 66% (and the Clore entrance 1%). However, tracking the routes of 58 visitors[19] during the first ten minutes of their visit, [**Figure 3.13**] showed that the initial pattern of movement was not affected to a large extent, and the main axis still dominated the pattern of space use -it had by far the highest movement rates, more than twice the average. For those who entered by the main entrance, [**Figure 3.14a**] the axis worked as the integrating point that imparts movement in different parts of the building, as it was shown in the previous study. But what

was more interesting was that, for the majority of those who reached the gallery floor by the new entrance, [**Figure 3.14b**], the axis functioned also as an orientation device and a navigation aid.[20] This effect could be explained by the strategic location of the new linking staircase that leads to the beginning of the route proposed by the museum, [**Figure 3.12a**, Room 1] and allows an important visual connection into the main axis of the building, facilitating the orientation of the visitor and simple wayfinding.

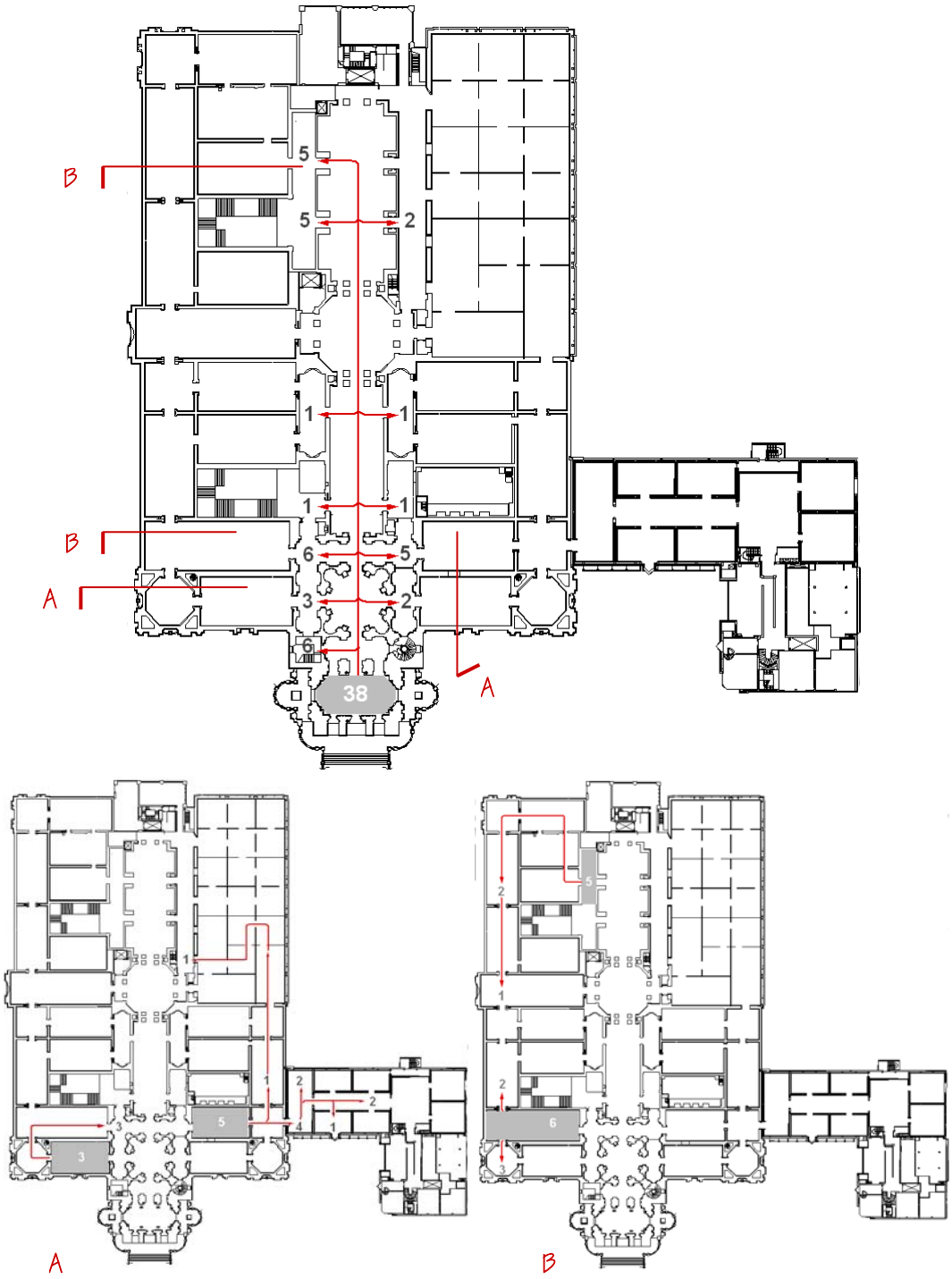
Furthermore, it was found that the bias to the gallery spaces on the left side of the building was still pronounced, if not more so. The majority of people entering by the main entrance turned off the main axis early (room 15 and 17). 13 % followed the recommended route of going to the end of the main axis before turning left (room 1), and exactly the same percentage of people turned right (room 19). In comparison to the right, the left side complex had also the highest movement rates, in terms of total average and individual galleries. The most well occupied spaces were located in striking positions: room 1 (used as a transition space by those arriving by the new staircase), room 2 (in the route of visitors arriving from the new entrance as well as those moving along the main axis), and room 9 (a key space, located in the junction of two major axes and open into the circulation spine of the building).

This is not where the similarities between the two studies end. Coming to the almost symmetrical complex on the right, it was found that it still underperformed after the remodelling changes. On the whole, it had rates of movement (mean 2.23 per minute) lower than those of the Clore, and included spaces (as for instance rooms 18, 22, 24, and 25), whose mean movement rate was 0.85 per minute, that is less than third of the average. [**Figure 3.15**] On the other hand, two of the most well occupied spaces of the whole gallery, rooms 19 and 20, were part of this complex. How could we explain this finding? One reason for the total low movement rates of the right side was the fact that the new entry level and, by implication, the linking staircase was not directly linked neither to this complex of spaces to the right side of the main axis nor to the Clore. But the discrepancy between the two sides in terms of movement rates could also be due to the heterogeneity and the lack of internal coherence that characterized the complex on



^ **FIGURE 3.12** Plans of the gallery (a) and the ground level (b) of Tate Britain (also indicating the room numbers, in red)

^ **FIGURE 3.13** Routes of 58 people observed during the first 10 minutes of their visit at Tate Britain, on the gallery (a) and the ground level (b). In red are indicated the locations of stops.



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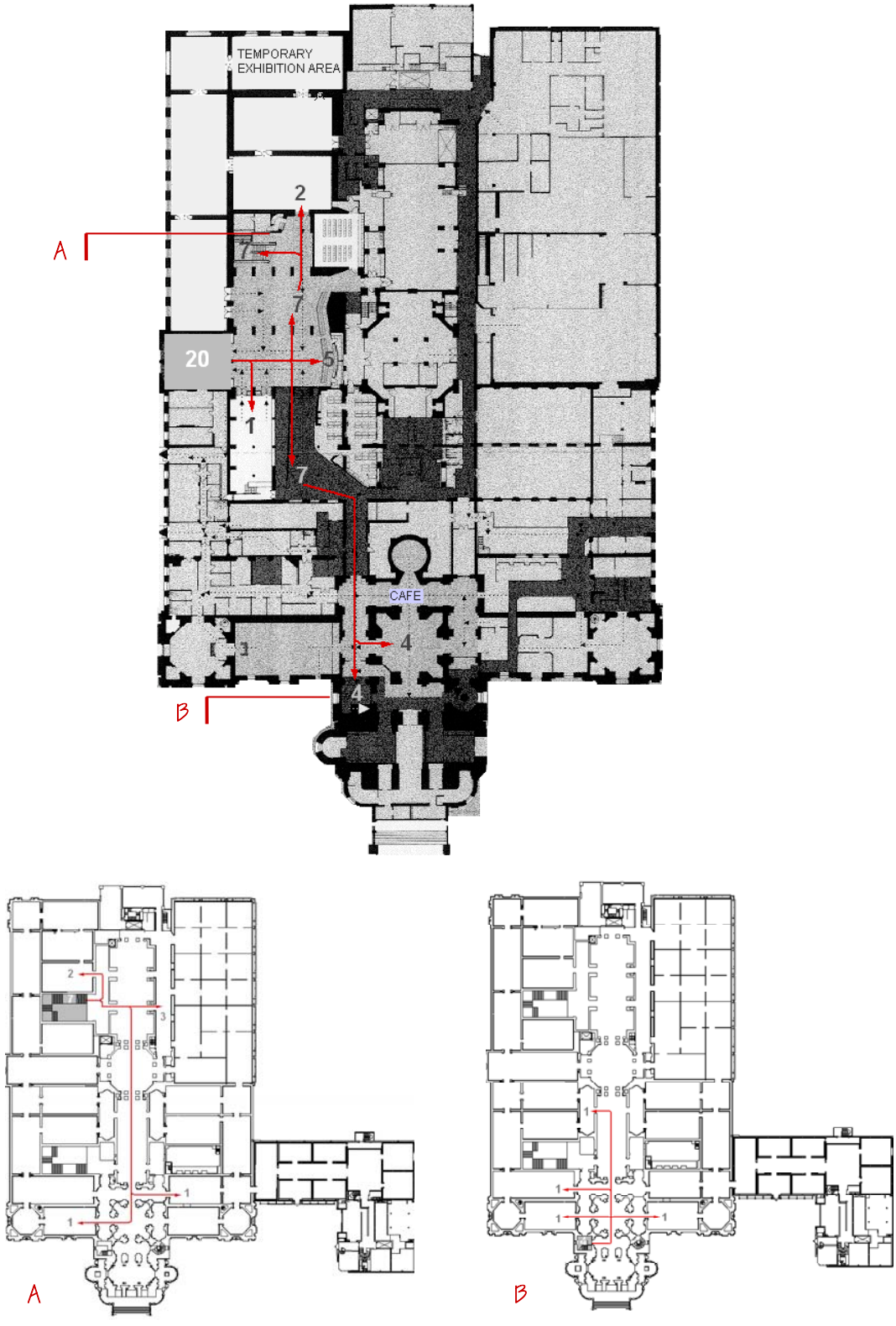
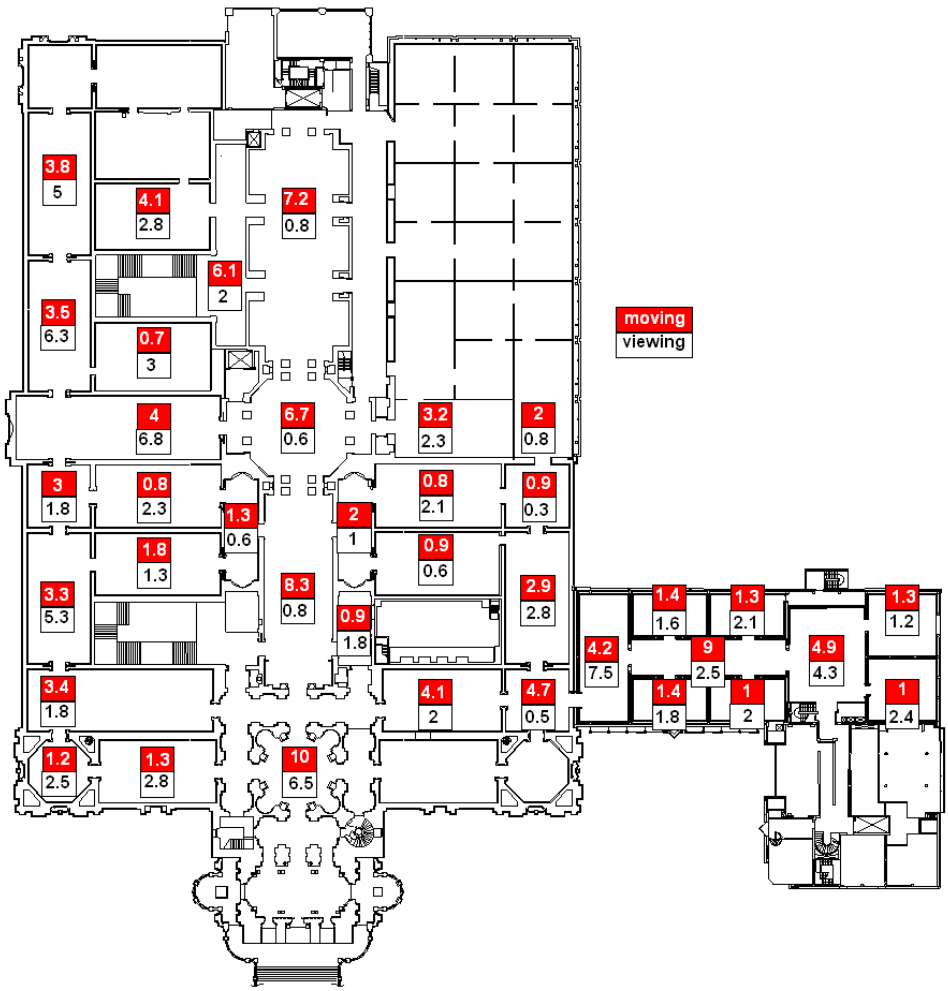
^ **FIGURE 3.14** (a) A map showing the directional splits of where 38 people are moving from the main entrance of Tate Britain in the first 10 minutes of their visit.



b

^ **FIGURE 3.14** (b) A map showing the directional splits of where 20 people are moving to from the new entrance in the first 10 minutes of their visit. Maps A and B show their route choices on the gallery level



^ **FIGURE 3.15** The gallery level plan of Tate Britain showing the average movement rates (per minute) and viewing rates (per snapshots) of each space

the right. Its south-eastern part was occupied by the shop, its north-eastern, was dedicated to temporary exhibitions, and the remaining part, the core of the complex, consisted of a set of spaces, much more strongly sequenced that those on the left. Furthermore, the key axis of this complex, transversal to the main circulation spine, worked mainly as a route to the Clore Gallery. Since there was no independent entrance to the Clore on the gallery level,[21] spaces 19 and 20 made the link between the main gallery and the Clore, and had therefore high movement rates; but these were in effect deceptive due to the compulsory character of the through movement. A similar observation was made in respect to the movement rates in the central spaces of the Clore (C1, C4 and especially C2 which had the highest level of viewing of all gallery spaces), since high movement in the key spaces did not generate movement in the side, dead-end, rooms as well (and certainly not in the spaces of the upper floor which were underused).

So the question to be addressed next was: does more integration mean more movement, as it was the case in the previous layout? At first sight, the pattern of integration in the layout seemed to bear resemblance to the movement pattern, as shown in **Figure 3.16a.** The convaxial map indicated that the central axis constituted the *integration core* of the gallery, combined with a series of vertical axes on the left side of the building, and a secondary cross axis, running from room 17 on the left side, to the first space of the Clore, which became equally important. A strong bias of integration to the left side was also apparent, and became even stronger when in the spatial model, we also took into account the space outside. [**Figure 3.16b**]

The observations were also confirmed numerically. A good correlation (R^2= .505) was found between the movement rates in different spaces[22] with the integration values given by the spatial analysis (the statistical significance of correlation values, or *p-value*, was < .0001), shown in the scattergram in **Figure 3.17a.** This means that more than half of the differences in moving in different areas of the main gallery seemed to be due to the configuration of the layout itself. Interestingly, the correlation between the two variables improves (R^2= .62, p= < .0001) if we exclude the Clore data. [**Figure 3.17b**] Further analysis showed that

movement in the Clore was strongly correlated with local measures, for instance a statistically significant correlation of (R^2= .66, p = .0007) was found between movement and connectivity. This result could perhaps be explained by the following argument. The Clore complex was rather segregated; consequently, the high movement rates were not correlated with global integration, but, in contrast, local values seemed to be more significant. It was therefore suggested that the Clore worked differently than the main gallery, in other words, it worked locally in relation to movement.

A key point that derived from the analysis above, and is of critical value for the particular aims of this thesis is that the differences in spatial structure between parts of the gallery were crystallized in different movement patterns.[23] Precisely it was found that the structured left complex, characterized by a ratio 1:2 between *d*- and *c-spaces* had high movement; the Clore, the layout of which was made up of *c*- and *a -spaces*, by differentiation between movement rates; and the right side complex, comparatively the more sequenced part of the gallery, was marked by uniformity in the low movement pattern. [**Figure 3.18**]

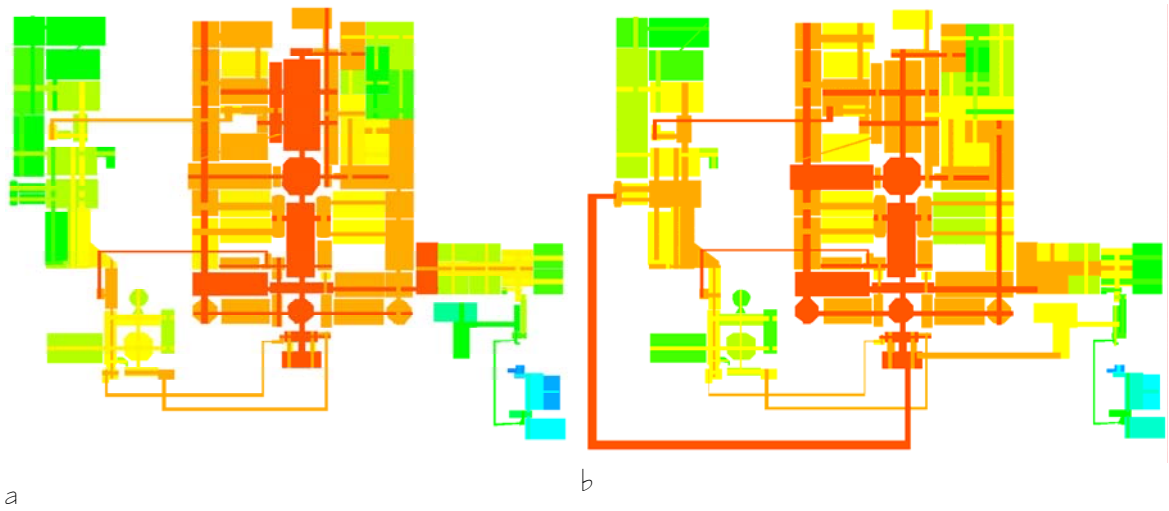
Before moving to the observed patterns of viewing, it should be noted that the new design was also seen as an opportunity of exploring a new presentation of the collection of British art, from the sixteenth century to the present, since the section of international modern and contemporary art had moved to the Tate Modern. Works were now arranged into two broad chronological blocks corresponding to the division of the building by the main axis: the art of the period 1500-1900 was shown in the west side complex and that of 1900-to the present, on the east. [**Figure 3.19**]

One of the most striking findings of this study is precisely related to the difference between current and previously observed viewing patterns: the main axis seemed now to be almost exclusively confined to movement function, as people tended to move along it and not stand to view the exhibits.[24] [**Figure 3.20**] One reason for the discrepancy between movement and viewing rates[25] may be the fact that in contrast to the 1996 arrangement, in which the main axis was part of the display of the permanent collection, in the new layout, the axis was systematically devoted to temporary exhibitions and, as a consequence, worked independently of

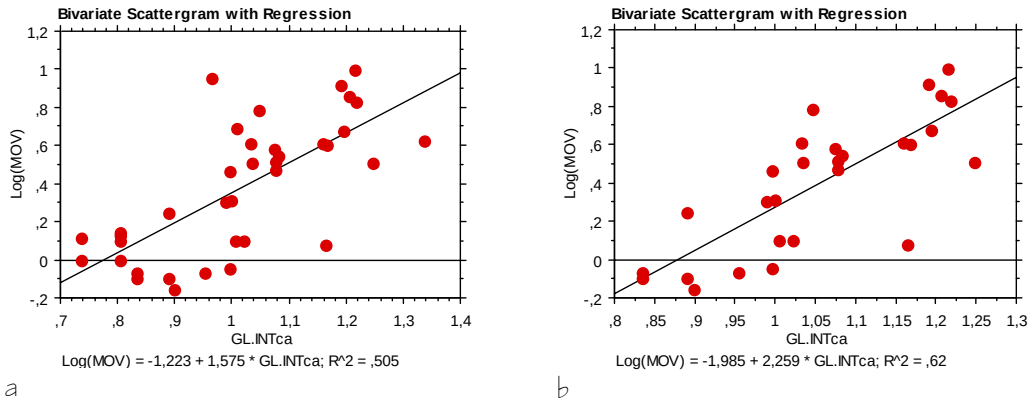
the galleries. [**Figure 3.19a**] But, apart from the axis, it was found that the spaces with *higher viewing rates were located in high movement areas of the gallery,* as for instance in the key spaces of the left complex or the central spaces of the Clore. Respectively, the low movement rates on the right were coupled with low viewing,[26] as shown in **Figure 3.15**. An observation should be made in respect to room 8, which was one of the few gallery spaces that remained devoted to the same displays after the recent refurbishment, the works of W. Blake. It was found that its poor movement (as it was also found in the 1996 study) was coupled with higher than average viewing (in contrast to the low figures in the 1996 study). This observation may lead to the suggestion that improving considerably its access (located by the new staircase and directly connected to the transition space 1) has also contributed to improving its operation.

On the basis of the above observations, it was suggested that movement can positively affect viewing.[27] This does not mean that the attraction power of the works themselves was dismissed as insignificant. On the contrary, it was argued that it was the special attraction of the earlier works (1500-1900) displayed on the left side that contributed to the differences in viewing patterns. [**Figure 3.19c**] This part of the collection constituted the highlight of the Tate Britain, as opposed to the modern and contemporary British art which was also represented in Tate Modern (among other London galleries). [**Figure 3.19d**] Maybe the fact that now people '*get to the Clore and to the pictures*' (paraphrasing the argument advanced by the 1996 study which identified the opposite tendency) could also be explained by the same argument: the division of the displays between Tate Britain and Tate Modern rendered Turner one of the gallery's main attractions. [**Figure 3.19e**]

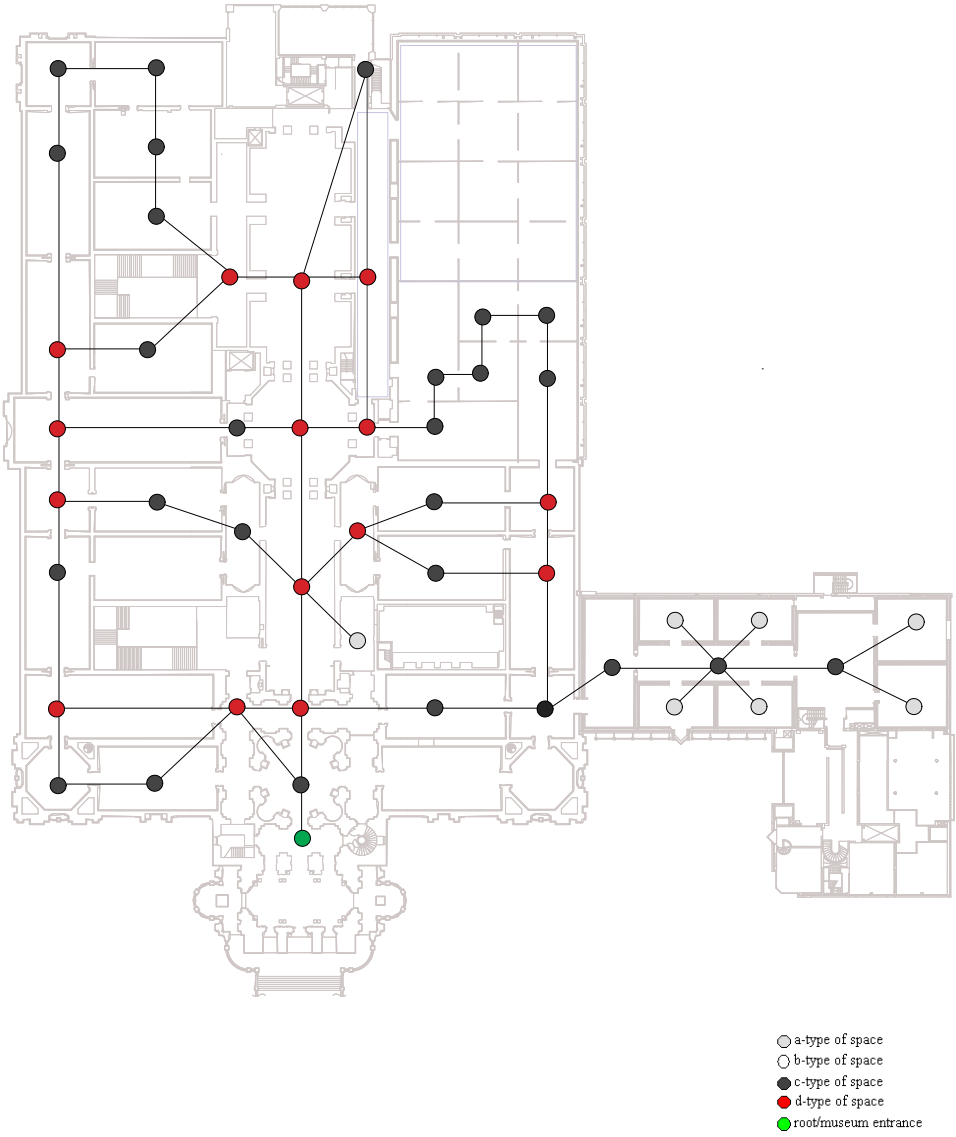
What were then the key findings of the study? The general conclusion that emerged with respect to the spatial operation of the new layout was that the level change introduced a certain degree of complexity into the layout and the 'spatial logic' of the building was not immediately apparent to visitors entering by the lower floor. It could be also suggested that the new design favoured even more overtly, the left side of the gallery –a bias which was reflected both in the integration and the space use patterns. But on the other hand, the plan was given a strong global structure, and that the lower entrance complex as well as the spaces



^ **FIGURE 3.16** (a) The spatial integration analysis of the Tate Britain layout; (b) the pattern of integration in the layout including the outside space.



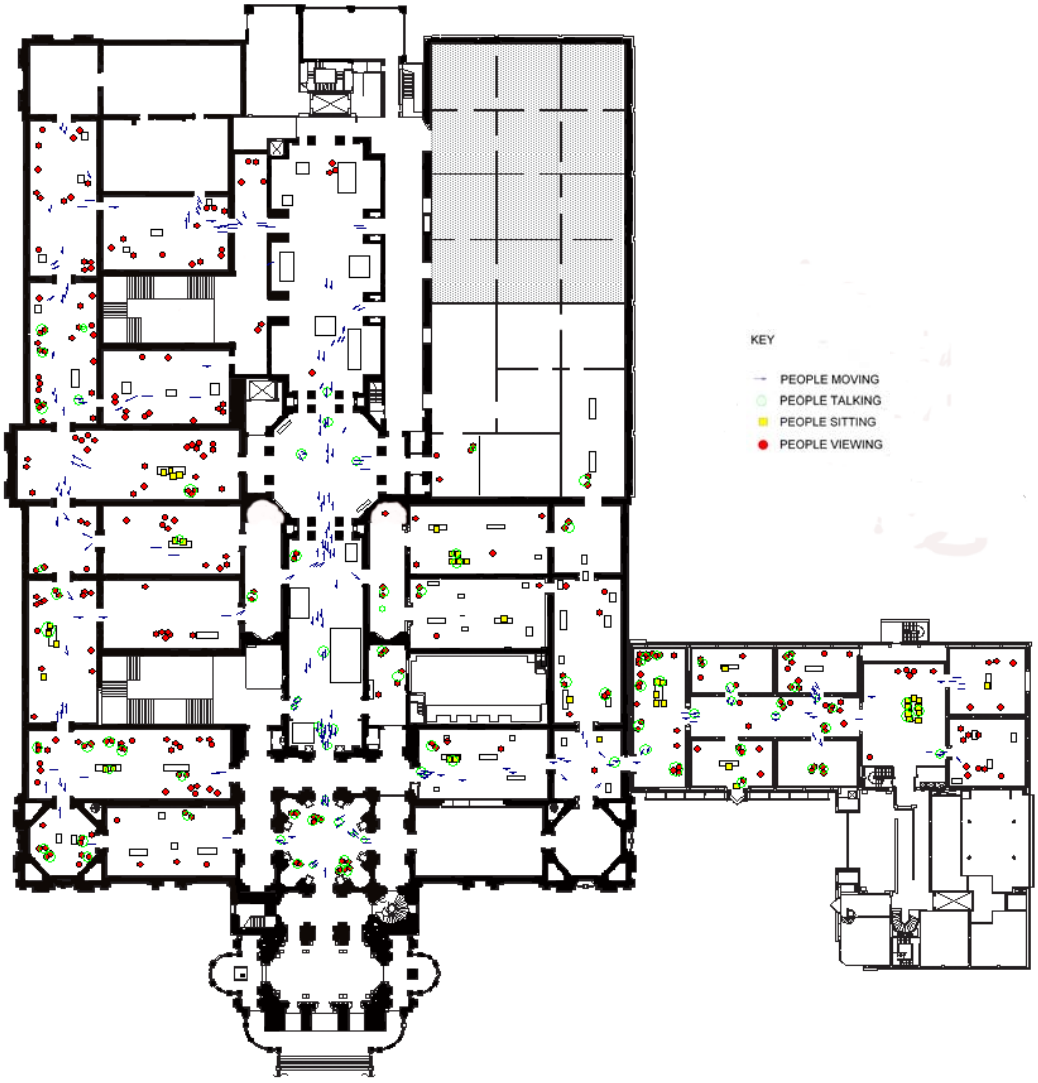
^ **FIGURE 3.17** Correlation between spatial integration values and Log (Movement): (a) including all the spaces observed; (b) excluding the Clore Gallery



^ **FIGURE 3.18** The space type analysis of the Tate Britain layout

^ **FIGURE 3.19** Installation views of the collection at Tate Britain

^ **FIGURE 3.19 continued** Installation views of the collection at Tate Britain



^ **FIGURE 3.20** A map showing the pattern of people standing, sitting and moving at Tate Britain, based on 'snapshots'

previously segregated (for example, the lower Clore) became more integrated into the building (as shown in the spatial analysis of the gallery that takes into account the space outside, **Figure 3.16b**).

More importantly, the remodelling changes did not affect the impact of the configuration of the layout on how people used the main gallery, for two main reasons: first, the new spatial design did not affect the clarity of the layout, which provided a structure to the exploration of the building and the collections. It was still based on a well-organised network of axes of visibility and access, and gallery spaces were arranged in circuits along the main circulation spine of the building. On the contrary, especially the layout changes introduced in the left side complex had positive consequences[28] both on the local and the global level. They created a well-linked set of spaces that improved the circulation locally in the western half of the gallery and thus led to a more uniform movement flow on the whole left side of the axis. The second reason why the pattern of movement remained exploratory was the extensive use of the main axis by people entering by this new route.

Thus by maintaining most of its key characteristics, the spatial layout still shaped the pattern of movement and sustained a dense pattern of encounter between visitors entering from the main entrance or by the new staircase and those moving around in the gallery and using the main axis. In conclusion, and though the object display was not the main focus of concern as in the main case studies, it could also be argued that, the potential for exploration and encounter created by the structured spatial layout, was supported by the curatorial strategy, which did not presuppose a particular viewing sequence, but allowed for the exploration of objects.

3.3 How has space syntax been used to develop our understanding of spatial layout in museums?

From a theoretical point of view, the study of Tate Britain made clear that space syntax can be used as an objective analytical technique, as a tool for evaluating design proposals with respect to functional performance. To complete this

argument we propose shifting our attention to the review of accumulated syntactic studies on museums,[29] and see how space syntax has been used to develop our understanding of spatial layout in museums.

Design choices

Looking at one of the first published syntactic study on museums, it is of particular interest to find that this key dimension of space syntax -being a powerful design tool- was already manifested. The paper by Hillier, Peponis and Simpson (1982) was about design choices, in the form of an analysis of the schemes proposed for the extension to the National Gallery. The purpose of the study was to show that by studying critical spatial properties, such as axiality, segmentation, and movement choices, the effects of spatial design on the informational potential and social character of the designs could be more explicitly discussed, and so allow a more considered functional assessment to complement the aesthetic considerations. Reviewing the designs, the study suggested the functioning of a scheme characterized by major axes which cross its length and width, and combined with secondary axial lines directly intersecting the main ones, would facilitate a *pedagogic* approach; such a simple structure, with variety and directness of spatial relations and sequencing, would suggest a chronological presentation of the collection, permit a more simultaneous appreciation of paintings and by implication, enhance the encounter between visitors. By contrast, a more elaborate layout, characterised by convex subdivision, axial fragmentation and complex route choices, would encourage a more exploratory visiting style, and at the same time lead to shorter and less regular encounters between visitors. In effect, the schemes in the competition offer quite different outcomes in terms of the *spatial culture* that could be expected to emerge if the scheme were built, the one more overtly pedagogic, and at the same time more public and ceremonial, the other more exploratory and private. As it turned out, none of these schemes were built; a new design proposal was realized some years later, which is analyzed in chapter 5.

If we continue in this line of investigation, digressing provisionally from our chronological narrative, we will find that the way space syntax, as an analytical description, can interact with design ideas, has been further developed by Peponis in two of his subsequent papers. Interestingly, in both papers he uses the case of the museum to illustrate how understanding functional potentials at a more abstract level allows much clearer formulation of a range of strategic design alternatives.

In his 1993 paper '*Evaluation and formulation in design*', Peponis took the Human Biology Hall in London's Natural History Museum (analyzed below) as a polar case in which an intricate and localised layout leads the visitor to lose any sense of the building as a whole and reduces the social nature of the museum experience, and the Guggenheim in New York as the opposite case of a layout in which public space dominates a highly deterministic viewing sequence. Comparing these two cases with the High Museum of Art in Atlanta, he argued that the latter exploits both potentials and creates a much richer informational and social experience. Precisely, this is realized in two ways: first, through a structure of integration, or *integration core*, which continually guides locally varying movement patterns in the galleries back to balcony-like spaces overlooking the socially active main atrium, rather than creating a deterministic pattern of movement in the viewing galleries; and secondly, through a system of visibility in the galleries themselves much richer than the system of potential movement, so that at each stage of the visitor's progress, works of art form the foreground and other visitors, appearing at varying depths in the visual field, sometimes in other galleries and sometimes in the main atrium, form a background. In this way, the spatial layout created a '*built choreography of movement and encounter'* (Peponis 1993, p.60), in which the two aspects of the museum, as an experience of objects and of other people, were richly integrated with each other in continuously varying ways.

The above argument was taken up more extensively by the author (2005) in his latest paper on '*Formulation'*. He based again his argument on the example of museum design and specifically the High Museum of Art. Using convex, axial and isovist representations of the museum layout, Peponis showed precisely how

the organization of viewing sequences, which accommodated the programmed function of displaying, had emergent effects over and above the deliberate design intent. The spatial arrangement structured particular ways of looking at and comparing objects, and generated particular patterns of mutual awareness among visitors. It is precisely these two themes, the consistent *informational* and *social* implications of museum design, that impregnate the majority of syntactic studies on museums, as we shall see in the next section.

Spatial design, informational potential and social character

Returning to our chronological review, we will now see how syntactic research has contributed significantly to the study of museums by rendering explicit the particular ways in which space consistently affects how people explore galleries and become aware of each other. In 1982, along with the first study of design choices, Peponis and Hedin in their seminal paper on the '*Layout of Theories in Natural History Museum*', aimed at a more thoroughgoing critique of the pedagogic and social implications of layout. The paper was published one year after the celebration of the centenary of the Natural History Museum, London, and the reorganization of its internal arrangement, and was based on a comparison between the Birds Gallery, which had remained almost unchanged since it was originally designed in 1881, and the Human Biology Hall, which had been reorganized according to new exhibition design principles.

First, a number of critical morphological differences were identified between the two exhibition layouts, based on three key syntactic properties: the *depth* between two spaces -as outlined above, the number of spaces that need to be crossed to move from one point to another; the *ringyness* of the spatial system, defined as the provision of alternative routes of going from one space to another; and the *entropy*, the degree of differentiation between spaces. On the basis of these measures, the Human Biology Hall came out not only much deeper and ringier than the Birds Gallery, but also much less structured (or more *entropic*). This was argued to be (the '*intelligibility'* measure had not at that stage been developed) a main reason why visitors could not easily find their way and grasp the overall

structure of the layout. The fact that the exhibition spaces were only very indirectly connected to the entrance of the museum, implied that visitors had to go deep into the building in order to '*be initiated in the ritual of transmission*', and constituted a critical dimension of their spatial experience. We will see that this idea will be reinforced in our discussion of the '*deep core'* museum layout below. The authors also argued that in the Birds Gallery, the experience of spaces, arranged on both sides of a central aisle, which emphasized synchrony and hierarchal order, reflected the hierarchy of the classificatory ideas of nature that dominated scientific thinking in the eighteenth century. In the Human Biology Hall, nature was presented though a sequence of spaces with varying depths, a spatial feature that, they argued, reflected the theory of evolution that prevailed from the middle of the nineteenth century. The changes in exhibition design were also held by the authors to reflect the changing relationship of visitors to knowledge, from direct and explicit to indirect and elaborated. While in the Birds Gallery, the scientific knowledge was abstract, in that it was displayed but not explained, in the Human Biology Hall, it took a more physical, and didactic form, reinforced through the popularist use of educational technology. The authors also saw current educational thinking reflected in the layout in that the subdivided and axially fragmented exhibition layout served to individualize learning, in contrast to the older morphology, characterized by the central aisle which acted as an integrating point and generated a collective interaction between people and objects. In all these senses, the authors contended that the layout changes reflected changes in ideas of scientific knowledge and its forms of transmission, an argument that has been advanced earlier in the discussion about the dual potential of space.

A wider comparative study of layouts, focusing on both social and pedagogical implications, was made by Pradinuk (1986). He set out from the conceptual framework for the transmission of knowledge developed by the sociologist Basil Bernstein (1975) in his theories of curriculum and pedagogy. Precisely, he transposed Bernstein's concepts of '*classification'* and '*frame'*, originally developed to describe differences in educational knowledge and its transmission, to a more overtly spatial interpretation. Bernstein had proposed that

educational knowledge in general could be categorized according to: first, the degree to which categories of knowledge were insulated from each other, which he called '*classification'* and referred to the form of conceptual control of the curriculum; secondly, the degree to which teacher and taught could exercise control over what was transmitted, which he called '*framing'* and referred to what could happen in the real classroom situation, and so to pedagogy. Transcribing for space, Pradinuk used '*classification*' to mean the visual insulation of the gallery contents from each other, which would either encourage or handicap cross-comparisons, and '*framing'* to mean the degree to which the layout was sequenced to generate a more or less rigid circulation, and so govern the degree of differentiation in visitors' itineraries.

Within this theoretical framework, he discussed how spatial classification and framing would affect the pedagogic relations between curators and visitors and the social relations among visitors. Strong classification would visually insulate room contents from each other, and so conserve curatorially defined categories, while a weak classification would imply more open visual relationships and invite them to compare and interpret the gallery contents, and at the same time allow visitors more mutual co- awareness and co-presence. Strong framing would imply both a more controlled viewing sequence and a more individualized experience, while weak framing would allowing a more permissive pattern of exploration, and more chances of varied social encounter. Pradinuk then proposed that the strength of framing could be measured by the mean *convex integration* of space, since this would measure how far it was necessary to move through sequences of intervening spaces to arrive at every other space in the layout, and classification by *convaxial* integration, that is the degree to which spaces, non-adjacent as well as adjacent, were linked by lines of sight.

On this basis, Pradinuk proposed a general typology of layouts. A layout that was both strongly classified and strongly framed would be one in which spaces were visually isolated from each other and at the same time subject to strong sequencing. If framing were weakened, the layout would maintain the visual isolation of spaces but allow choices of movement. If classification were weakened, visual relations would be opened up, but movement control retained. If

both were weakened, both visual links and movement choices would be opened up. Pradinuk saw these strategic choices as corresponding to *didactic*, as opposed to *auto-didactic* layouts, and *transpatial* or *conceptual*, as opposed to *spatial* layouts, and on this basis, suggested a typology of some of the best-known and most influential galleries in Europe using other terms from the Bernsteinian vocabulary, including the idea of a *strongly didactic collection code*, in which categories are strongly separated and the relations between them controlled, in contrast to a more *auto-didactic integrated code*, in which boundaries are more blurred, permeable and open to individual choice.

Choi's empirical studies of movement and space use in museum and gallery layouts followed in the early nineties. As part of his PhD research (1991), Choi investigated how far the morphology of movement and encounter in the spaces of eight art museums in USA was shaped by spatial configuration, as opposed, for example, by the objects on display. He recorded visitors' itineraries and spatial distribution within the layout in two ways: first as 'state' counts by recording the numbers of people, both static and moving in each space in a series of visits; second, as 'dynamic' patterns, by unobtrusively tracking individual itineraries, and recording as *tracking score* the number of people who visited each space, and as *tracking frequency* the number of times each space was visited. He then correlated the two sets of observations both with non-spatial factors -such as the number of objects in each space-, and various measures of spatial configuration -including *convex* and *axial connectivity* and *integration*- as well as a measure of visual range -the number of other spaces visible from each space.

The results showed that for the 'state' description there was no correlation between the number of standing or moving people and the number of objects, and only an inconsistent relation with configurational variables. For people that could be seen from each space, there was, however, a strong and more or less consistent relation with configurational variables. On this basis, Choi argued that museum layout modulates the pattern of visual encounter between visitors rather than the pattern of literal co-presence.

Furthermore, the results from the analysis of the 'dynamic' tracking data showed a strong and consistent pattern of correlation between *tracking score* and

configurational variables and an even stronger pattern of correlation with *tracking frequency*. Choi also showed that the degree to which movement was predictable from configuration was dependent on the degree of syntactic *intelligibility* and *integration* of the layout, a phenomenon that, as we have seen, had been previously noted for urban movement.

On the basis of these findings, Choi proposed to distinguish two models according to the role of space in structuring the pattern of movement and encounter: the *deterministic* model, according to which movement is forced, as circulation choices are restricted, and by implication, encounters are limited; and the *probabilistic* model, according to which movement and presence of people are allowed to be more random but modulated by configurational variables.

Taking into account the accumulated syntactic studies, and setting this against the wider *museological* literature, Huang (2001) sought to develop a more theoretical approach to issues of spatialization of knowledge and social relationships in museum layouts. He argued that the two key themes were embedded in the spatial layout of the modern museum, which he called *organized walking* and the *congregation of visitors*. The former is realized by the organization of spaces into visitable sequences so as to map knowledge, and the latter is manifested by the creation of gathering spaces, the *integration core*, where the congregation takes place. He saw these two '*genotypical themes'*, of organizing sequences and gathering spaces, as providing the ground for a typology of museum buildings.

To illustrate this argument, Huang analysed the syntactic structure of a set of museums taken from different time periods and countries, and classified them according to their strength of sequencing[30] and the depth of their integration core. He observed that the *integration core* of the museum had tended to become deeper with time, and suggested that this shift in the pattern of space had an additional effect on the pattern of co-presence and co-awareness: the physical encounter of people through movement which took place in the *shallow core* was weakened and replaced by the virtual encounter of visitors through visibility, rather than physical co-presence, in the *deep core* of the museum. There was no

comparable trend as far as the strength of sequencing was concerned, though he did find a particularly strong sequencing tendency in British museums.

This uneven distribution of *genotypes* in terms of time and place suggested, Huang argued, that progress is not so much evolutionary, but a matter of finding different ways of resolving an underlying conflict between social and informational function within a finite set of possible ways to design museum and gallery layouts. This conflict resides in the fact that the two functions have opposing spatial requirements: gathering people presupposes a swallow integration core, meaning a '*symmetrical spatial system*', while organizing movement requires a strong sequencing, or an '*asymmetrical spatial system'*. So the author concluded that the history of the museum space is characterized by oscillation in the resolutions to this genotypical conflict between the informational and the social function of the museum.

Space, cognitive function and visual perception

Once a clear link between the spatial layout and the functioning of museums as social as well as informational places was established by a substantial body of syntactic studies, the most recent research was in a position to shift attention from a focus on the understanding of the configuration of museum space and its functional implications to one that also considers the effects of space on our cognitive experience and visual perception. The shift has been made apparent in the work of Psarra and Grajewski (2000a) that added issues of building forms to those of layout. The aim was to enable not only a better understanding of museum space, but also a better understanding of architecture as a larger three dimensional spatial, formal, social and symbolic entity within which spatial characteristics of the kind of space syntax measures occur.

Setting out from the fact that the condition of interaction between architecture and the viewer presupposes an understanding of the building, the authors studied, in the context of the Museum of Scotland in Edinburgh,[31] the geometric, volumetric and surface articulation of the building and related it to its syntactic characteristics. Using isovists in combination with axial lines to describe how the

museum was experienced through movement as a series of visual fields, they also looked at the ways in which the viewer can grasp the three dimensional sculpturing of the building, and showed how three dimensional formal characteristics can affect space cognition and *intelligibility*. The creation, for instance, at the heart of the building of a unifying core, that integrates visually atrium and galleries on different levels, forms an *intelligible* core which guides visitors in their itineraries by providing a constant point of orientation, while stimulating further exploration of the galleries.

The link between space syntax and the architectural and narrative potential of museums was further explored by Psarra (2005) in the comparative analysis of two contemporary and two historical museums in Britain: the Art Gallery and Museum, Kelvingrove, Glasgow and the Natural History Museum, London, on the one hand, dating from the turn of the 19th century, and the Burrell Museum, Glasgow, and the Museum of Scotland, Edinburgh (analyzed above), on the other hand, built at the end of the twentieth century. In this paper Psarra looked at how architectural concepts like axiality and 'spatial layering' affect *integration*, and suggested that architecture uses syntactic properties to mediate the relationship between the building and the displays and create a varied and interesting experience. She concluded that from the historic buildings to the contemporary ones, museum architecture moves:

'from "knowing" to "showing" and "telling", and from a container of knowledge to an active participant in the viewer's experience' (2005, p.85).

But the new interest in issues of cognition and perception was most clearly shown in the contributions to 4th International Space Syntax Symposium (2003). In their paper '*Path, theme and narrative in open plan exhibitions settings*' Peponis, Wineman, Conroy and Dalton explored the relationship between visitor behaviour and layout in open plan exhibition settings. The paper reported the research into two traveling science exhibitions, which displayed mainly interactive individual exhibits, classified according to conceptual themes; these were made evident through various means, from thematic labeling to coloring and spatial zoning. The challenge of this project, both methodological and theoretical,

was to explore how a permissive, open layout, allowing almost any pattern of movement and unobstructed visibility, may influence the pattern of exploration. First the paths of one hundred visitors were recorded in each setting as a sequence of *contacts*, meaning visitors' awareness of an individual exhibit, and as a sequence of *engagement*s, meaning physical interaction with an individual exhibit. Visitors' paths were then transcribed into strings of various characters according to individual exhibit and according to theme.

Investigating into the spatial arrangement of individual exhibits the authors found that spatial parameters had a powerful effect on the way in which people explored the exhibitions. Interestingly, the pattern of *contacts* was affected by variations in direct accessibility, while the pattern of *engagements* was influenced by the degree of individual exhibit cross-visibility. These results suggested a first conceptual model of spatial behaviour, the *positional* model, in which spatial behaviour is a function of the layout considered only according to the effects of the spatial positioning of individual exhibits in space.

The authors also looked at the spatial arrangement of exhibits on the same theme. Firstly, the exhibition plans were categorized in '*weakly grouped layouts'* or '*strongly grouped layouts'*, according to how far thematically linked individual exhibits were dispersed or spatially adjacent so as to encourage sequential viewing. It was found that while the sequencing of contacts was affected by the extent to which the plans were thematically grouped, engagements resulted from a conscious decision, the cognitive registration of thematic labels. On this basis, a second, enhanced model was developed: the *compositional* model, which recognized the additional effects of the specific semantic content of individual exhibits, and suggested that the pattern of visitor exploration is influenced by the thematic organization of the exhibits. This implies that the design of space can add relationships between objects which are otherwise equivalent in terms of accessibility or visibility, and affect the ways displays are perceived and cognitively mapped.

Building upon the above distinction between *positional* and *compositional* model, and developing further the relation of space and display, the paper of Stavroulaki and Peponis (2003), presented in the same Symposium, argued that C.

Scarpa's design of the Castelvecchio Museum stages our perception of how exhibits are related and constructs spatial meaning. To illustrate this argument, the authors discussed first the positioning of statues in the sculpture galleries of the museum. It was demonstrated that their seemingly free spatial arrangement, revealed at closer inspection a deliberate configurational pattern: the location of each statue took virtually into account that of others, so that their gazes were either directed to each other, or intersected at a common point in space -often the integration axis. But the perception of these changing relationships between the statues' gazes depended on the visitors who occupied the point of intersections and acknowledged the convergence of gazes; so the structure of the field of intersecting gazes could be revealed though movement. The statues became more than objects to be seen, and distant viewing was replaced by an embodied experience. In this way, space did not only generate patterns of encounter between visitors, but also sustained a different field of co-awareness, generated by the co-presence of both visitors and statues.

Similar intentions were identified in the painting galleries of the Castelvecchio museum. In this case, Scarpa plays with the interaction between the visual depth suggested by the representation of the paintings and the viewing depth created both by the treatment of the surrounding space and the disposition of pictures. For instance, the two axes of movement that framed the galleries created two different kinds of perspective which introduced the visitor to perspectival effects and to questions of visual perception of art; paintings placed on free-standing easels were organized spatially so as to create overlapping planes situated at varying depths within the same visual field. Thus movement became more integral to seeing and to perceiving abstract structures embedded in space and staged through design, than would otherwise be the case.

The theme of embodied experience that engages movement and seeing, opened up with the paper on Castelvecchio, was further explored by the same authors (2005) in their contribution to the 5th International Space Syntax Symposium. Enriching visibility analysis, by taking into account not only the spatial arrangement of objects but also the illumination of space, Stavroulaki and Peponis showed that patterns of co-visibility and intersecting gazes, similar to

those at Castelvecchio, were identified in Greek Byzantine churches. On the basis of the analysis, they argued that there are important differences between the viewing principles that apply in churches, as '*sites of original formation of the visual regime for viewing icons*' and museums of Byzantine art, as '*sites of re-contextualization of icons'*, which, on the contrary, are mainly concerned with the interpretation and the presentation of icons as works of art.

Conclusion

It is hoped that the preceding review made clear the reasons why the study is rooted in the space syntax method for spatial analysis and seeks to use this to develop a combined framework for space and objects. Not only does it allow consistency and rigour in the spatial description and makes possible a precise account of the functional and experiential properties of the museum layouts, but it has also developed the *theory of layout*, the idea that museums through space organization determine the pattern of movement of visitors and provide them with awareness of other people and with the potential for encounter. This will also serve as a key to understanding concepts of object layout.

One other aspect of the theoretical background established by the syntactic research is the general characterisation of the differences between the museum as a layout type, and other types of buildings -a museum being in general some kind of gathering space related to a more or less traversable sequence of spaces. Several authors whose work has been reviewed above have shown how these distinguishing characteristics of the layout relate to two key functional aspects of museums, that is, the *informational* aspect -visitors experiencing exhibits in some kind of order- and the *social* aspect - visitors experiencing each other in some distinctive way. For the point of view of this thesis, it is also of particular interest that syntactic studies have begun to suggest that museum design can act not only as a device for communicating knowledge and art historical or other kind of narrative, but that it has the potential to transmit a non-narrative meaning, in the form of an embodied spatial experience.

However, the stage for the thesis was primarily set by the Tate Britain pilot study, which informed the research prior to empirical investigations and provided the

necessary background for elaborating research methodology (discussed at greater length in the following chapter), as the differences in the approach (methodological and theoretical) between the analysis of Tate and that of the following cases will clearly show. More fundamentally, it assumed a significance which exceeded its initial aim -the evaluation of the effects of the specific spatial design. Therefore, though it is not included in the main case studies, it will be systematically used in the comparisons between museums developed in the analytical chapters and the theoretical conclusions in the final discussion.

Notes

[1] The term 'space syntax' appeared first as the title of an article by Hillier, B., Leaman, A., Stansall, P. and Bedford, M.,1976. Space syntax. *Environment and Planning B: Planning and Design*, 3, 147-185.

[2] The convex space is defined as the largest unit which is fully visible from any of its parts.

[3] Axial analysis-using the *axman* computer programme- is principally used to analyze cities, as it is particularly useful in understanding how urban parts fit into the urban surrounding.

[4] Multiple layer analysis is possible by using the *pesh* software; it allows calculating the integration of the combined convex and axial model by layering one on top of the other.

[5] Isovist analysis can be applied at two levels: knee level for where you can move; and eye level for what you can see. The relation between the two is often vital to understanding how space works. It can also be applied three dimensionally, either for a single floor or across floors.

[6] It is measured in terms of Real Relative Asymmetry (RRA) values -obtained by a computer analysis and indicating an index of depth- which permit comparisons across spatial systems of different sizes. Smaller RRA values indicate greater integration. For mathematical development of this concept see Hillier and Hanson 1984, p.108.

[7] The integration of a system is given by the mean integration value of its spaces and describes the average number of spaces that must be crossed in order to reach all the other parts of the system.

[8] For a full account of the study of farmhouses in Normandy see Hanson, J., 1998. *Decoding Homes and Houses*. Cambridge: Cambridge University Press.

[9] See Hillier B. et al. 1987c; Peponis, J., Hadjinicolaou, E., Livieratos, C. and Fatouros, D.A., 1989. The spatial core of urban structure. *Ekistics*, 56, 334/335, 43-55; Hillier et al. 1993.

[10] A similar phenomenon is observed in museums (see below).

[11] The Visibility Graph Analysis (VGA) showed that the patterns of *visual integration* in the gallery was strongly correlated (giving a correlation coefficient, or R^2 value, of .68) with the average density of movement traces in each space. A detailed description with full results from the analysis is included in Turner, A. and Penn, A., 1999. Making isovists Syntactic: Isovist Integration Analysis. In: *2nd International Symposium of Space Syntax*, 29 March-2 April Brasilia; a revised analysis is also presented in Turner, A., Doxa, M., O' Sullivan, D. and Penn, A., 2001. From Isovists to Visibility Graphs: A Methodology for the Analysis of Architectural Space. *Environment and Planning B: Planning and Design*, 28, (1), 103-121.

Using Tate Britain, Ruth Conroy explored, as part of her PhD, how visuals fields through space affect the movement of people within virtual environments (see Conroy, R. 2001. *Spatial navigation in immersive virtual environments*. London: University College London). Turner and Penn compared the numbers of people moving through the Tate Britain with the numbers of computer 'agents', equipped with vision and some degree of intelligence, progressing through an agent based-model of the same environment, and found a correction between agents and real

people of .77. For a fuller account of the agent simulation of Tate see Turner, A. and Penn, A., 2002. Encoding natural movement as an agent-based system: an investigation into human pedestrian behaviour in the built environment. *Environment and Planning B: Planning and Design*, 29, 473–490; Turner, A., 2003.Analysing the visual dynamics of spatial morphology. *Environment and Planning B: Planning and Design* 30, 657–676.

[12] For a detailed account of the architectural development of the Tate, see Searing 2004.

[13] The observer enters a space and records on a building plan the location of each visitor at the time of entry.

[14] In the scattergram, the vertical line is the numerical 'integration' value of the rooms of the layout and the horizontal line is the observed movement rate in these spaces. If the relationship were perfect –that is, if integration were a perfect predictor of movement rate- then the points would lie in a precise line at 45 degrees

[15] Similar correlations were found in the Visual Integration Analysis. See above note 11.

[16] This major scheme was called the Centenary Development. See Searing 2004, p.58-65.

[17] Upon entering, visitors are offered three route choices: first, the stairs by the entrance that are the most used, as they can be easily seen from people entering the foyer (additionally, there is a lift in this area); second, the stairs adjacent to the café, that cannot be easily located; third, the small staircase in the corridor connecting the cloakroom to the café, that is the most complex to locate.

[18] According to the numeric data provided by P. Warner, Head of Visitor Services in Tate Britain, in February 2002.

[19] Fifty eight visitors, spread across time periods, were followed for ten minutes as they entered the gallery through the two main entrances. More precisely, thirty eight visitors were followed from the Millbank entrance and twenty from the Manton entrance. (The number of people followed was in proportion to the number of visitors that each entrance attracts.)

[20] A five minutes observation of movement at the top of the staircase showed that 73% of people arriving on the gallery level go straight to the main axis, 19.3% turn towards room 2, and only 7.7%, towards room 1, the starting point according to the museum guide; so few experience the exhibits in the proposed sequence.

[21] Only 1% of visitors enter by the Clore entrance (according to the data provided by P. Warner).

[22] In fact we use for technical reasons the logarithm of movement.

[23] On the whole, comparing the movement rates of 2002 with those of 1996 it is found that the numbers have decreased -as also confirmed by the visitor studies (see note 18).

[24] During our observations, British sculpture of the '60s was displayed in the Duveen gallery. The works, with geometric forms and bright colours, were standing directly on the floor, impeding the circulation instead of encouraging exploration and contemplation.

[25] Even the basic viewing rate of these spaces reflects the large numbers of people standing in the entrance space (A) and not of people viewing.

[26] The low viewing rates in room 20 reinforce the argument about the deceptive high movement rates developed earlier.

[27] However, there is no significant correlation between spatial variables and viewing.

[28] It is evident that at the local level the new entrance complex opens up the ground level: first, to facilitate and resolve problems of access; second, to provide more space for temporary exhibitions, by the development of an area independent of the gallery spaces; and third, to introduce improved facilities that attract visitors.

[29] For the most part syntactic studies were recently reviewed in Hillier and Tzortzi 2006.

[30] Huang introduced a method for measuring the strength of the sequence, which determines the organization of movement, by calculating the proportion of 'two-entry' convex spaces in a spatial system.

[31] The authors also studied the Art Gallery and Museum, Kelvingrove -undertaken as part of consultancy work and based on detailed observation surveys of visitors' flows - to help to improve the functioning of the buildings in terms of legibility of the layout, and the distribution of visitors through their spaces. See Psarra and Grajewski, 2000b; 2002.

Chapter Four
Research methodology

Introduction

This chapter draws significantly on, and complements, the preceding one which set out the space syntax method and reported the pilot study of the Tate Britain Gallery, both providing the grounds for elaborating our research methodology. Hence introducing the methodological and theoretical approach of this study is precisely the subject of this chapter. It begins by presenting the ideas on which the theoretical framework of the thesis is founded and proceeds to explore the possible applicability of these ideas to museum analysis. The first idea is the recurrent in the space syntax theory dialectic between *order-randomness*, and the second, the dialectical dipole *redundancy-information* offered by the '*Mathematical theory of communication*'. These ideas will allow us to develop a combined framework for space and object layouts and propose a distinction between *long models*, aiming to *conserve* existing relations, and *short models*, intended to *generate* something new. Then the chapter moves to the practical line of discussion and presents the program of empirical investigation. As already argued, the synthetic overview of spatial and object layout will be built through intensive studies of specially selected European museums and galleries. How exactly the empirical studies were carried out and what methods of data collection were used are the questions addressed in the second part of this chapter. It should be reminded, however, that the empirical part of the study did not constitute an aim in its own right; the direct observational data was treated as another layer of the museum 'reality' –in addition to the 'spatial data'- that is being interpreted and discussed. Indeed, as we shall see, the direct observation of visitors' behaviour began to expose some key dimensions of visitor patterns which were not considered in advance, but generated through the in-depth case studies. The third part of the chapter introduces the framework for the numerical analysis of spatial properties of museum layouts that followed the empirical investigation. It gives a brief introduction to the analytical ideas and the recurrent or newly

adapted, syntactic variables used in this study. The chapter ends with presenting the data tables that summarize all the above, behaviour and spatial, data and will provide easy and constant reference from this chapter onwards.

4.1 Theoretical foundations

As we have seen in the preceding chapter, one of the basic axioms of space syntax[1] is that the layout can both *reflect* social relations by mapping cultural ideas about them into space -as in the case of the French house- and *generate* potential social relations by maximizing the randomness of encounter through movement -as illustrated by the Tate Gallery. The former is associated with a *longer model* in that most of what happens is specified by social rules which are built into space. A long model requires space to play an essentially *conservative* (or *restrictive*) role, in the sense that it is used to *re-express* given social relationships or statuses. The latter case, the Tate layout, is associated with a *shorter model* in that a minimum of rules attached to space restricts what happens and, by implication, the spatial structure of the gallery introduces randomness into the encounter field. It is clear that, as opposed to the long models, in the short models, space tends to be used morphogenetically, to *create* new relational patterns. So the key idea behind the *long-short model* distinction is the ratio of rules to randomness, which, significantly, can be applied equally to spatial and social phenomena, allowing us to understand the relation between the '*social logic of space'* and the '*spatial logic of social encounters*' (Hillier and Penn 1991, p.27). An interesting property of this distinction is that it enables us to describe more rigorously how buildings vary in respect to the dimension of formality and informality. We can clarify this by taking the above examples and arguing that the *long model* French house creates a ritualized domestic space and conversely, the Tate Gallery, an informal visiting pattern (see chapter 3).

This key idea is a fundamental point of departure of this study, in its attempt to understand the spatial form of museum buildings. It allows a critical distinction between *long model* museum buildings in which space is strongly structured -as, for instance, in the case of a single ring of space- and, by implication, visitors'

movement is controlled in a prescribed way and their pattern of encounter, restricted; and *short model* museum buildings in which the rules of space are weaker -as for example in the case of a grid system-, and so the control that the layout places on the visitor is minimized and more randomised patterns of encounter are allowed.

Since the aim of the study is to build a combined framework for spatial and object layout, the effort is directed towards bringing the latter within the theoretical scope of *long* and *short models*. Besides, as argued in the opening chapter, the focus of attention is the spatial aspect of the organization of the collection -since by being arranged in space, it acquires a spatial pattern of organization over and above its purely conceptual one. Accordingly, the *length* of the model can be interpreted as referring to the degree of conceptual intervention in the arrangement of objects in space and, by implication, of the interchangeability among objects within the display. To illustrate this, let us consider the two theoretical limits: on the one extreme, we would have an arrangement where objects are put in a *random* order (*short model*), and on the other extreme, a strictly categorized organization of objects (*long model*). If the latter would be too restricting and didactic, the former would require of the visitor a too difficult task, to reconstruct the story semantically, in other words, to put an *order* in *randomness*; so the curator puts a *structure* (as, for instance, by means of a chronological arrangement) and assigns individual works specific relations with other objects. The more structured the arrangement, the higher the conceptual intervention by the curator and the noninterchangeability of the objects; and the more random the arrangement, the higher the intellectual effort required from control given to the viewer and the interchangeability among the works. If we would like to consider in parallel the two ends of the scale in terms of spatial structure, it could be argued that confusion would be maximised by a random arrangement in a grid and minimised by a single unique order in a sequence.

Although the idea of *long* and *short models* is specific to space syntax, their eventual foundations is set by the influential '*Mathematical theory of communication*', developed by C. Shannon in 1948.[2] Shannon addressed human

communication systems (like language) and sought to show how information, independent of meaning, is communicated. This is a critical point since for Shannon information is considered as a quantity that can be measured; and the measure of the quantity of information is '*a function of the improbability of the received message*' (Moles 1966, p.19). Setting out from the analysis of language, he argued that every communication system is a balance between structure (or *redundancy*) and freedom of choice (or *information*). Following Shannon, when we speak there is a certain proportion of combinations of letters or words into meaningful messages which are imposed by the rules of the language (the 'necessary structure', or *redundancy*, of language), as opposed to the remaining part that represents the choice of the speaker in constructing the message. Redundancy makes language, or a message in general, more intelligible, while a message without redundancy (maximum information) is the most difficult to transmit successfully, because the rate of *information*, or originality, exceeds our capacity for understanding.

These ideas allow us to link space to the mathematics of information theory -a suggestion already made before (Hillier 2003a, 2003b)-, and refine the argument by incorporating another significant dimension, that of the underlying structure of communication. It should be pointed out, however, that these ideas are used philosophically and not mathematically: they are part of the theoretical framework through which we can *interpret* our quantitative data, and not intended to add a new dimension of quantification. So we could say that a highly ordered[3] layout made of repeating spatial elements or recursive sequences, set in similar relations, will have a high degree of *redundancy*, rendering it intelligible but predicable; on the contrary, a disorderly layout will have a high degree of *unpredictability*, as a result of its variety and absence of manifest order, and so it will be less intelligible but more interesting to explore. Following the proposed spatial interpretation, we can look at the same ideas from the side of the layout of objects. Precisely, we propose to transpose the notion of *redundancy* to the structure of the arrangement of objects to measure the a priori knowledge of the exhibition message. The idea behind is that semantic *randomness* in the groupings of objects yields uncertainty

in the message, increasing the '*unexpectedness*' content of the display and maximizing informational gain; as for example in the case of an *ahistorical* or *visual* arrangement of objects where the curator juxtaposes works outside the normal frame of reference. This can be opposed to an arrangement of objects by schools or artistic movements: in that case, there is a precise idea behind the narrative which is based on organizing principles that are likely to be familiar to the viewer; so he can possibly predict something of the juxtapositions of objects from what he has already seen or knows in advance. However, it should be noted that we should look at *semantic redundancy* as a potential aspect or symptom of the *long model*, rather than a sharp criterion, in the sense that is neither necessary nor a sufficient condition for it; as we shall see, for instance, in the case of Tate Modern, the viewer has a low degree of intellectual control upon the exhibition message, since the conceptual links between works are already set up by the curator, but this does not preclude unexpected readings. It is precisely these subtle but strategic variations that we seek to capture by the proposed overall conceptual framework for the *syntactic* (spatial) and *semantic* (objects) aspects of the layout, in which, as developed above, the *redundancy* is the *length* of model and the *information* the more *randomised* patterns allowed by a shorter model, out of which emergent relations (i.e. among objects, among viewers) are generated.

4.2 Procedure of analysis

It is this theoretical framework that the methodology of space syntax will enable us to convert into a programme of empirical investigation, by analyzing museum space as a pattern in itself and systematically observing its use. Consistencies between spatial and space use patterns form the basis for asking theoretical questions, with the most fundamental being how museum layouts can act either in a *conservative* or in a *generative* mode.

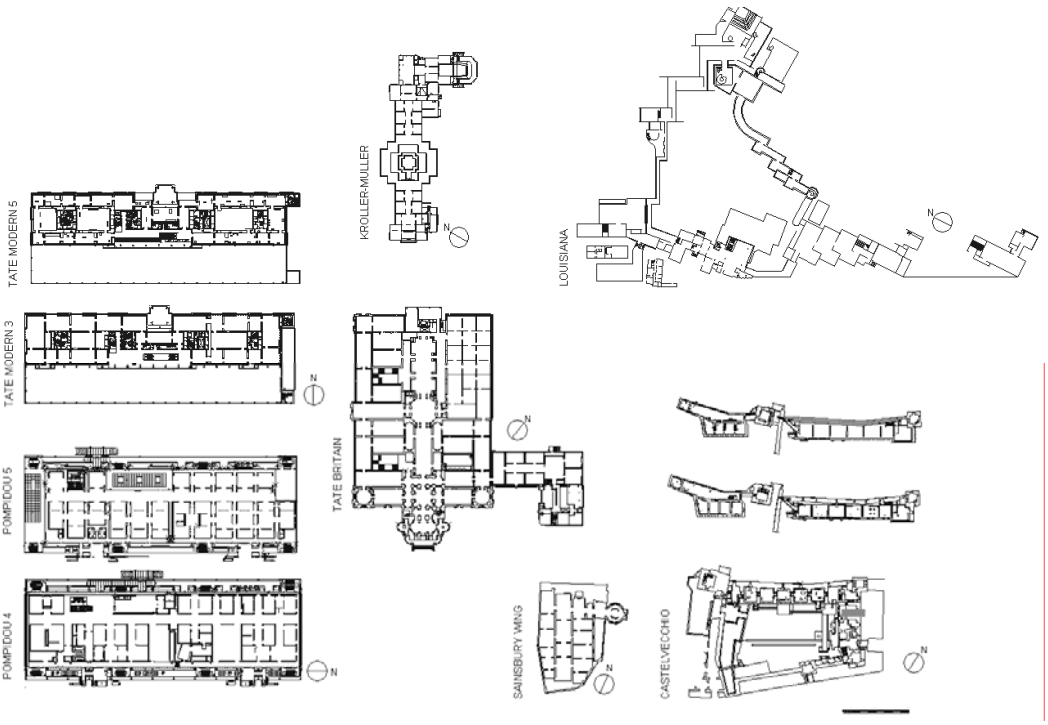
Empirical part of the research

Taking the second point first, in this section we will direct attention to the empirical part of the research, which entailed intensive, multi-dimensional on the

spot study of the layout, object display and visitor behaviour in the selected museum settings. The aim of the empirical study was two-fold: first, to confirm the variability of space and object layout styles and visitor patterns in museums, and second, to arrive at an understanding of how museums might be different and why they work the way they do.

To this end, the space use variables proposed here refer to patterns of movement, viewing and co-presence, and vary from the global to the local scale: that is, from the overall pattern of circulation to the morphology of paths of individual visitors within spaces, and from the viewing densities of galleries to the attraction power of particular displays. Finally, it should be remembered that these empirical data were treated as a research aid, which would allows us to retrieve something of the properties of museums, independently of the intentions of architects and designers; in other words, they were considered as the *dependent* variable that would eventually enable us to arrive at a fuller clarification of the *independent* variables, that is, the layouts of space and objects, in respect to the way they affect critical dimensions of visitors' experience of museums.

With the exception of the Sainsbury Wing and the Castelvecchio, all field studies were carried out by the researcher in the summer period, as shown in the time schedule for the visits to each museum [see **Table 4.1**]. Though the length of the visit varies from one case to another -affecting, consequently, the intensive nature of the investigation-, the observation study covered minimum a week in each of the museums, during which the following tasks were carried out by the researcher. First, each floor plan -in most cases obtained by the museum that was visited- was checked by direct observation of the building and was modified accordingly [see museum plans in **Figure 4.1** below and **Figures A.1a-f** in the *Appendix*]. Since the orientation of the study was towards an understanding of how the layout of space interacts with the layout of objects, the basic step was to also provide a precise description of the object display. Specifically, we recorded the information content (artist, title, date) as well as the specific location and arrangement of objects within the galleries, for the analysis of the spatial organization of the



^ **FIGURE 4.1** The plans of the nine museum settings of the sample (in scale)

MUSEUM	LOCATION	ARCHITECT	YEAR (OPEN)
SW	London, UK	R.Venturi	1991
CV	Verona, ITALY	C. Scarpa	1964
TATE3	London, UK	J. Herzog and P. de Meuron	2000
TATE5			
POMPIDOU4	Paris, FRANCE	R. Rogers and R.Piano	1977
POMPIDOU5			
KM	Otterlo, THE NETHERLANDS	H. van de Velde	1938
LOU	Humlebaek, DENMARK	J. Bo and V.Wohlert	1958

^ **TABLE 4.1** Programme of museum visits

MUSEUM	COLLECTION	DATE OF VISIT
SW	Early Renaissance collection (1260- 1510)	29 October- 21December 2002
CV	Veronese sculptures and paintings (12^{th}-18^{th} c.)	3-10 February 2003
TATE3	National collection of 20^{th} c. art	2-23 June 2003
TATE5		
POMPIDOU4	National collection of 20^{th} c. art	22 August- 2 September 2003
POMPIDOU5		
KM	Originally private collection of modern art (mainly of the second half of the 19^{th} c. - beginning of 20^{th} c.)	10-18 July 2004
LOU	Originally private collection of modern and contemporary art (after 1945)	8-15 August 2004

^ TABLE 4.1 Continued

collection as both a physical morphology and a significant conceptual structure in its own right.

The empirical investigation itself entailed systematic representations of visitors' movement and space use patterns and was based on the following, common observation techniques: movement traces and 'gate' counts, suitable for investigating patterns of movement and exploration, and 'static snapshots', for patterns of viewing and encounter. Let us explore a little further and discuss in turn each of the above data collection strategies. First, in order to build the overall picture of visitors' itineraries and route choices, people, randomly selected and spread across time periods, were tracked throughout their visit in each museum setting -that is, from the moment they entered the exhibition (and not necessary the museum building) to the moment of exit-[4] and their routes were traced on the plan. When the visitor stopped in his or her tracks to look at a work, a stopping point was recorded on the plan.[5] Arrows and other symbols were used to clarify in which directions visitors had been looking and where they had stopped for longer periods of time. The total time they spent in the exhibition (*Time spent*) was also recorded, and used both to characterize individual visitors and to retrieve something of the attraction power of museum displays.

The movement traces were used both graphically -to generate directional split maps of route choice from the entrance-, and statistically, to measure two variables proposed by Choi (1991, p.82-83): the *Tracking Score* and the *Tracking Score Differentiation Index*. The *tracking score* of a space measures the proportion of people that visited each space, and similarly, the *mean tracking score* of a museum determines whether visitors moved selectively or whether they tended to exhaust all its spaces. The second variable, the *Tracking Score Differentiation Index*, defined as the ratio of the standard deviation of the *Tracking score* over the *Mean Tracking Score*, describes how far the different spaces within each museum were visited by similar numbers of people; the higher the ratio, the more spaces are differentially visited.

Furthermore, based on the tracking data, it was possible to obtain a picture of the average rate and distribution of stops made in each museum setting (described as

Sum of stops, Mean number of stops -per room or *per visitor-, Stops Differentiation Index*). These data were used in the analysis as an additional viewing variable: in conjunction with the corresponding viewing rates, they are taken to indicate visitors' preference in particular displays; and the ratio of *Sum of stops* over *Sum of objects* on display (per museum), the proportion of objects with which the viewer interacted.

After building up a picture of the large-scale movement and the overall process of exploration, we turned attention to the microanalysis of exploration paths of individuals; and since the focus is not only on the layout of space but also on its interaction with the layout of objects, it was decided to investigate to what extent differences in curatorial strategies are mapped in the morphologies of visitors' movement. Interestingly, this allowed us to test some new ideas, generated by the intensive case studies, and propose a set of descriptors[6] that, we think, have particular potential because they can possibly describe fundamental dimensions of visiting patterns. More precisely, the first idea derived from the analysis of the Sainsbury Wing and the Castelvecchio, two museums that show contemporary paintings but in diametrically different spatial arrangements; the question raised was: does the spatial positioning of objects affect the use of space within a gallery? To answer this question, two kinds of variables were proposed for measuring the degree of exploration. The first one was the average *rate of changes of direction* in visitors' recorded tracks; it was thought that, the meandering and 'disrupted' exploration paths might indicate that the arrangement of objects in space impels viewers going from exhibit to exhibit to perambulate space and explore the display, as opposed to the straight and continuous lines of movement, possibly suggesting that visitors move straight through from one side of the gallery to another. The second variable proposed was the average *number of intersections,* meaning, how many times each visitor 'crossed' his own path by going from one point to another within a room. Like *the rate of direction changes*, it is seen as an indication of an 'active' engagement with the exhibits that entails backtracking and cross-referencing -a pattern distinct from the common approach, namely visitors circulating around the periphery of a room.

But perhaps the most fundamental idea generated by the empirical part of the research is the distinction between the '*object-driven*' and '*space-driven*' visitor.[7] The question was initially posed by the thematic groupings at Tate Modern, as opposed to the chronological arrangement at Pompidou: bearing in mind the way objects are grouped, does this appear to influence the way in which they are explored by visitors? Are visitors seen to look at several works at once? By studying the morphology of visitors' paths and mapping the precise location and distribution of their stopping points, as analyzed earlier, we came to distinguish visitors who tend to focus attention on individual works, according to the dominant theory of art, move at the periphery of the rooms and stand close to individual exhibits-, which we called '*object-driven*' visitors, from those whose attention seems drawn by group compositions and configurations in space, as it might be indicated by the fact that they traverse the middle of rooms and tend to stand at locations that allow a wider view of space or groups of objects, defined as '*space-driven*' visitors. Furthermore, as it will be suggested in the final chapter (cf. **Table 8.1**), looking closely at the quantitative profile of '*space-driven*' visitors in each museum setting (that is, comparing the mean time spent and the mean number of stops made by this kind of visitors, with the total average time spent and number of stops), allowed us to propose an additional sub-type within this type: visitors which we have come to call '*browsers'*, since they tend to scan space and browse objects on display while moving in the middle of spaces. We also proposed a third type, the '*eclectic*' visitor, who appears not to examine everything but to select which exhibits to view, and, as a consequence, stop more frequently at certain rooms and less at others.

To complement the analysis of the global pattern of movement and provide a more accurate description of movement densities in galleries, quantitative data were also collected using a different observation technique, the 'gate' counts. The method was discussed in length in the preceding chapter, in relation to the Tate study; so there seems to be no reason for repeating how it was used in order to count flows across the thresholds of spaces. We should note, however, that on this basis, each space, and by implication, each museum setting,

was indexed with two additional values: a mean *Movement density* and a *Movement Differentiation Index*. The latter, defined as the ratio of the standard deviation of *Movement density* over the *Mean movement density*, is a variable equivalent to the *Tracking Score Differentiation Index* analyzed above*:* based on the '*gate*' method, it determines how far the spaces of the museum are differentially visited.

Finally, to gain detailed information about visitor activities, we counted all people observed in each space of the museum and recorded accordingly on plan visitors as being either moving or standing/sitting and looking at the exhibits (based on the '*snapshot*' method also introduced in the preceding chapter)[8]; thus, each space was assigned two kinds of information: a '*viewing*' rate and a mean total room density, which is called, in consistency with other studies (Hillier et al. 1987c, p.240), '*encounter*' rate. Thus, like the movement data which are based on two sets of observations -tracking individual itineraries and counting flows across the thresholds of spaces-, viewing is also described both in terms of the spatial distribution of people standing and viewing works (cf. snapshot method), and as indicated by the stopping patterns (cf. tracking records). This allows a comparative picture of the density of movement and occupation in the various galleries (though, the reader must be warned that these numbers in absolute terms reflect to a large extent museum attendance). The two sets of observation of the pattern of viewing permit to more accurately identify visitors' preference for certain displays. It is then possible to take a step further and ask whether *attractor spaces*[9] take also advantage of their configurational position, besides their exhibition content.

Apart from the above 'behaviour data', gathered by direct observation in the field, on spot study entailed consulting the museum's records and collecting some additional data -such as design briefs, minutes of meetings, internal reports, and archival material- viewed as the necessary background information against which the results of the analysis could be better interpreted, and the actual performance of the museums evaluated. Furthermore, to better understand the original intentions of designers -architects and curators-, it was decided to request

interviews with architects and curators of the selected museums [see **Table 4.2**]. To illustrate the relevance of these data to our study, we can take the revealing example of the Sainsbury Wing. The administrative correspondence between architects and curators in the course of design -which included notes on unrealised strategies and sketches exploring possible positioning of objects- turned out to be rich source of information for understanding the architectural and curatorial programme. Against this knowledge it was then possible to detect a gap between designers' intentions and the gallery's actual performance.

Tate Britain	Piers Warner, *Head of Visitor Services*
Sainsbury Wing	Alexander Sturgis, *Exhibitions and Programme Curator* Peter Fortheringham, *Head of Building and Facilities*
Castelvecchio Museum	Alba di Lieto, *Architect*
Tate Modern	Peter Wilson, *Director, Projects and Estates* Francis Morris, *Senior Curator*
Centre Pompidou	Brigitte Leal, *Curator, Modern art collection* Sabine Cazenave, *Curator, Contemporary art collection* Yasmine Dabiens, *Curator, Exhibitions, Contemporary art collection* Didier Schulmann, *Documentation of the collections*
Kröller- Müller Museum	Piet de Jonge, *Director of the Museum* Toos van Kooten, *Curator*
Louisiana Museum	Kirsten Degel, *Curator, Permanent collections* Kjeld Kjeldsen, *Senior Curator*

^ **TABLE 4.2** Interviews with architects and curators

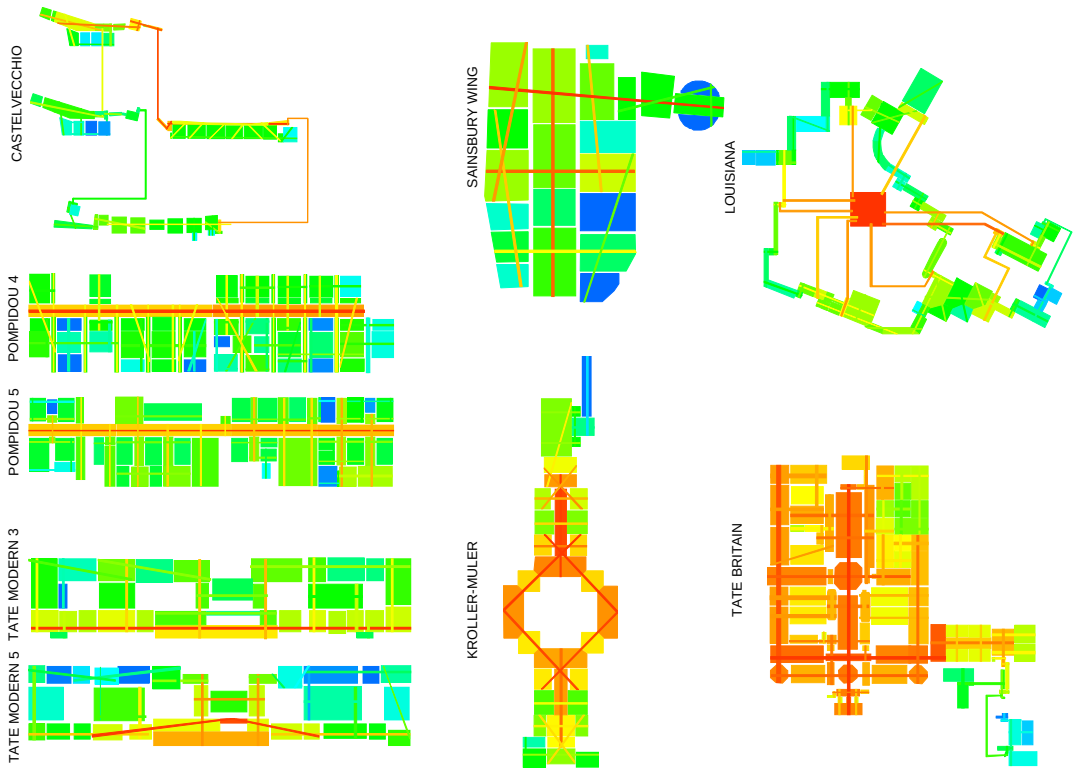
Analytical part of the research

The empirical data collection and analysis was then followed by the study of the spatial structure of layouts, with a view to identifying the underlying structures of space that are associated with the observable patterns of behaviour. Accordingly, this section offers the analytical definition of basic spatial measures used in our

analysis which are either recurrent in the space syntax literature or adapted and newly developed, so as to serve the purposes of this research.

The syntactic variables can be seen as being of two kinds: those that describe global and local relationships of permeability and are measured on the basis of the convex and convaxial representations of plans [see **Figure 4.2**]; and those that describe relationships of visibility and are based on the isovist map. The reader may find the definitions of these analytical techniques and ideas in chapter 3. For the representations of spatial relationships in the museum layouts of the sample, he is referred to the **Figures A.2a-f** in the *Appendix*. As we have seen, the concept of *Depth* is one of the fundamental relational ideas in space syntax, and the basis of the major global measure of the degree of *integration* of each space in a layout (that is, essentially the inverse of the number of spaces that must be traversed to reach all other parts of the layout). A restricted version of Integration, is *Local Integration* (or *integration radius 3*), calculated in the same way but counting only three steps away from each space (Hillier 1996, p.160). For the purpose of this research, and bearing in mind that, as repeatedly argued (Miles 1988, p.57; Falk and Dierking 2002, p.56), object displays located deeper within the building are less viewed than those near the entrance, we considered the Depth of a space not only as the number of spaces that must be traversed to reach all other spaces (*Mean Depth),* but also as its degree of accessibility from the entrance (defined as *Depth Entrance*). Two key syntactic measures that concern the relationships of spaces to their immediate neighbours, and not to the pattern as a whole, were also considered: *Connectivity* and *Control*. *Connectivity* measures the number of spaces that are immediately connected to each space (both convex and convaxial values were calculated), and *Control value* expresses the relative strength of a connection of a space into the layout, meaning the degree to which a space is well or poorly connected as compared to its immediate neighbours (Hillier and Hanson 1984, p.109).

The relations among these variables are also informative. Particularly, the key syntactic property of *intelligibility*, defined, in the previous chapter, as the correlation between *integration* and *connectivity*; in other words, what can be seen



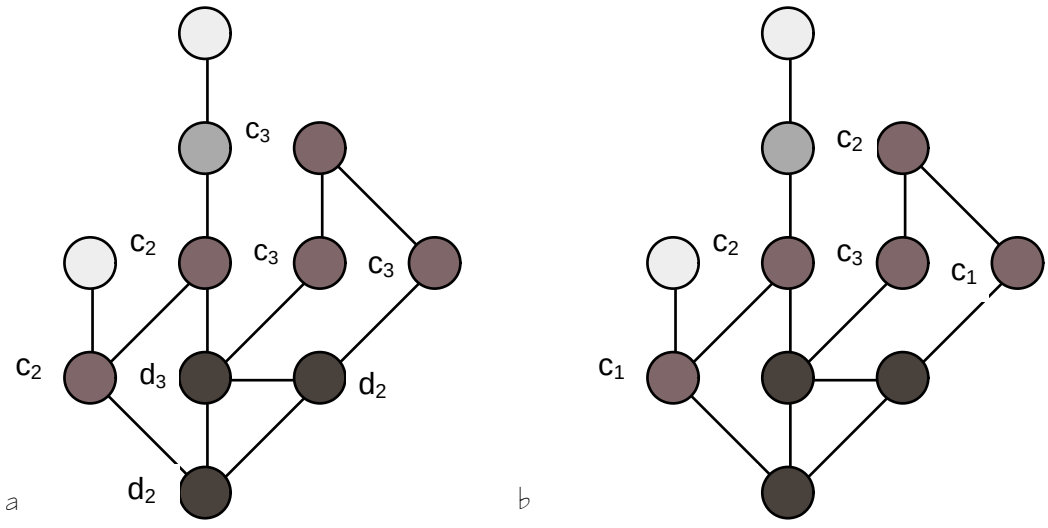
^ **FIGURE 4.2** Composite convaxial analysis of the museum layouts of the sample

from individual spaces in the layout gives a good guide to the position of that space in the layout as a whole. Another useful measure that has been identified by the analysis was the reciprocal of the *Depth* from the entrance multiplied by the convaxial connectivity (*Mean convaxial connectivity-DepthEntrance*); as we shall see, in certain museum settings, it appeared to have a critical effect on the pattern of movement and exploration.

In contrast to the above spatial measures that were analysed using the 'space syntax' computer programmes, a variable calculated manually by superimposing the axial over the convex map, was the *Axial line index* (Hillier and Hanson 1984, p.103); it expresses the number of convex spaces that are traversed by an axial line (the higher the mean value of the spatial layout, the more convex spaces the axial lines cross). Equally informative was a pair of measures related to visibility properties, which were also calculated manually. The first measure is the *Number of spaces visible from a space,* counted by overlapping the isovist field of each gallery over the convex map of the museum layout and identifying the spaces that are included in the isovist. The second measure that derives from the first is the *Mean transparency* value of the layout, defined as the ratio between the proportion of convex spaces visible from each gallery and the total number of the constituent spaces of the layout. Though at first they might appear similar, these two measures can point to different things, as for instance in the case of an articulated layout which has a high mean number of spaces visible from each gallery, and at the same time, a low transparency value.

The above variables will be used to measure properties of individual spaces and describe (through their mean values) each spatial system as a whole, making thus possible comparisons between museums. But in parallel to these common in the syntactic literature measures, a set of ideas were tested (and measures proposed), based on the *space type analysis*, developed in the previous chapter, in an attempt to capture a key aspect of the museum as a building type: the degree of sequencing and choice within the layout as constructed by the pattern of *c-spaces* (we recall that an a *c-space* is a two-connected space and part of at least one ring) and *d- spaces* (more than two-connected spaces, that lay on more than one ring).

The first stage involved representing the museum layouts as graphs of permeability relations [see **Figures A.3a-f** in the *Appendix*], identifying the constituent spaces as being one of the four topological types and calculating the proportions of each space type in a layout. The next stage entailed developing an account of the *c-ness* in the system, in other words, indexing numerically the length of the sequence; accordingly, two measures were proposed:[10] the *c-sequenceTotal (Length)* and *c-sequenceTotal (Depth).* In the first case, the value we assign to c-spaces is how many spaces form that c-sequence, while in the second instance, the number indicates the depth into the c-sequence. To illustrate this, we can take the familiar layout (see chapter 3) in **Figure 4.3a** and mark all c- spaces according to the length of the c-sequence they form part; we have two spaces marked c-2, that is, a sequence of two spaces without choice, and three spaces marked c-3. If we add them up, we have an account of the *c-ness* in the layout [the *c-sequenceTotal(L)* being 13]. In an analogous manner we can also



^ **FIGURE 4.3** Calculating the degree of sequencing (c-sequence) and the amount of choice (d-ring) in the layout.
In the figure on the left, we mark all c-spaces according to the length of the c-sequence they form part. We thus have *c-sequenceTotal(L)*: 13 and *c-sequenceMeanl(L)*: 2.6. Similarly, we can index d-spaces according to the number of rings they are on, and obtain *d-ringTotal*: 7 and *d-ring Mean*: 2.3 In the right figure, the values we assign to c-spaces indicate their depth into the c-sequence; adding them up we have *c-sequ Depth Tot*:9 and *c-sequ Depth Mean*:1.8

calculate *c-sequenceTotal(D)* [**Figure 4.3b**] and then obtain the corresponding average values -defined as *c-sequenceMean(L)* and *c-sequenceMean(D)*. Similarly, we can index d-spaces according to the number of rings (adjacent faces in the graph) they are on, as shown in **Figure 4.3a**; the resulting variables, *d-ringTotal* and *d-ringMean*, give a picture of the amount of choice in the layout.

Data tables

As noted earlier, all the above behaviour and spatial data, gradually built up, feed the six tables provided at the end of this chapter [**Tables 4.3-4.8**], which will constitute an informative background to the case study chapters that follow and more importantly, will provide the grounds for the review of the sample as a whole and the theoretical synthesis in the final chapter. The tables are thematically organized, reflecting in a sense the different stages of the analysis. Setting out from the most elementary information, the basic profile of the nine museums, presented in **Table 4.3**, the reader can then move to the more rigorous data, the results from the syntactic analysis tabulated in **Table 4.4**, concerning key global properties of the layouts, local measures as well as visibility relations. **Tables 4.5-4.6** shift the attention to the observed patterns of visiting. Precisely, Table 4.5 sets out data related to visitors' movement, based on tracking individual itineraries and counting flows across the thresholds of spaces, while Table 4.6 focuses on viewing, described in terms of the spatial distribution of people standing and viewing works (cf. snapshots), and as indicated by the number of stops made in each space by the visitors tracked. It also includes the total average encounter densities. **Table 4.7** refines visitor behaviour by paying close attention to the scale of individual visitors observed, and provides a profile of the viewer, based on quantitative data (such as, the average time spent in each museum) and qualitative, that is, the proposed distinction between '*space-driven*' and '*object-driven*' visitors. Finally, bringing together data from Tables 4.4-4.6, **Table 4.8**, presents correlations between syntactic and space use variables, significantly contributing to the final argument.

Conclusion

It should be implicit in the foregoing account that the proposed framework -consisting of ideas recurrent in space syntax literature and those progressively generated out of the analysis- responds to the key methodological and theoretical intentions of this research. Precisely, in methodological terms, it enables us to build a single framework for layout of space and objects. Making use of syntactic techniques and concepts for the study of object layout allows us to begin to deal with it as a spatial pattern, over and above the intellectual content of the works, and to work towards a methodology that approaches in consistency the spatial analysis. In theoretical terms, the proposed framework responds to the key effort of this thesis, to contribute to a better understanding of the spatial form of museums. More specifically, the descriptive, analytical and quantitative tools presented above, permit us to describe three kinds of morphologies in museums -of space, of objects and of space use-, and most importantly, understand their spatial logic. But they also enable us to take the next step towards a more abstract level, towards developing a conceptual model that seeks to explain the functional and experiential differences between museums.

Undoubtedly, to this end the contribution of the theoretical background of the *short-long model* distinction offered by space syntax and the concept of *information* as established by the information theory -used philosophically and not mathematically- is fundamental. It should be recalled at this point that two of the key questions set in the introductory chapter of this thesis were how museums are working in principle, independently of specificities of individual cases, and whether museum function can extend beyond the communication of the intended message. We believe that the above theoretical foundations provide the key for approaching museum space from a different angle, and most crucially, for expanding the analysis to the *non-discursive*[11] dimension of our experience of museums, which potentially can be distinguished from the more in the *discursive* domain experience of exhibits. As we shall see in the following analytical chapters and mainly, in the final discussion, it is possible to explain aspects of

structure of our experience of museums by pointing to objective properties of space and objects layouts.

Notes

[1] This argument draws on a number of syntactic articles that established the distinction between *strong* and *weak* program buildings (or *long* and *short* models). See for instance Hillier et al. 1984; Hillier and Hanson 1984; Hillier and Penn 1991; Peatross and Peponis 1995; Hillier 1996.

[2] The thesis also draws significantly on the application of the information theory on aesthetic perception by (Moles 1966).

[3] *Order* is defined here as the property of being made up of similar parts is similar relations (see Hillier 1996, p.235).

[4] With the exception of Louisiana, where the recorded amount of time spent corresponds to the visit of part of the museum.

[5] Occasions where visitors look at exhibits while they are walking are not included in the data.

[6] Term borrowed from Peponis et al. 2004.

[7] An idea suggested by J .Peponis, in conversation.

[8] Observations were conducted, at different times of the day, in the exhibition spaces (and did not include other parts of the museum). It should also be noted that the direction of route followed by the researcher changed on alternate rounds of observation, in the case of '*gate counts*' and '*snapshots'*.

[9] Term borrowed from Peponis and Wineman 2002, p.277.

[10] Measures proposed by B. Hillier.

[11] See chapter 1, note 4.

TABLE 4.3: Basic profile of the museums

Museum	Total display area (m^2)	No of galleries	Mean room size(m^2)	No of objects	A-spaces	B-spaces	C-spaces	D-spaces	A-ratio	B-ratio	C-ratio	D-ratio	C-/D-spaces ratio	c-sequ Tot(D)	c-sequ Tot(L)	c-sequ Mean(D)	c-sequ Mean(L)	d-ring Tot	d-ring Mean
SW	1633	17	83	221	3	-	10	5	.17	-	.56	.28	2.0	16	17	1.6	.16	12	2.4
CV	2200	38	52	299	4	-	25	9	.11	-	.66	.24	2.8	47	158	1.9	.08	16	1.8
TM3	3416	28	101	204	1	-	18	9	.04	-	.64	.32	2.0	39	61	2.2	.12	20	2.2
TM5	3586	30	91	239	-	-	23	7	-	-	.77	.23	3.3	66	109	2.9	.12	15	2.1
PO4	5708	46	76	321	17	3	24	2	.37	.07	.52	.04	12	57	90	2.4	.1	6	3.0
PO5	4977	57	57	492	13	-	27	16	.23	-	.48	.29	1.7	37	44	1.4	.05	52	3.3
KM	1933	33	50	263	14	1	17	-	.44	.03	.53	-	-	105	196	6.2	.36	0	.
LOU	3000	46	99	227	6	-	29	10	.14	-	.66	.23	2.9	105	189	3.6	.12	27	2.7
TB	7363	48		-	7	-	26	15	.15	-	.54	.31	1.8	61	93	2.2	.08	38	2.4
mean	**3867**	**37**	**76**	**283**	**7**		**22**	**8**	**.18**		**.6**	**.21**	**3.6**	**59**	**106**	**2.7**	**.13**	**20.7**	**2.5**

TABLE 4.4: Syntactic properties

Museum	Number of convex spaces	Convex spaces/ area	Mean global integration (convaxial)	Mean local integration (convex)	Mean depth	Mean depth (entrance)	Mean connectivity (convex)	Mean connectivity (convaxial)	Mean convaxial connectivity-depthEntr	Mean axial Line index	Mean number of spaces visible from a space	Mean Transpa-rency	Mean Intelligibi-lity
SW	22	.013	1.69	1.15	2.7	3.9	2.32	3.72	.8	30	7.3	.43	.88
CV	59	.027	.72	1.08	6.8	21.6	2.27	3.46	.57	75	4.8	.17	.25
TM3	32	.009	1.78	1.12	2.9	3.5	2.39	3.2	.70	46	7.4	.28	.79
TM5	33	.009	1	1.05	4.5	3.4	2.24	3.33	.84	62	5.1	.19	.39
PO4	59	.01	1.27	1.18	4.4	5.6	2.21	3.05	.43	106	5.9	.14	.76
PO5	65	.013	1.66	1.57	3.8	5.2	2.68	3.95	.52	136	9.4	.16	.76
KM	34	.018	1.04	1.16	4.5	10.1	2.06	3.83	.33	68	7.4	.24	.64
LOU	74	.025	.95	1.14	6.1	6.8	2.39	3.47	.37	77	3.2	.09	.4
TB	84	.011	.91	.41	6.9	7.8	3.21	3.25	.28	95	6.8	.13	.41
mean	**51**	**.015**	**1.22**	**1.1**	**4.7**	**7.5**	**2.42**	**3.47**	**.54**	**77**	**6.4**	**.2**	**.59**

TABLE 4.5: Movement data

Museum	Number of visitors tracked	Tracking Score	Track. Score Stand. Deviation	Track.Score Differentiation Index	Mean movement density	Movement Stand. Deviation	Movement Differentiation Index	Mean Movement/ area	Correlation Movement-Track. score
SW	100	68	17.7	.26	15.4	8.3	.54	.0094	.713
CV	33	87	13.6	.16	-	-	-	-	-
TM3	39	81	17.3	.21	6.0	1.6	.26	.0017	.448
TM5	19	90	9.5	.11	6.1	1.3	.21	.0017	.325
PO4	42	60	18.2	.3	7.8	6.1	.77	.0014	.352
PO5	39	58	22.9	.4	3.4	2.8	.84	.0007	.621
KM	31	81	20.2	.25	3.6	4.0	1.12	.0019	.430
LOU	29	81	15.0	.18	5.2	2.4	.47	.0017	.520
TB	-	-	-	-	3.2	2.5	.78	.0004	-
mean	**42**	**76**	**16.8**	**.23**	**6.3**	**3.6**	**.63**	**.0024**	**.690**

TABLE 4.6: Viewing and encounter data

Museum	Mean viewing density	Viewing /area	Movement / Viewing ratio	Correla-tion movement-viewing	Sum of movement & viewing densities	Sum of stops	Stops Differen-tiation Index	Mean number of stops *(per room)*	MeanStops/ MeanObjects *(per room)* ratio	SumStops /area ratio	SumStops/ SumObjects ratio	Mean encounter density	Correla-tion viewing-stops	Corre-lation Track. score - Stops
SW	12.6	.0077	1.22	.289	28.0	3175	.37	187	14.4	1.94	14.4	31.5	.651	.563
CV	-	-	-	-	-	6485	.56	191	15.3	2.95	21.7	-	-	*
TM3	5.9	.0017	1.01	.136	11.9	3768	.56	140	18.5	1.1	18.5	7.9	.407	.148
TM5	5.4	.0015	1.14	.003	11.5	2976	.62	103	10.8	.83	12.5	7.6	.399	.177
PO4	2.8	.0005	2.84	.069	10.6	3326	1.21	85	10.9	.58	10.4	4.6	.232	.226
PO5	2.2	.0004	1.53	.559	5.6	4087	.92	72	6.4	.82	8.3	4.4	.634	.293
KM	3.1	.0016	1.16	.011	6.7	8368	.77	270	27.7	4.33	31.8	4.4	.405	.287
LOU	2.4	.0006	2.17	.138	7.5	4776	.91	191	26.9	1.59	21.0	4.0	.616	.227
TB	2.5	.0003	1.27	.058	5.7	-	-	-	-	-	-	5.7	-	-
mean	**4.6**	**.0018**	**1.54**	**.289**	**10.9**	**4620**	**.74**	**155**	**16.4**	**1.77**	**17.3**	**8.8**	**.473**	**.274**

***** *Insignificant correlation* - *No available data*

Table 4.7: Basic profile of visitor

Museum	Mean time spent (*minutes*)	Ratio time spent/ area	Maximum time spent	Minimum time spent	Percentage of visitors spending longer than avg.	Percentage of '*object driven*' visitors	Percentage of '*space-driven*' visitors	Percentage of '*eclectic*' visitors
SW	16.0	.59	80	2	32.3	50.0	38.2	11.8
CV	50.4	1.38	85	5	51.5	62.0	38.0	-
TM3	27.7	.49	78	5	38.8	62.0	7.0	31.0
TM5	27.4	.46	72	9	40.0	58.8	29.4	11.8
PO4	34.1	.36	110	7	35.0	74.4	17.9	7.7
PO5	37.0	.45	111	9	42.5	62.2	10.8	27.0
KM	36.0	1.12	70	10	35.5	80.0	10.0	10.0
LOU	38.0	.67	65	15	48.3	64.2	17.9	17.9
TB	-	-	-	-	-	-	-	-
mean	**33.3**	**.68**	**83.9**	**7.8**	**40.5**	**65.5**	**17**	**17.6**

Table 4.8: Correlations between syntactic variables and space-use variables

Museum	Log (Mov)-global integration	Log (Mov)-local integration	Log (Mov)-convaxial connectivity	Log (Mov)-convex connectivity	Log (Mov)-convaxial connectivity/ depthEntr	Track. score-global integration	Track. score-convaxial connectivity/ depthEntr	Viewing-global integration	Viewing-convaxial connectivity/ depthEntr	Log(Enc)-convaxial connectivity/ depthEntr
SW	.278	*	.443	*	.765	.20	.546 [(11)]	*	.255	.233 [(14)]
CV	-	-	-	-	-	*	*	-	-	-
TM3	*	*	*	.237 [(6)]	*	*	.366 [(12)]	*	*	*
TM5	*	.511[(2)]	.244 [(2)]	.570 [(2)]	.38 [(2)]	*	*	*	*	*
PO4	.383	.455	.365 [(4)]	.493 [(4)]	.493	.46 [(4)]	.19	*	*	.176
PO5	.351	.338 [(3)]	.327 [(3)]	.352 [(7)]	.368 [(7)]	*	.438 [(13)]	.31	.517	.198 [(15)]
KM	.472 [(1)]	.648 [(1)]	.665 [(5)]	.452 [(8)]	.708 [(9)]	.28	.254	.177	*	.13 [(16)]
LOU	*	*	*	*	.266 [(10)]	*	*	*	*	.104
TB	.505	.365	.320	.247	.297	-	-	.11	*	.112
mean	**(.398)**	**(.483)**	**(.388)**	**(.392)**	**(.468)**	**(.313)**	**(.358)**	**(.199)**	**(.386)**	**(.162)**

***** *Insignificant correlation*; SW: [(11)] *excl. the entrance space (R.51)*; [(14)] *excl. R50 (lowest rate)* TATE3: [(6)] *excl. R21 (lowest rate),* [(12)] *excl. R.19,R.21(lowest rates);* TATE5: [(2)] *excl. R.4 (lowest rate);* POMPIDOU4: [(4)] *excl. axis (R.3a, 3b), with the highest rates;* POMPIDOU5: [(3)] *excl. R.30 (lowest rate),* [(7)] *excl. axis (R.3a, 3b) and R.30,* [(13)] *excl. the entrance space and the axis (R.2-R.3),* [(15)] *excl. axis (R.3a, 3b) and R.45 (lowest rate);* KM: [(1)] *excl. R.28 (lowest rate),* [(5)] *excl. axis (R4) and R.28;* [(8)] *excl. axis (R.4 and R.18) and R.28;* [(9)] *excl. R.18 (highest rate)* [(16)] *excl. R.29 (lowest rate);* LOU: [(10)] *excl. R.N5 (lowest rate).*

Chapter Five
The Sainsbury Wing compared to Castelvecchio

Introduction

This section (chapters 5-7) constitutes the analytical part of the thesis. It entails paired comparisons of museums that, theoretically informed by the literature reviewed in the previous chapters, and to a large extent inspired by intuitions and insights, produced surprising ideas which could not have been foreseen. The analysis of each contrasting pair progresses in stages (not always in the following order): it explores *the morphology of space,* and looks at the key spatial qualities of the layout which are of interest not only for themselves but also for their critical implications for the construction of the route, and the viewer's exploration and exposure to information. It examines *the morphology of display,* in terms of both its conceptual and spatial structure, with the aim to clarify how layout of space and objects relate to each other, resonate with each other and take each other into account; it analyses *the morphology of visitors' movement and exploration,* from the manipulation of circulation to the orbits of the moving observer, seeking to arrive at a better understanding of how and why the museums are currently working the way they do. The background of these three kinds of morphologies is then used to illuminate *the character and the quality of the whole experience*.

Coming to the first paired study, the questions proposed above, tightly interwoven, are investigated in the context of the Castelvecchio Museum, Verona, and the Sainsbury Wing, the extension to the National Gallery, London (introduced in the previous chapters).[1] Both constitute interesting cases, as the configurational properties of the more or less similar in size layouts, are closely connected to the organisation of the displays. Moreover, their collections, though they vary considerably in scale and importance, overlap chronologically. But what makes their study even more intriguing is the fact that the designs of the buildings and the designs of the displays were developed together. It is also worth noting that Castelvecchio was among the galleries in Italy visited by the architects of the

National Gallery as an inspirational journey before the design of the Sainsbury Wing.

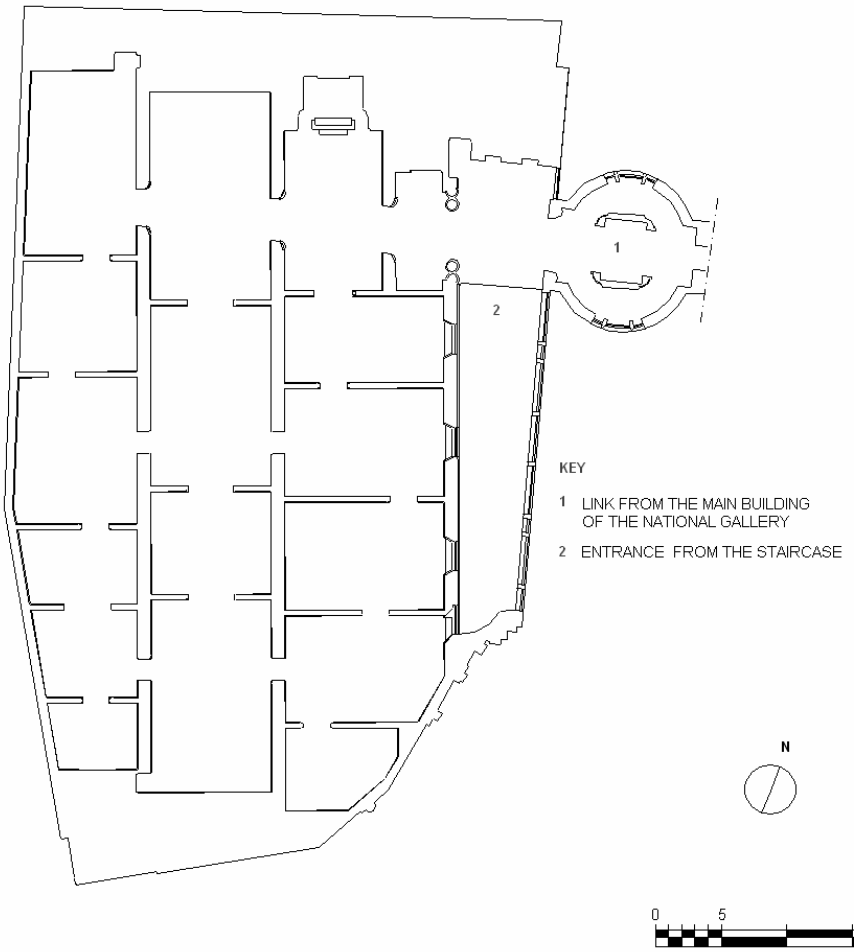
5.1 Description

The National Gallery's requirements and Venturi's design rationale[2]

The Sainsbury Wing [**Figure 5.1**] was designed by Venturi, Rausch and Scott Braun, in 1986-1991, as an extension to the main building of the National Gallery. The latter, founded in 1824, and designed by W. Wilkins in 1838, was developed through a succession of additions. The latest, and much needed, extension was planned specifically to accommodate the Early Renaissance collection of the National Gallery, comprising mostly Northern and Italian works, from 1260 to 1510, as this was thought to be the least well served part of the collection by the existing galleries. Accordingly, the main building would show painting produced between 1510 and 1920. Moreover, it was decided that '*the arrangement of pictures by room (would) be fixed*' (National Gallery Archive, HSI.39a), since the Renaissance collection was not expected to grow considerably in the future. A first competition of a commercially funded building was held during the early 1980s, but continuing criticism put an end to the project in 1984, and the winning design was refused planning permission.[3] A new project was soon announced, in 1985, after the offer of funding of the Sainsbury brothers, and in 1986 R.Venturi was selected to design the new wing.[4]

To present the design of the gallery we suggest reviewing the principal requirements set out in the Brief, the comments on the spatial design made by the curators, and the design intentions formulated by the architect. The National Gallery's Design Brief (February 1985) focused on that:

'*the new galleries would provide a permanent home for these paintings and bring together both Northern and Italian paintings as a coherent display*', and required '*a clear and easily comprehensible layout*'. For this reason, '*a broadly rectilinear arrangement of spaces was called for, with clear distinctions between different spaces, as an aid to orientation*'.



^ **FIGURE 5.1** Gallery floor of the Sainsbury Wing

Fundamental was the idea that the '*new galleries should consist of rooms, having a substantial character and an air of permanence*' (National Gallery Archive, HSI.69).

At this point it is worth adding the more precise curatorial comments on the viewing sequence and the manner in which the paintings should be displayed. Curators argued that:

'*while rooms should be created… these rooms might well be best thought of as being interlocking spaces*' and, most importantly, that '*the doors should not be centrally disposed*' (National Gallery Archive, NG 16/115.8).

For them it was fundamental that the spatial design would allow the spatialization of geographical and chronological relationships.
The main characteristics of the gallery are also given by Venturi in his design rationale:[5] he feels that his approach, by '*allowing some flexibility and yet suggesting an abstraction, an elemental expression of the context*', lies between the two traditions in the display of paintings, the one providing an architectural context analogous stylistically with the period of the paintings, and the other creating neutral and flexible spaces.

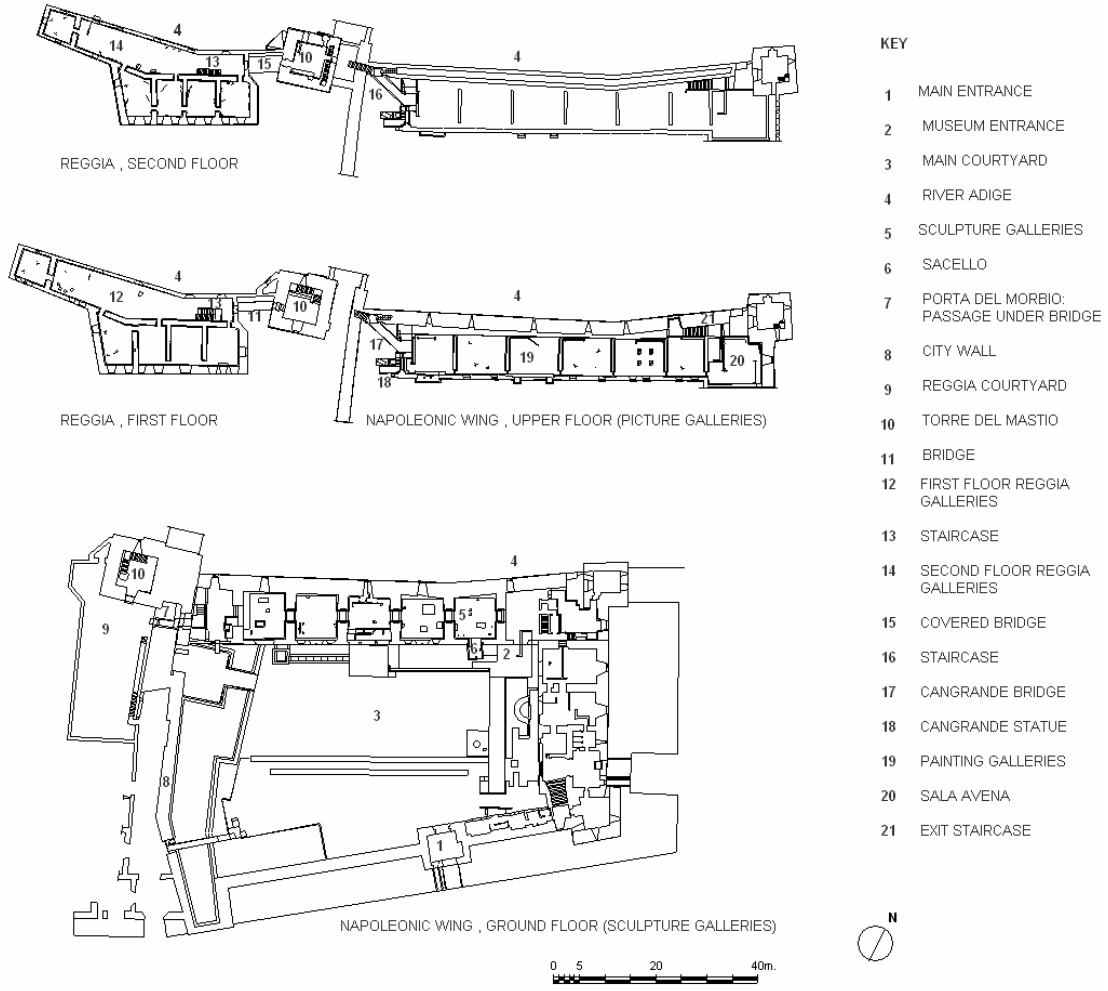
'*For the National Gallery to suit the character of its Renaissance collection, we propose*', he said, '*returning to the earlier tradition. Galleries, that are rooms defined by familiar, traditional walls, floors, ceilings, doors and windows will, we feel, be more appropriate for exhibiting Renaissance paintings….*'. '*The aim of our design*', he pointed out, '*is to promote a sense of place, but not to intrude on the paintings*'.

The next two sections will discuss how the Sainsbury Wing functions as pattern of spatial organization. But first let us introduce the Castelvecchio Museum.

Scarpa's design decisions at the Castelvecchio

The Castelvecchio [**Figure 5.2**] is not a purpose built museum, but a conversion of a complex of historic buildings dating from different periods, redesigned by C. Scarpa in 1958-1974. More precisely, the museum occupies a medieval military castle, by the river Adige, on the edge of Verona.[6] It consists mainly of the *Reggia*

wing, the original residential building, built in the fourteenth century (marked 12 and 14 in **Figure 5.2**) and the *Napoleonic* wing (5 and 19), an L-shaped block of barracks added on the north and east side of the main courtyard (3), in the nineteenth century, during Napoleon's occupation of Verona. The two buildings are connected under a bridge, as the twelfth-century city wall (8) splits the complex in two. Castelvecchio was first converted into a municipal museum in 1924-1926, by A. Avena (director of the city's art museums), after undergoing radical restoration work in 'period' style (which involved the remodelling of the facades of the Napoleonic block and the decoration of the interior of the Reggia as a Renaissance palace). The appointment of L. Magagnato as museum director in 1956 marked also Scarpa's involvement in Castelvecchio. In 1958 the architect undertook the renovation of the Reggia, to house the exhibition '*Da Altichiero to Pisanello*', and the design of the exhibition installations. Soon his initial task was extended, entailing the restoration and reorganization of the whole museum,[7] a work carried out in two phases, between 1958 and 1964, with the last phase being completed in 1974. It is widely acknowledged that Scarpa succeeded in exploiting the existing layout while at the same time following the principle of preservation of the historic fabric. The interior of the Reggia was very much left in its original state. On the ground floor of the Napoleonic wing Scarpa also left intact the wall structure, and at the same time introduced three key changes: he moved the entrance from the centre of the facade to the corner, to break its symmetry; he added a small projecting room, the *Sacello* (6), close to the entrance, specially designed for the display of small objects; and he demolished the sixth room of the sequence to construct the gallery exit door and accommodate the iconic equestrian statue of Cangrande (18), the symbol of the museum and the city.[8] Major alterations occurred on the upper floor of the Napoleonic wing (19), where Scarpa removed almost all early twentieth-century interventions, and closed off the central openings of the traverse walls, creating an atypical circulation system (analyzed below). But more interestingly, Scarpa was also responsible for the spatial arrangement of the museum collection -a local collection consisting mainly of Veronese sculptures and paintings from the twelfth to the eighteenth centuries.



^ **FIGURE 5.2** Overall plan of Castelvecchio

The museum re-opened on December 1964, and since then the displays, as set up and arranged by Scarpa, remain fixed.[9]

5.2 Morphology of space

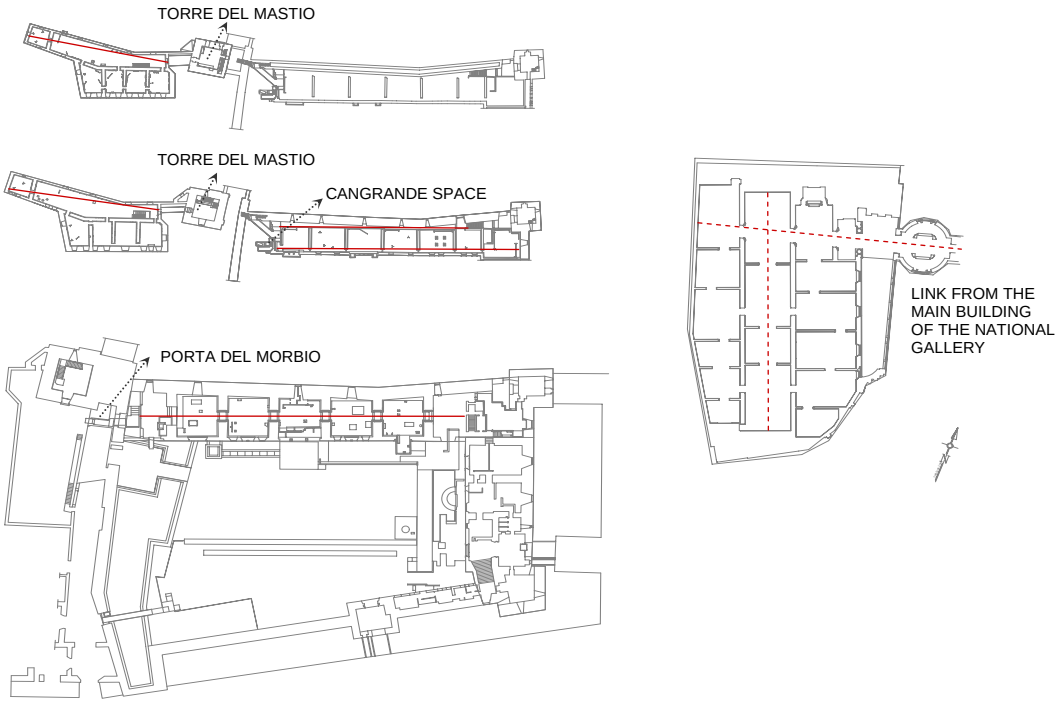
Let us begin the analysis of the museums by exploring the patterns of spatial organisation and the spatial qualities of the two contrasting layouts.

Axiality and the question of perspective

Major axes are the recurrent theme of both spatial structures. [**Figure 5.3**] In particular, powerful axiality is the key structural property of the layout of the Sainsbury Wing. The whole structure is created by two intersecting major axes: a cross perspective axis, which is a continuation of the central axis of the main building, and penetrates the whole width of the extension; and another, vertical axis which crosses the central enfilade of rooms and runs across the whole length of the extension. Thus, the two major axes provide information which reaches the periphery of the plan.

The cross axis cuts the central axis at a diagonal, because the dominant north-south axis of the Sainsbury Wing was shifted to the west with respect to the orientation of the main building. This axial shift allowed the creation of the central enfilade of the northernmost rooms of the extension which aligns with the central enfilade of the existing building. Thus, the new wing follows the precedent of the old galleries, while at the same time the axial disjunction makes the transition felt. Secondary smaller axes -usually at right angle to the major ones- cross the spaces that do not already lie on one of the main axes.

Similarly, on observing the entire complex of the Castelvecchio Museum as a whole, one finds that major axes are the recurrent theme of the spatial organization, found with consistency in each sequence; on the lower floor of the *Napoleonic* wing, a powerful perspective axis, emphasized by the arched openings, traverses the enfilade of the sculpture galleries; on the first and the second floors of the '*Reggia*,a long axis crosses the main gallery and runs through

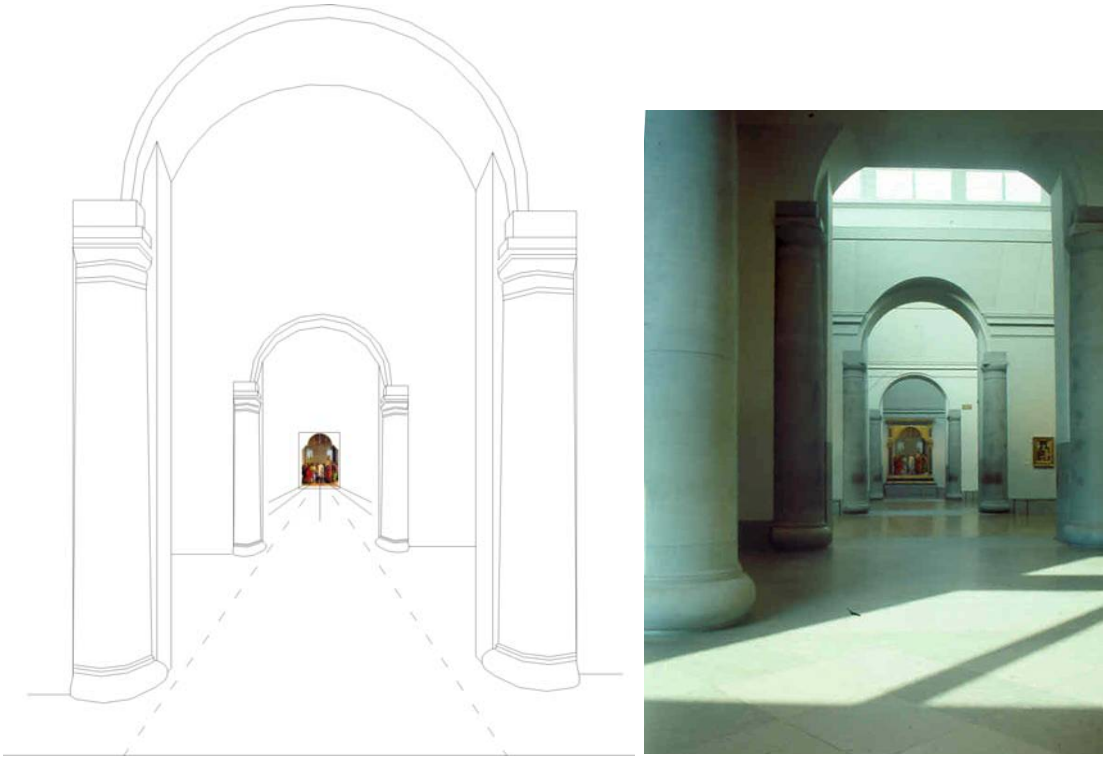


^ **FIGURE 5.3** Axiality is a key structural property of both museums (shown here in scale)

the whole length of the layout to the dead-end room at the far end; in the final sequence, on the upper floor of the *Napoleonic* wing, two parallel long axes of movement run along the sequence of painting galleries. Interestingly, these main axial lines systematically exceed the limits of the interior spaces and are at one end anchored by an element of the outside space:[10] in the sculpture galleries, by the *Porta del Morbio* (a gate, part of twentieth-century city wall, closed off in the eighteenth century and discovered after excavations by Scarpa) [7 in **Figure 5.2**]; in the Reggia, by the *Torre del Mastio* (the massive tower of the castle that accommodates the vertical circulation) [10 in **Figure 5.2**]; and in the picture galleries, by the *Cangrande space* [18].

However, the accentuated axial layout becomes contradicted by a succession of oblique elements, inserted at the nodal points of the layout. Bridges, passageways and staircases mediate between levels and create variations and discontinuities. Also, in contrast to the Sainsbury Wing, at Castelvecchio the axis of the entrance, which crosses perpendicularly the long perspective axis of the ground floor galleries, acts as an optical guide locally, but it gives no hint as to the overall structure of the layout.

Closely connected to the issue of axiality, the question of perspective is used in very deliberate ways in both galleries. Especially in the Sainsbury Wing the use of perspective may also imply the Renaissance preoccupation with what it means to design a building around perspectival ideas.[11] The cross axis which links the two buildings creates a false perspective, through the arched openings, diminishing in size, into the northernmost rooms, and gives an impression of increased distance. This diminishing perspective creates a visual play with the perspective construction of the large altarpiece at the end of the vista, Cima's *Incredulity of Saint Thomas*, and seems to continue in the painting of the coffered ceiling the same diminishing perspective. [**Figure 5.4**] The central enfilade makes also use of the perspective, [**Figure 5.5**] and its broad semi-circular arched openings, already seen in the cross axis, further emphasize its importance. Moreover, its long vista terminates at each end by an altarpiece: Raphael's *The Crucified Christ* on the north end wall, and Pollaiuoli's *The Martyrdom of San Sebastian* on the south.



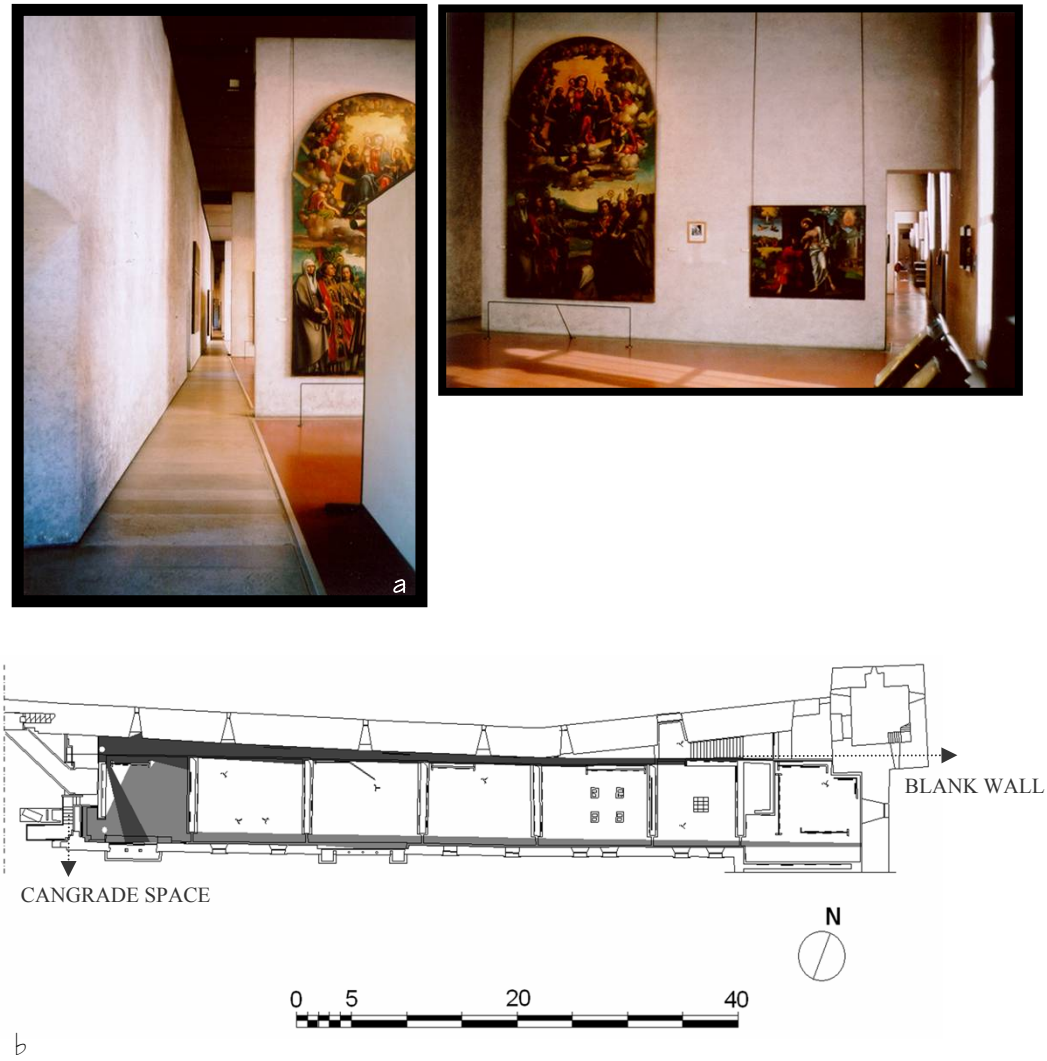
^ **FIGURE 5.4** Perspective vista through the cross axis of the Sainsbury Wing and visual play with the perspective construction of Cima's painting.

^ **FIGURE 5.5** The long vista through the central enfilade of the Sainsbury Wing terminates on altarpieces at both ends

At Castelvecchio, Scarpa also uses the perspective and intriguingly, handles different kinds of perspective within the same spatial domain, the painting galleries. [**Figure 5.6a-b**] As outlined, he deliberately closed the central openings of the original transverse walls and designed two narrow circulation zones, so that movement occurs in spaces which pass by, rather than through, the gallery spaces: the north axis which runs from the outside and alongside the curved wall of the building, by the river (as if it follows the meander of the Adige), and creates a false perspective; and the south axis, on the side of the courtyard, which runs along the edges of the galleries and provides a diminishing perspective. At first, these axes might appear as two identical circulation spaces framing the galleries, an initial impression quickly dissolved by a closer examination of the architectural details: the north axis, a ceiling-height space (since the traverse walls are completely detached from the outer wall), connected with its pattern of paving to the outside (the *Cangrade space*), structures an external path that leads back towards the entrance. On the contrary, the south axis, with a paving pattern similar to that of the galleries, and punctuated by the aligned door-like openings cut on the walls, acts as an extension of the gallery space. Thus these two axes potentially structure two morphologies of movement, one continuous and linear and another, meandering and interrupted. Intriguingly, their long perspective vistas are at one end, stopped by a blank wall and at the other, anchored by an outside space, as shown in **Figure 5.6b.**

Hierarchy

Next, a powerful difference between the two layout structures is identified by the comparative analysis. The dominant feature of the Sainsbury Wing is hierarchy, expressed both by the structure of space and the size of rooms. The sixteen galleries (plus the *annex* for the Leonardo cartoon, **Figure 5.1**), which constitute the Sainsbury Wing, are organised in three ranges of rooms running the length of the building from north to south. The range of the central galleries is made taller and wider than the flanking ones, designed to accommodate late fifteenth-century Italian paintings, mainly large altarpieces. By contrast, the side galleries are



^ **FIGURE 5.6** Perspective view though the north and the south axis of movement in the painting galleries, stopped by a blank wall (a) or anchored by an outside space (b) respectively

smaller rooms, with lower walls and ceilings, reserved for small scale paintings, as for instance Netherlandish portraits and intimate devotional pictures. Their subordination to the central galleries is further emphasized by the fact that the side rooms are open to, in other words dependent on, the central enfilade, and that their shapes take up the angles of the site boundary. Furthermore, the four galleries that constitute the central range are linked by broad arched openings in enfilade, while the linking doors in the side galleries are not aligned, creating thus an informal note, an interesting play. Seen as a whole, the design of the three ranges recalls the layout of a tripartite church, an ecclesiastic symbolism which emphasizes the religious character of the works displayed.

In contrast to the hierarchy of the Sainsbury Wing, the distinguishing feature of Castelvecchio is the lack of syntactic *centrality*[12] and the changing *genius loci.* As previously outlined, the museum occupies two buildings and is articulated into four separate, rather linear sequences, each on different levels; [**Figure 5.2**] by implication, its four components give the building four centres. However, a series of short passages organises the isolated episodes with solidity into a whole, by creating the nodal points of the itinerary and providing a pause between its parts.[13] Thus the insulation from the entrance, which increases with the change in level, is in a sense balanced by the outdoor links, which act as the constant visual reference. The rejection of symmetry,[14] and the acceptance of the independence of elements, clearly illustrated by the spatial layout, is also suggested, and perhaps reinforced, by the arrangement of objects in space, that -as we shall see- create multiple focal points, '*local complexities*' (Los 2002, p. 30), independent of any centre or hierarchy.

Distant visibility

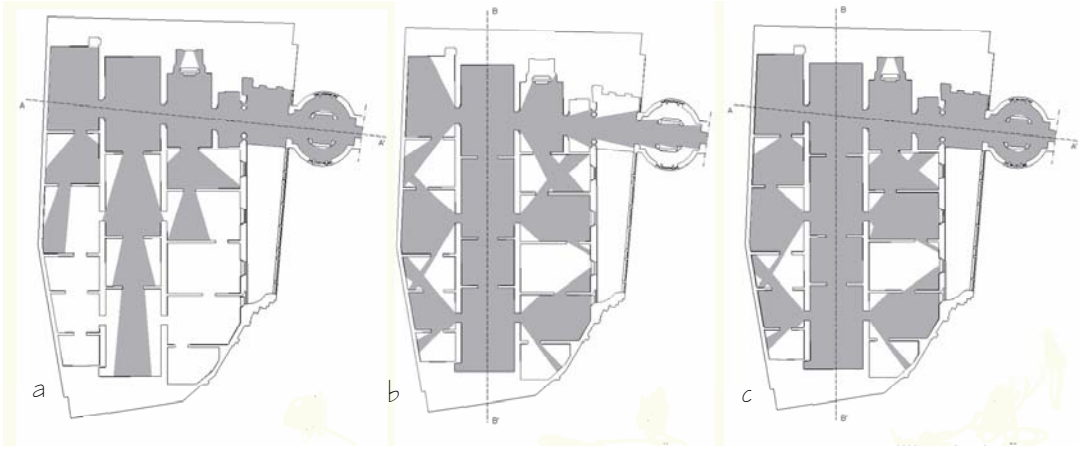
Finally, the two museums have quite distinct principles organizing their visual construction. In the Sainsbury Wing, although it seems that the design is more concerned with conventional rooms, and not with a free-flowing space, the open spatial relationships of the well-defined rooms create a sense of unity and flow, a succession of visual relationships, which is usually the characteristic of open

spaces. The wide door openings and their axial or staggered alignment, allow a distant and synchronic visibility, shape powerful vistas and define a determinant feature of the gallery. The majority of visual fields are not restricted to the local scale of a single space; they enter up to six rooms. If we look at the series of visual fields experienced along the major perspectival axis, we find that there is a visual access to the entire length and width of the gallery. In addition, the visitor can simultaneously see the spaces of the two sides by moving through the central aisle, [**Figure 5.7**] while, walking along the shorter axes of the each side, he is presented with fragments of visual information already offered.

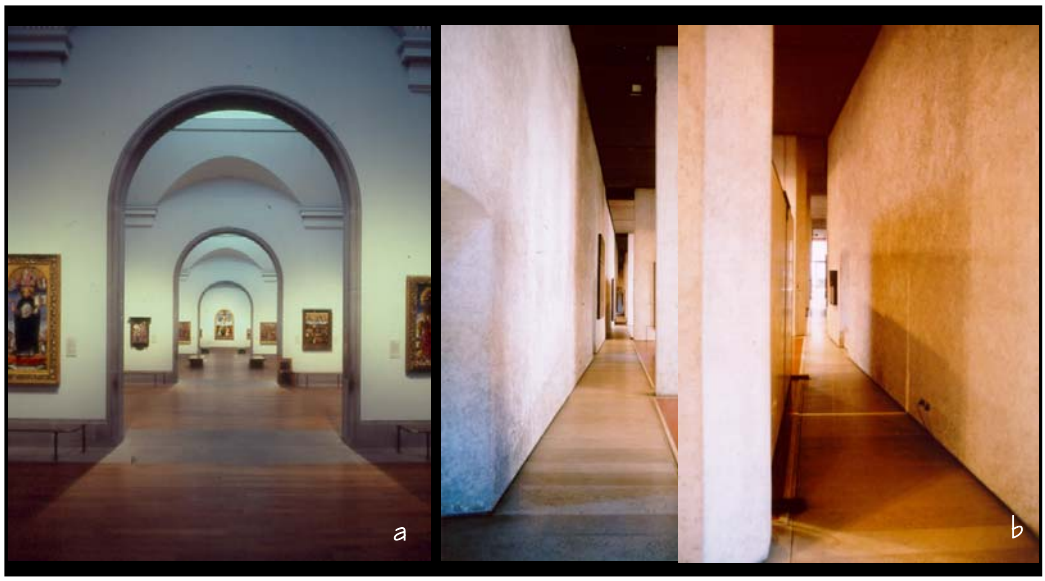
This visual play is enhanced by the fact that the collection numbers a high proportion of small size paintings and subsequently, the changes in the visitor's views tend to be sharp: he does not change views of partially visible paintings, but entire works become visible or disappear from his field of vision. Only in the main axis are the paintings of big scale; but its wide and tall arched openings, viewed in perspective, allow works shown in different rooms to be seen together. This powerful visibility, perhaps the key property of the Sainsbury Wing, can be seen as means to counteract the lack of spatial variety and differentiation[15] that would engage the visitor.

Like the Sainsbury Wing, Castelvecchio is characterized by distant visibility, [**Figure 5.8**] but, unlike it, it is marked by visual fields which are quite restricted and views which seem to be '*informationally stable*' (Peponis et al 1997; Peponis 1997a) in the sense that they do not change as you move along the axis.[16] Visual information is again not limited to the local scale; for example, in the case of the picture galleries, perspective vistas offer access to seven spaces but, interestingly, these are end-stopped by blank walls. [**Figure 5.6b**] Also it is worth noting that the layout of each sub-complex is not revealed as a whole from any central spatial point or from the transition spaces that break up the circuit.

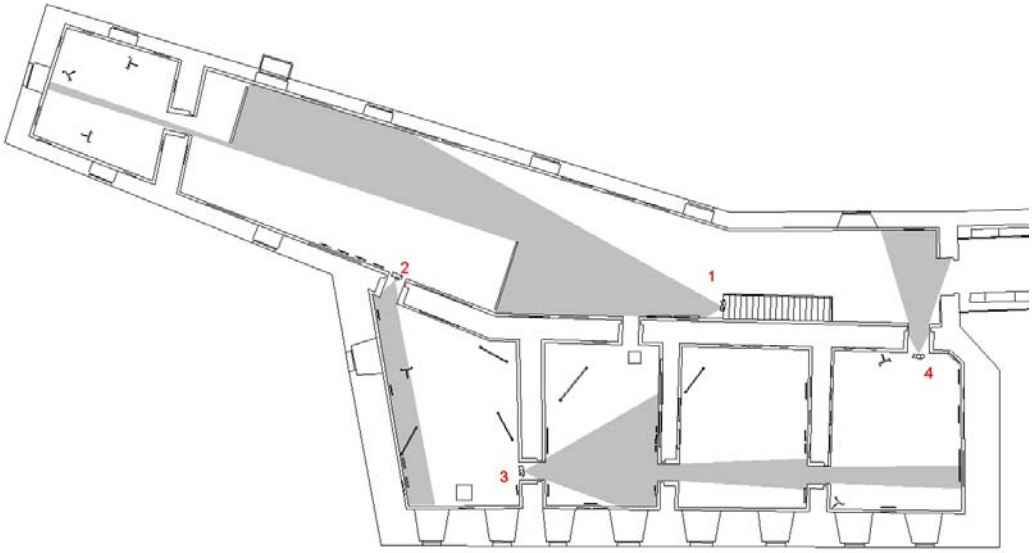
If we try to describe how the second floor of the Reggia is experienced as a series of visual fields, enclosing all the area that is frontally visible 60^{o} around some key points,[17] [**Figure 5.9**] we find that the general rule that directs the organisation of space is the control of vistas. Visual fields are systematically constructed so as



^ **FIGURE 5.7** Isovists drawn from the cross perspectival axis (a) and the central axis (b). In figure (c) the line isovists from the two intersecting axes of the layout are superimposed on each other, indicating that they provide information which reaches the periphery of the plan.



^ **FIGURE 5.8** Both the Sainsbury Wing (a) and Castelvecchio (b) are characterized by distant visibility



^ **FIGURE 5.9** Plan of the Reggia (second floor) showing visual fields enclosing all the area frontally visible 60^0 around some key points.

to reveal glimpses of spaces to come, in order to suggest the continuation of the route, but not to allow any inspection of their content. From the top of the staircase (point 1, **Figure 5.9**), for instance, a long line of sight runs through the entire length of the main gallery to the room at the far end. Yet, much about that space is not revealed and only a narrow glimpse of the distant dead-end room is available. As the viewer proceeds towards the side galleries (for instance, at point 2, **Figure 5.9**), the first thing he encounters is the back of an easel. It seems therefore no accident that possible expansive visual fields are consistently restricted by objects laid out so as to maintain a sense of uncertainty. However, we shall see that the '*information stability'* on the global scale is countered by visual experiences changing rapidly and increasing in complexity, locally.

Interestingly, by bringing out their key structural properties, it is shown that the two museums are in effect characterized by similar principles -powerful axiality, distant visibility and systematic use of perspective. [For numerical spatial data, the reader is refereed to **Tables 4.3-4.4**] But what seems to radically differentiate them, and give rise to their contrasting spatial styles, is the manner in which they handle these common principles to create a wholly different kind of experience.

5.3 Morphology of movement and exploration

To pursue the analysis a step further, we will now move from the more conspicuous spatial properties of the layouts to the less obvious ones which explain how the two museums work.

SAINSBURY WING

Design intent

It would be useful to begin by reviewing two issues that are of direct relevance to our study of the Sainsbury Wing: firstly, the Brief's focus on circulation as a key element of the layout and secondly, the architect's intention to create a hierarchy among spaces. More precisely, the National Gallery's Design Brief required a

'*well defined main route through the galleries*' (National Gallery Archive, HSI.69), and already in the Preliminary Outline it was stated that:

'*visitors should feel instinctively what the layout of the Extension is. We want to avoid the danger of visitors by-passing rooms because they are out of the way or appear to be in a cul-de-sac. No gallery should be missed because it is out of the normal flow. Visitors must be able to know easily where they are*'. (National Gallery Archive, NG 16/115.8)

Fundamental was also the concept that:

'*there should be a choice of routes through the collection, enabling visitors to explore at will, rather than obliging them to follow a set route'*.

The Brief continued:

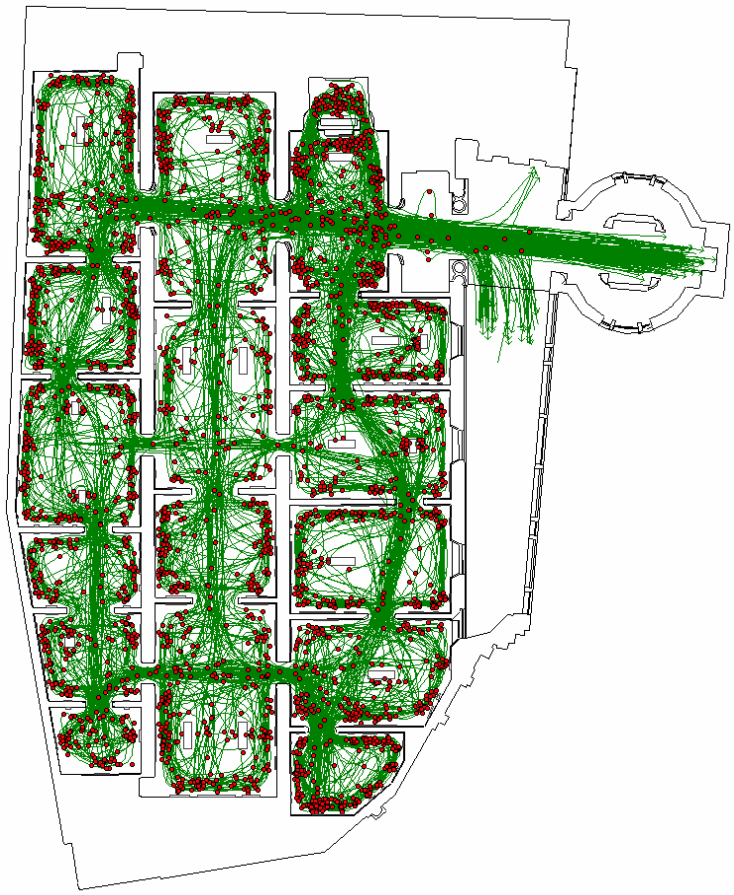
'*one or more main routes should be identified*, *with other rooms offering short detours from these routes, returning the visitor to easily recognisable main spaces'*.

Concerning the second issue, Venturi designed a 'basilica' style layout which enhances the predominance of the central sequence. This series of the axially aligned longest and highest spaces of the gallery was planned to play the role of '*a public processional space*' (National Gallery Archive, HSI.39a).

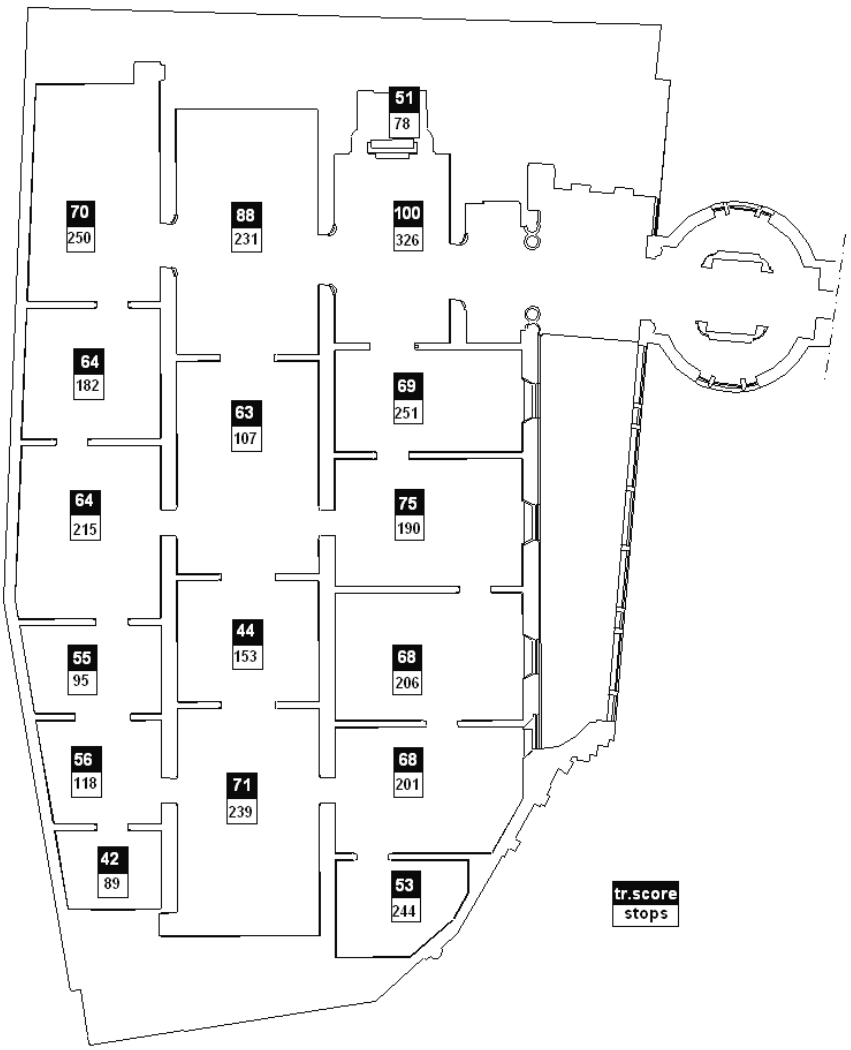
The circulation pattern and the hamiltonian path

But how do these explicit design choices relate to the actual spatial operation of the gallery? In dealing with this question, we carried out an observation study of the circulation pattern that involved recording the routes of 100 people through the galleries, [**Figure 5.10-5.11**] and counting flows in both directions across the thresholds of spaces.[18] [**Figure 5.12**]

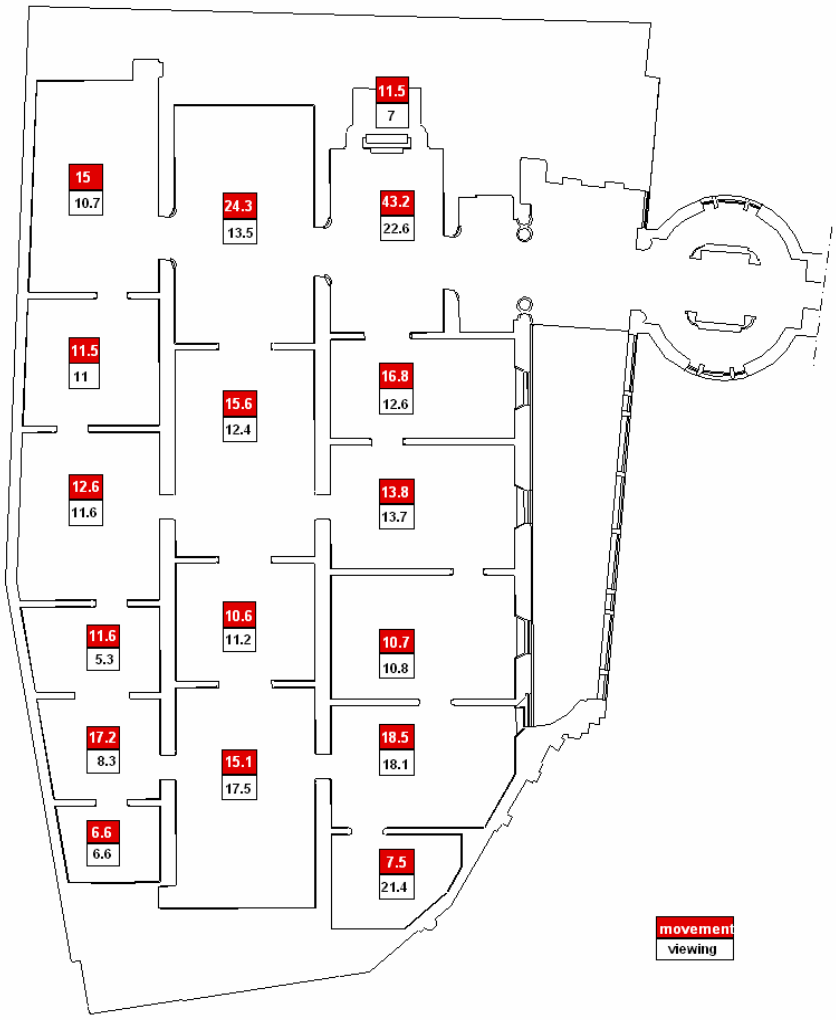
As regards the use of the two entrances, it seems natural that 23% of visitors enter from the Sainsbury Wing, which was designed as a secondary entrance.[19] But this also implies that the 77% of visitors who use the main entrance, start their visit from the old building, and by implication, the Sainsbury Wing becomes the



^ **FIGURE 5.10** The routes and stopping points of visitors observed during their visit to the Sainsbury Wing



^ **FIGURE 5.11** The mean tracking score and the average number of stops made in the Sainsbury Wing



^ **FIGURE 5.12** The per minute movement rates and per snapshot viewing rates in the Sainsbury Wing

dead-end part of the whole complex (though visitors can exit through it).[20] At the end of their visit, 42% of the people observed get to more than thirteen spaces (out of the seventeen that constitute the gallery), 26% get to more than nine spaces and 6% get to only one space. This space is either room 60 (since people tend to move along the main link between the existing building and the new wing, and then continue to this room to build up an overall picture of the gallery), or the annex for the Leonardo cartoon (room 50). In this case, visitors come specifically to look at that work. Before focusing on the analysis of the morphology of visitors' exploration, it is of interest to add that the average time of stay in the Sainsbury Wing is 16 minutes (see **Table 4.7**). This can be accounted by the fact that, apart from a considerable number of people who visit the museum exhaustively and pause to view the exhibits, there is an even higher number of visitors who tend to omit spaces (up to one third of the total), and spent much less time than the average. [**Figure 5.13**]

If we now turn our attention to the visitors' patterns of exploration, two observations are in order: first, that visitors start moving in a systematic way, following the lines and the corners of the gallery, but then move randomly, returning to the same spaces or missing parts of the layout; and second, and more remarkably, that the spaces that seem to lie outside the search track of visitors are those of the central sequence. People enter the gallery from the corner, the common point at which arrives both the staircase from the entrance and the link from the main building. [**Figure 5.14**] Visitors then either turn left (45%) and move through the rooms of the east side, following the alignment (as also proposed by the museum), or go towards the end of the perspective axis (50%), attracted by the visual strength of Cima's work, at the end of the long vista (room 61), and then follow the next axis, down to room 66. Few turn to the central enfilade, as it is unlikely that they will start their visit from the middle of the gallery space. Up to that point people move in a systematic way. The difficulty lies in deciding the continuation of their itinerary when they find themselves at the south end of the central axis. Beyond that point there is less consistency in their paths, which may also indicate confusion. Moving along the main axis seems to take them back home at the same starting point too quickly, while there are

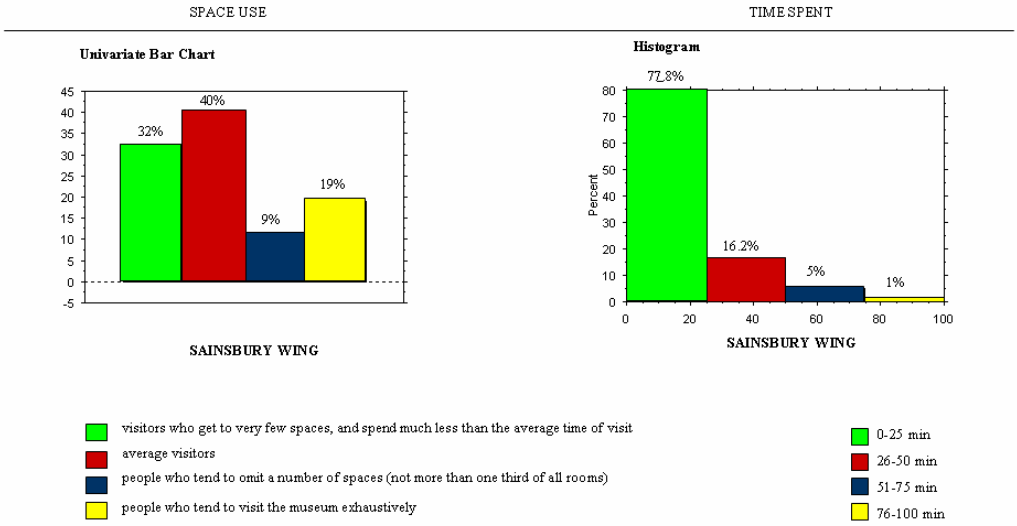
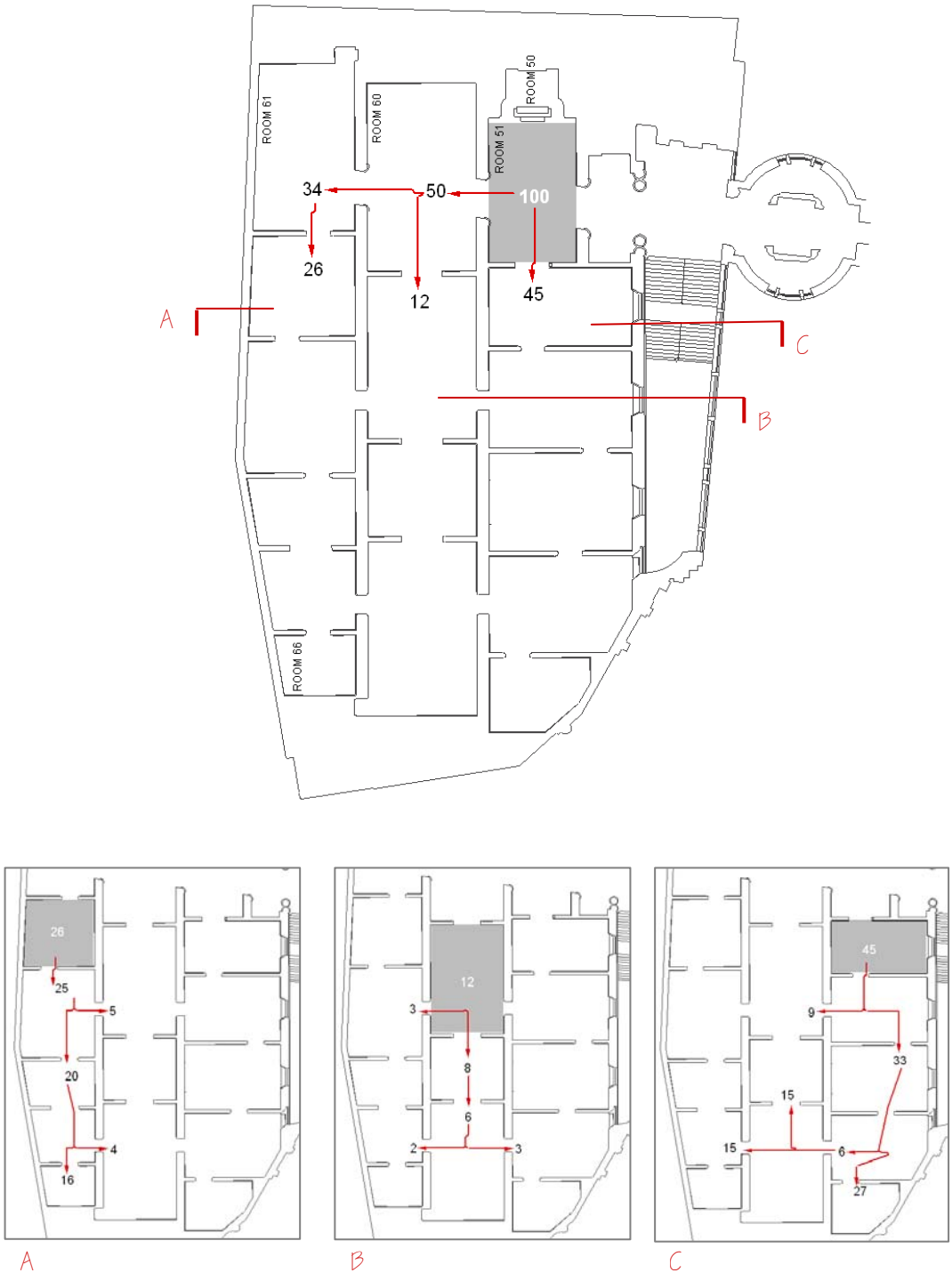


FIGURE 5.13 Diagrams showing the use of space and the length of time spent by visitors observed in the Sainsbury Wing



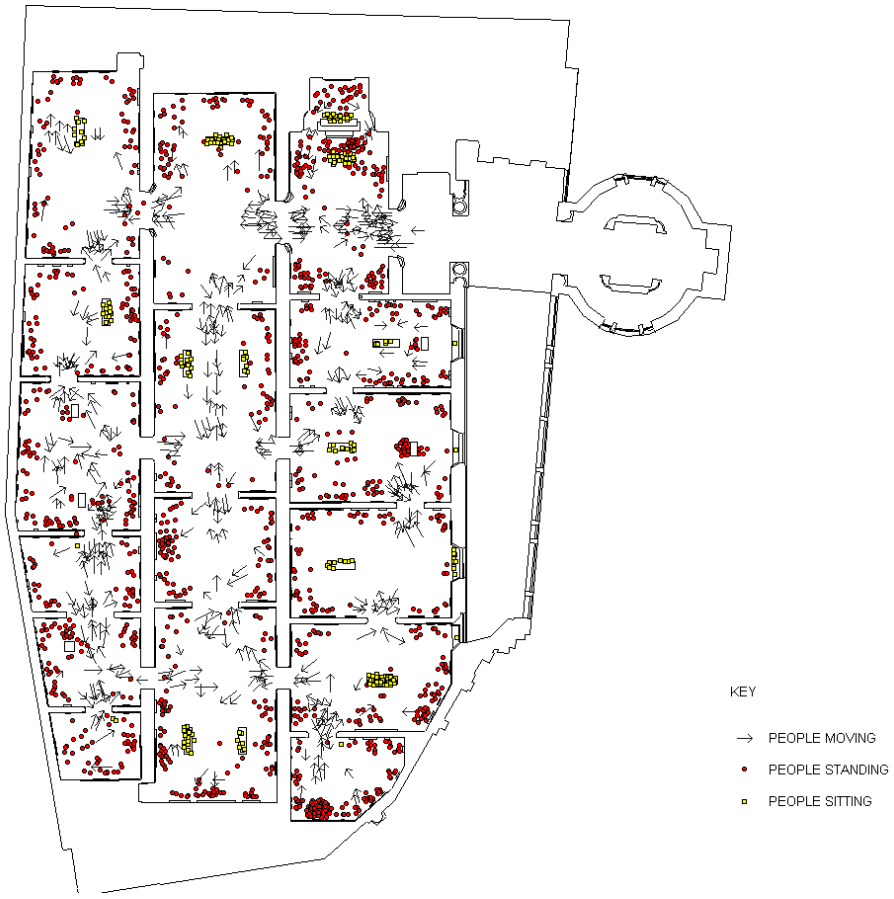
^ **FIGURE 5.14** The directional splits of where visitors observed are moving to upon entering the Sainsbury Wing

more things to explore on the other side of the axis; so, they continue linearly to the other corner of the gallery, and do not get to the central rooms. Some return to the same spaces or move randomly; the majority of them continues though the west sequence of rooms and finds the way out through the main perspective axis.

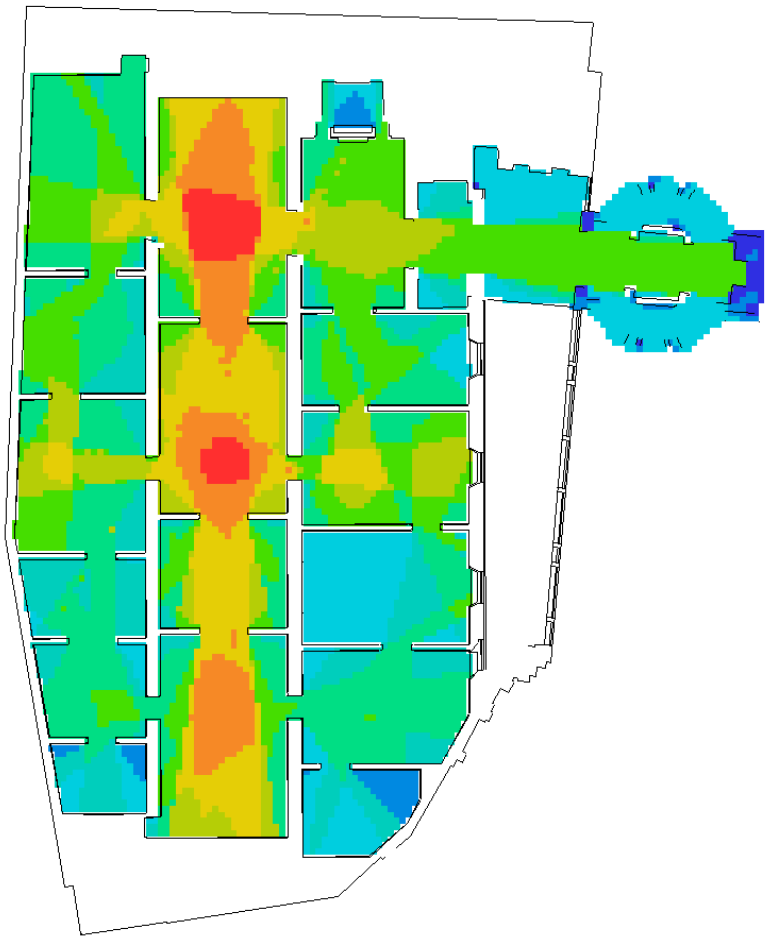
Now if we compare the three sequences we find that the complex of spaces on the east side has by far the highest movement rates (the sum of movement per minute in the seven east galleries is 121). It is surprising that the central axis, the intended circulation spine of the gallery, designed to draw people through and enhance a sense of ceremony and procession, gets almost half of the sum of movement of the east side (that is, 65 per minute). Even the west sequence has slightly higher movement rates than the central one (74 per minute). Interestingly, this bias towards the east side (rather than the central one) is also reflected in the observed pattern of encounter. [**Figure 5.15**]

This gap between observed movement and design intentions can be explained by the '*deep core structure*' of the gallery and its simplified, but not intelligible layout. In contrast to Tate Britain (see chapter 3), in the Sainsbury Wing, the central axis, the '*integration core*' of the gallery (cf. the pattern of visual integration in **Figure 5.16**), is deep from the entrance; it starts from the second space and has no connection with the beginning of the route. This also suggests that the local aspect of movement is independent from the global circulation, meaning that people moving within the gallery do not encounter those moving in and out of the gallery –either the extension or the main building. Moreover, since the main axis is not adequately integrated into the gallery, it can not act as an organizing axis nor give guidance to visitors as to the overall spatial logic of the layout.

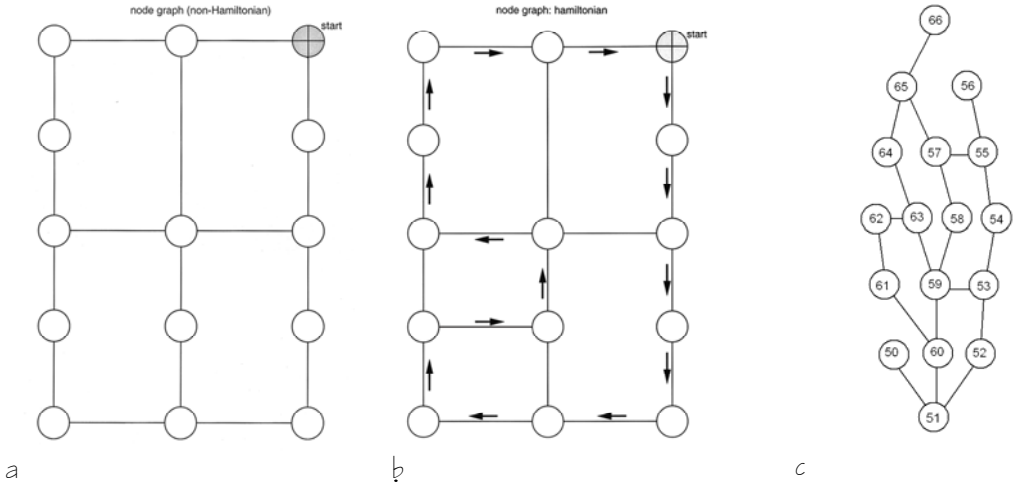
It is also argued that the gallery's simplistic structure does not create merely local problems, but on the contrary, affects the whole layout and through movement. This feature is related to a graph problem. In **Figure 5.17a** we construct the node graph of the spaces in the gallery (the 1-connected spaces are evidently omitted). It becomes evident that if the visitor follows the route proposed by the gallery, he cannot end where he started. This property, which refers to the existence of a single path passing through all the spaces ending where it started, is known



^ **FIGURE 5.15** The pattern of space use and interaction in the Sainsbury Wing, based on '*snapshots*'



^ **FIGURE 5.16** The pattern of visual integration in the spatial layout brings to the surface the '*integration core*'



^ **FIGURE 5.17** (a) The non-hamiltonian node graph of the Sainsbury Wing; (b) the hamiltonian graph showing that it would be possible to make a single path by opening one more partition (drawn by B. Hillier); (c) the graph of the gallery justified from the entrance

.

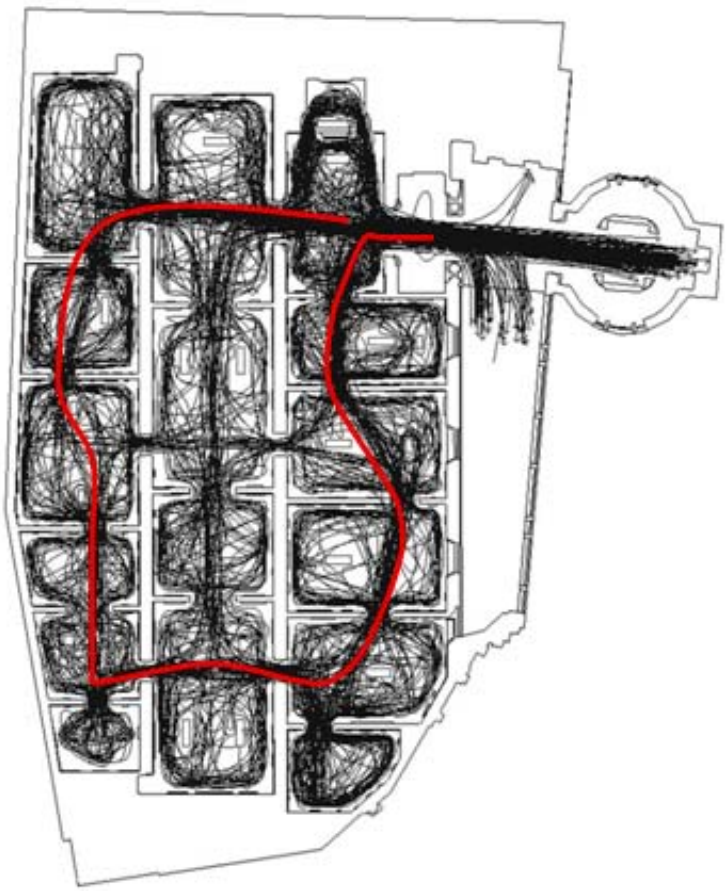
as hamiltonian (Buckley and Harary 1990, p.77-91). It is clear that the Sainsbury Wing's graph, although quite small, is a non-hamiltonian graph: visitors cannot get to all spaces without crossing some of them more than once or missing out parts of the gallery –usually the central axis. However, it would be possible to make a single path by opening one more partition between space 58 and 64. [**Figure 5.17b**]

What follows from the above discussion is that the Sainsbury Wing is not an easily traversable gallery. It lacks clarity of structure from the point of view of visitor entering the entrance to the gallery, and its spatial properties do not encourage the explorative aspect of visitors' movement. This might also account for the evidence that there is no great differentiation of visitors' itineraries, and 19% of visitors observed follow exactly the same route (shown in red in **Figure 5.18**) -upon entering, they turn left, then continue along the east side and, through the room 57, get to the west galleries, while the main vertical axis provides them with a clear way out.

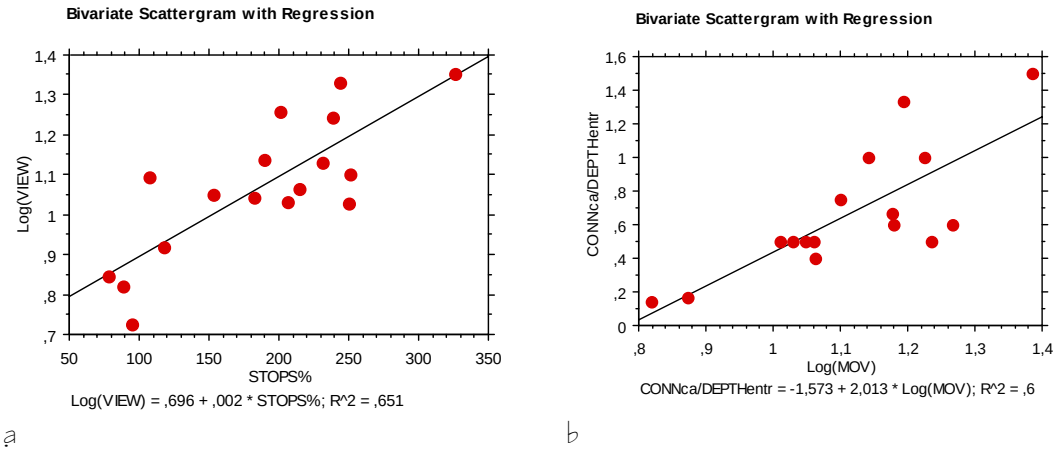
The spatial logic of the pattern of space use

If we compare the dynamic patterns -flows of visitors across the thresholds of spaces-, with the static counts -of people viewing,[21] [**Figure 5.12**] we find that on the whole, the correlation between movement and viewing rates[22] is not significant (R^2 = .289, p value = .0260).[23] It is of interest, however, that viewing rates (based on the snapshots) and number of stops (based on the tracking records, **Fig. 5.11**) are strongly correlated (R^2 = .651, p = <.0002, **Figure 5.19a** and **Table 4.6**), meaning that both data concur with the idea that there is a bias towards the east side.[24]

The highest viewing rates are found in the first (51) and the last (56) rooms of the east sequence. [**Figure 5.12**] This can be explained by the curatorial strategy that proposes to display in the first room (51), not the earliest works, as one might expect by a chronological arrangement, but the paintings which constitute the culmination of the Renaissance art, that is Leonardo, Michelangelo, Ghirlandaio and Verrocchio; and respectively, to show in the dead-end space (56), one of the



^ **FIGURE 5.18** Walking though the Sainsbury Wing: the red line shows the path of 19% of visitors observed



^ **FIGURE 5.19** Correlations between: (a) viewing rates and number of stops, and (b) Log (Movement) and the reciprocal of depth multiplied by connectivity -excluding the entrance space of the Sainsbury Wing

highlights of the whole collection of the National Gallery, Van Eyck's *The Arnolfini Marriage*.

However, it is intriguing that there is a stronger preference for the east dead-end space rather than its west equivalent, in terms of viewing rates as well as number of stops. The reason for entering more frequently room 56 and avoiding room 66 might be spatial. Both are cul-de-sac spaces at the end of the sequence, and not open onto the central space [see **Figure A.1a**]. In addition, like room 56, room 66 is also devoted to the works of one of the most important Renaissance artists, Piero della Francesca. It seems, however, that room 56, by being at the end of the alignment for visitors moving through the east sequence, attracts a substantial number of visitors; on the contrary, its symmetrical cul-de-sac on the west side is against the alignment and as a consequence people tend to turn off before getting to it.

A final observation, related to the morphology of visitors' paths, seems worthy of some emphasis. As suggested in the previous chapter, mapping the precise location and distribution of visitors' stopping points, allowed us to establish a distinction between '*object-driven*' and '*space-driven*' visitors. It is of particular interest in this respect that, though half of visitors observed in the Sainsbury Wing are '*object-driven*' (see **Table 4.7**), the gallery is characterized by the highest proportion of '*space-driven*' visitors in the sample, that is, visitors who seem to be engaged in exploring whole compositions in space rather than individual exhibits, potentially encouraged by the ample cross-visibility of the layout. This is an interesting finding to which we will return later in this section; its relevance however will be better understood in the context of the final comparative review of the case studies.

What makes the gallery work this way?

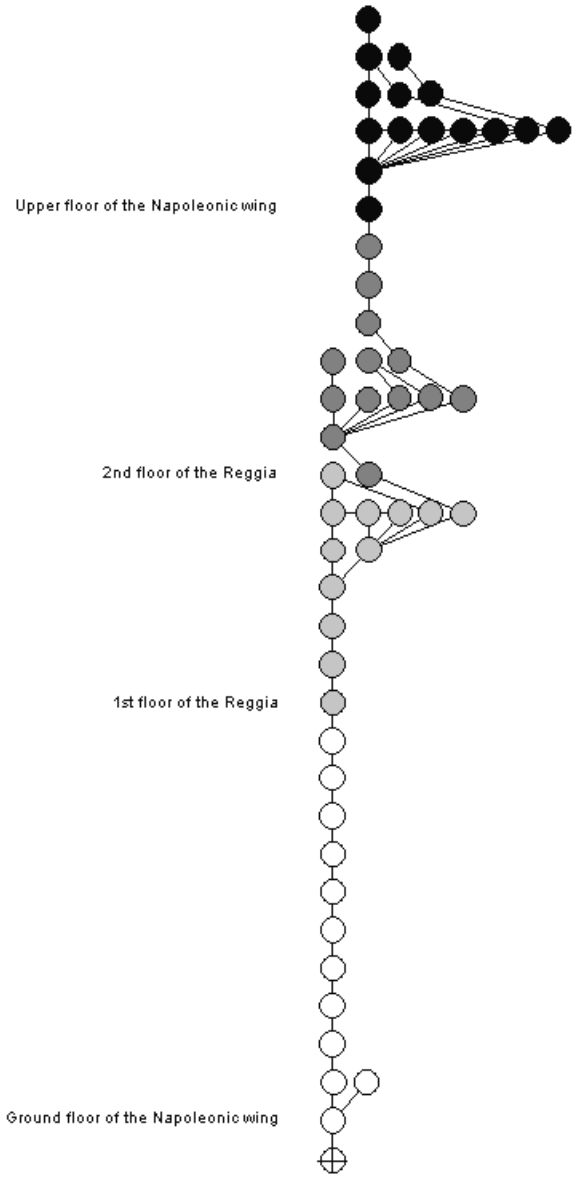
The question that arises next is what makes the gallery on the whole, work this way. The link between spatial configuration and observed pattern of space use that has been proposed above in the context of the two dead-end rooms, will be numerically confirmed by the spatial analysis of the global layout. We recall that the most frequently empirically tested theorem of space syntax is that more

integrated spaces are statistically associated with higher rates of movement. This does not hold strongly in the case of the Sainsbury Wing, meaning that the gallery does not guide movement as in the case of Tate Britain. If we correlate the numerical integration values of the rooms with the observed movement rates, we find that the correlation is just about (<.05) statistically significant (R^2= .278, p=.0298; see **Table 4.8**). Yet syntactic properties have a powerful effect on the pattern of movement. The present study has identified a strong correlation between movement and the reciprocal of *depth* multiplied by *connectivity* [25] (R^2= .765, p = < .0001, if we include all spaces; R^2= .6, p = < .0004, if we exclude R.51, the entrance point; see **Table 4.8**). The 'scattergram' in **Figure 5.19b** shows that 60% of the differences in movement rates between spaces are due to the structure of the spatial layout, and more precisely, to the local conditions. This result can perhaps be explained by the following argument. Since the structure of space itself does not guide visitors around the Sainsbury Wing, as indicated earlier, people cannot decide on the route from the entrance. Consequently, they move locally, in other words, they continue their itinerary through the galleries and take decisions at different stages as they proceed. As seen, choosing either side of the central axis is like deciding a direction, while the exploration of the central spatial sequence requires a later bifurcation and generates unnecessary backtracking. It could therefore be argued that spatial analysis seems to contribute to explaining something of the structure of the experience and occupation of space in the gallery that we could intuitively understand but find difficult to describe. So the main conclusion that emerges from the analysis presented here is that the Sainsbury Wing cannot be used in a clear way nor can it be easily traversed, as the navigation through spaces requires an understanding of the way in which local parts are interrelated into a whole pattern, which is not available in the gallery.

CASTELVECCHIO MUSEUM

The construction of the route

To introduce the issue of circulation at Castelvecchio, it is critical to make explicit first the very deliberate architectural decisions -interventions and additions- of Scarpa that aimed at providing an order to the spatial sequences. A historic building sets inevitably requirements and imposes its own restrictions on the architect's creativity and imagination, but the spatial design of Castelvecchio is in essence the product of Scarpa' choices. For the purposes of this discussion, we suggest looking closely at the manner in which Scarpa invented and created a path through the museum complex. As shown in **Figure 5.2**, he designed a passageway (7) connecting the two courtyards -of the Napoleonic wing and the Reggia; he used the tower, the *Torre del Mastio* (10), to mediate between the two wings, and designed an internal staircase that makes the link between the ground floor of the Napoleonic wing and the first floor of the Reggia; then, to connect the tower to the Reggia, he built two bridges on different levels (11, 15); finally, to provide access from the tower to the upper floor of the Napoleonic wing –the last sequence of the itinerary- he designed the *Cangrande bridge* (17). The whole itinerary can be briefly described in Frampton's words (1995, p. 321): '*Scarpa elected to treat the building as a continuously unfolding promenade that would mark its progress through space by the discrete articulation of different elements*'. If we now analyse the museum plan as a justified graph, [**Figure 5.20**] we find that it has a '*deep tree*' form; as we shall see, Castelvecchio is by far the deepest gallery of the sample (cf. **Figure 5.17c**; see also **Table 4.4**). Moreover, it structures a unidirectional global pattern of movement; visitors return to the starting point after completing the circle of the route. Yet the circulation is not rigid. The '*rings*' of circulation offered on both floors of the Reggia and the two parallel axes of movement provided by the painting galleries, introduce a measure of flexibility and choice into visitors' itinerary, both increasing as one progresses deeper into the museum -as if Scarpa first sets up the stage, by



^ **FIGURE 5.20** The justified graph of Castelvecchio

carefully controlling movement, and then is in a position to accord the viewer some degree of freedom.

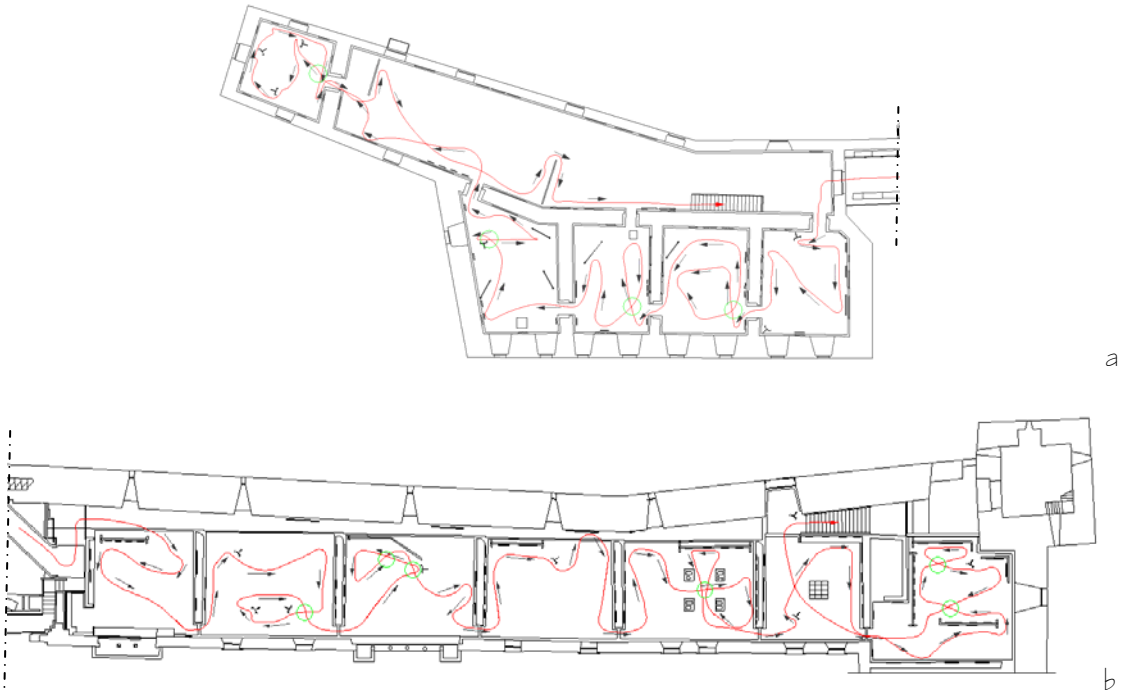
Single general direction of movement and exploratory nature of paths

This single general direction of movement suggested above is reflected in visitors' paths (see **Figures 5.21** and **5.22**), generated by tracing the routes of 33 people throughout their visit.[26] As in the case of the Sainsbury Wing, also at Castelvecchio, the spatial layout has a strategic effect on creating the pattern of movement, but this effect is generated in a completely different manner. The high degree of sequencing (see **Table 4.3** and **Figure A.2b**), the limited choices and few possible diversions from the entrance to the exit, force circulation along the well defined routes and structure a rather constrained overall movement pattern. But since movement is not allowed to be random, it can not be modulated by spatial variables.[27] Not surprisingly the only spatial property that is significantly correlated with the pattern of movement is *depth from the entrance*. More precisely, we find a strong, and negative, correlation between *tracking score*[28] and *depth from the entrance* (R^2= -.37, p-value = < .0001), meaning that the deeper visitors get into the museum, the more spaces they omit.

What is particularly important in the recorded paths is that the sequential movement shaped by the global layout is coupled with a non linear movement locally. If we look closely at the morphology of the traces of individual visitors, [29] we find that the rate of *changes in direction* as people explore the displays is at Castelvecchio twice as frequent as in the Sainsbury Wing. Interestingly, a similar ratio is found when we compare the two museums in respect to the average *number of intersections,* that is, the number of times each visitor 'crosses' his own path by going from one point to another within a room. [**Figure 5.23**] These findings suggest that the simplicity of the global path is countered by the complexity of the local. Visitors tend to walk around and among the objects, shaping intersecting and encircling orbits of movement that are not kept to the perimeter of the rooms but, on the contrary, fill the space. This meandering

^ **FIGURE 5.21** The routes and stopping points of visitors observed during their visit to Castelvecchio

^ **FIGURE 5.22** The mean tracking score and the average number of stops made at Castelvecchio



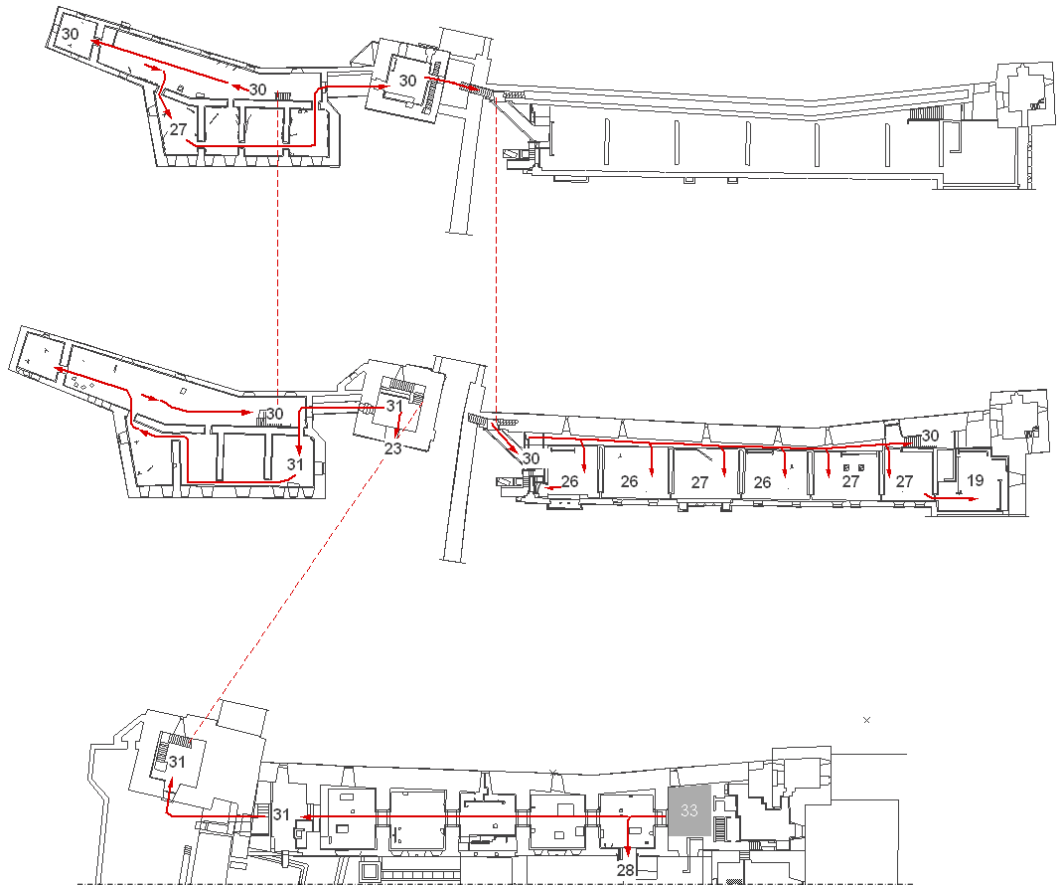
-NUMBER OF CHANGES OF DIRECTION: 87
-NUMBER OF INTERSECTIONS : 10

^ **FIGURE 5.23** The morphology of a sample visitor path as recorded on the plan of the Reggia - second floor (a) and the painting galleries (b). the arrows indicate the changes of direction and the circles, the intersections

pattern of movement can be accounted for by the morphology of the display, which not only does not determine any viewing sequence but also requires the viewer to shift positions and viewpoints to build up a picture of the whole.

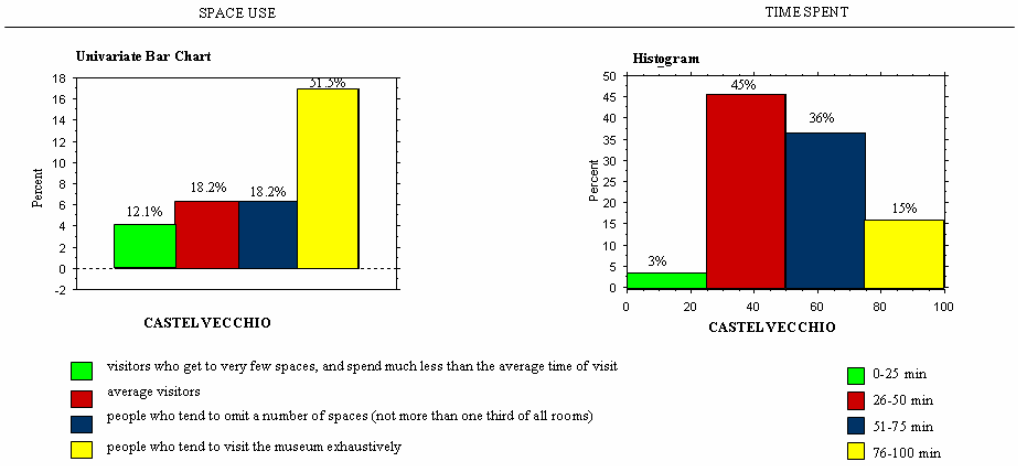
Focusing attention on the stopping points (per room) made by the visitors observed, and considering them as indexes for the viewing attraction of the galleries, we find that the Reggia, and specifically the first floor, has the higher viewing. [**Figure 5.22**] This result is compatible with the fact that the rooms 21-24 and 29, on the first and the second floor of the Reggia respectively, show some of the key works of the collection (i.e. Flemish and German paintings in room 24, works of Pisanello in room 21, of Bellini in room 23 and Mantegna in room 29), and best illustrates Scarpa's strategy of idiosyncratic arrangements of objects (see below). Two more empirical observations concur with the idea that space use is biased towards the Reggia: first, the visitors' recorded paths on the ground floor, linear and continuous in majority, suggest that they tend to traverse the first sequence rather quickly; a possible interpretation might be that the distant visibility (in conjunction with the view of the end of the sequence upon entry) acts as a decentring factor, inducing visitors to move on, and creating anticipation for the parts unseen. The second empirical observation relates to the paintings galleries and the fact that 20% of visitors tend to pass by the galleries, scanning their content as they move along the external path, rather than pause to look at the pictures (spaces 41-47). [**Figure 5.24**] On the contrast, the Reggia is characterized by the exhaustive and exploratory nature of individual visitor paths (as described above).

In examining the stopping points, two interesting findings emerged which merit some comment. [**Figure 5.25**] A significant number of stops were recorded in the transition spaces between the gallery sequences. This may be due to the fact that, these outdoor links provide visitors with views to the river and the surrounding landscape that were not afforded upon entering. Moreover, by acting as a continuous visual reference, these passages guide visitors' exploration, as the detachment from the entrance, which increases with the change in level, and the frequent changes of direction,make difficult an understanding of how the complex is composed as a whole prior to exploration. The other, related



^ **FIGURE 5.24** The directional splits of where visitors observed are moving to during their visit to Castelvecchio

^ **FIGURE 5.25** Location of stops made by visitors during their visit to Castelvecchio



^ **FIGURE 5.26** Diagrams showing the use of space and the length of time spent by visitors observed at Castelvecchio

observation which arises from the distribution of stopping points is the high percentage of '*space-driven*' visitors, a percentage that Castelvecchio shares in common with the Sainsbury Wing. However, a closer look to the amount of time spent at Castelvecchio reveals a fundamental difference between the two museums in respect to this type of visitors. It has been found that visitors stay in the museum 50 minutes in average, [see **Table 4.7** and **Figure 5.26**] that is, twice as long as in the Sainsbury Wing -if we consider the ratio of floor area over mean time spent. It could perhaps be argued that among other, and perhaps more important, factors, the fact that the Castelvecchio is a destination itself has a critical effect on the duration of their stay. Furthermore, the '*space-driven*' visitors in particular, spend time close to the average, as opposed to this type of visitors in the Sainsbury Wing, who stay less that the average by 20%. This finding, in conjunction with the observation that the majority of visitors (51.5 %) visit the museum exhaustively, seems to suggest that we have to do with a quite different pattern of exploration, which will be further discussed in the final chapter.

Concluding, the above observations on the spatial functioning of the museums seem to lead to an interesting suggestion, that in both cases a tension arises between the global and the local properties of space as visitors move around. On the one hand, at Castelvecchio the coercive overall structure of the route (single sequence) is coupled with the more exploratory nature of the potential local paths within rooms (local movement). On the other hand, in the Sainsbury Wing, there is a strongly localised movement, independent from the global circulation of the gallery, which works in a different way than planned.

5.4 Morphology of display

SAINSBURY WING

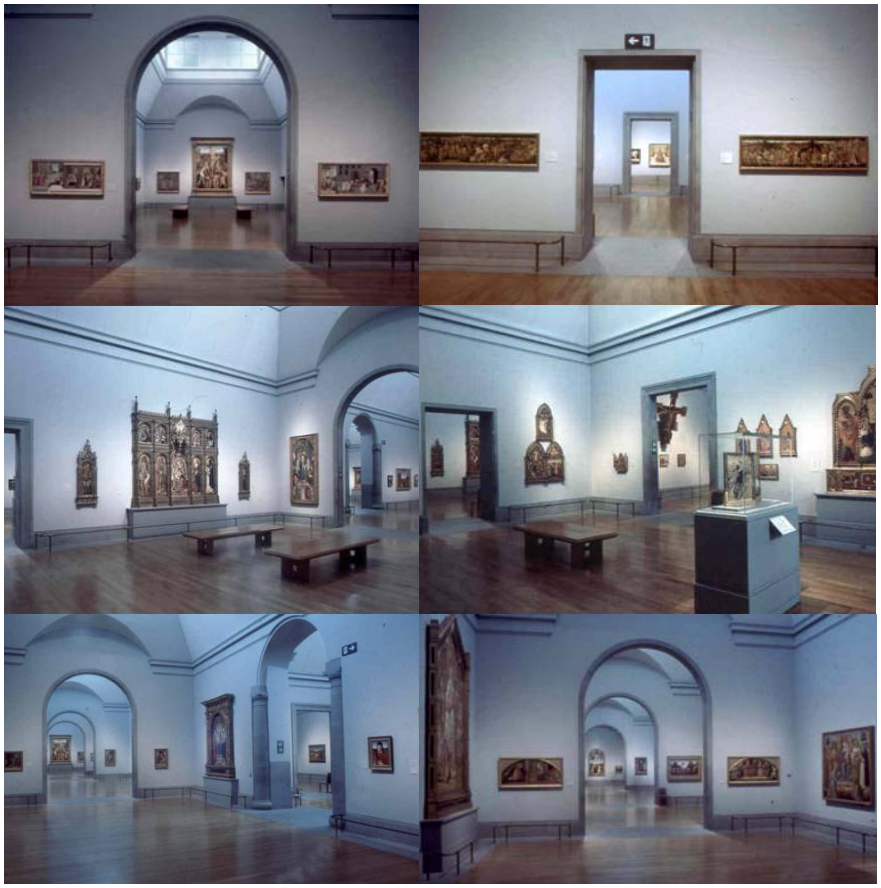
Conceptual structure

Having discussed one parameter of the gallery space, its spatial configuration, and explored its movement, we can now move to the second one, the display layout.

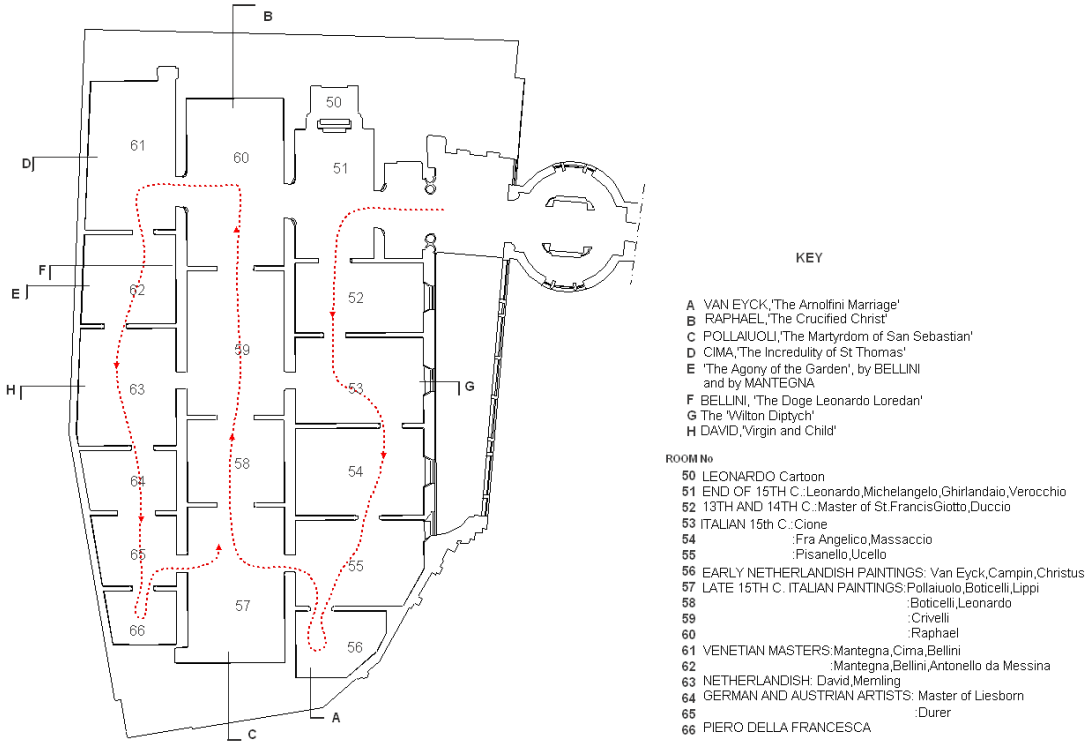
At the Sainsbury Wing, '*the aim of the arrangement of the collection is to create spaces for the paintings, so that they can be seen in a broadly chronological sequence, with contemporaneous paintings from different geographical locations being shown in rooms of close proximity*.' This statement from the original Brief is, we believe, reflected in the spatial configuration. The paintings, chronologically ordered, grouped by artist or school, are displayed in a grid of spaces, so as to reveal affinities, related compositions and themes. [**Figure 5.27**] Visitors' steps through the recommended route correspond to the idea of retracing successive stages of the artistic production in Europe during the period 1260-1510, while the availability of loops in the circulation allows visitors to make short-cuts and move freely from one gallery to the other. This logic of the spatial organization is apparent in the initial comments on the layout made by the curators; they required that:

'*the display should have rooms side by side. The public should be aware that moving straight on means a move forward in time; a move to the side means a move to a different geographical region at roughly the same time. Some way of allowing the visitor to see into the adjacent rooms might be good, thus presenting the visitor with a greater sense of direction.*' (National Gallery Archive, NG 16/115.8).

Suppose we travel along the path as proposed by the gallery.[30] [**Figure 5.28**] We enter room 51; this is the only entry point of the display and serves as an introduction. However, as pointed out earlier, it is devoted not to the earliest works but those of the end of the fifteenth century which constitute the culmination of the Renaissance art. The chronological narrative starts from room 52, with paintings of the thirteenth and fourteenth centuries, including works by Giotto and Duccio, and continues with rooms 53 to 55 that also show Italian works. The cul-de-sac room (56) at the end of the east sequence is specially designed for the works it contains, small early Netherlandish paintings. Moving to the central sequence, the works displayed in the four rooms linked in enfilade have common chronological and geographical frame –late fifteenth-century Italian paintings. The west sequence seems an inversion of the east: it starts with Italian artists -mainly Venetians masters (rooms 61 -62), but continues with Netherlandish (room 63), German and Austrian (rooms 64-65) artists of the



^ **FIGURE 5.27** Views of the spatial arrangement of the collection in the Sainsbury Wing [*National Gallery Archive*]



^ **FIGURE 5.28** Gallery floor of the Sainsbury Wing showing the locations of key paintings (arrangement recorded in November 2002). Dotted lines indicate the proposed route by the museum

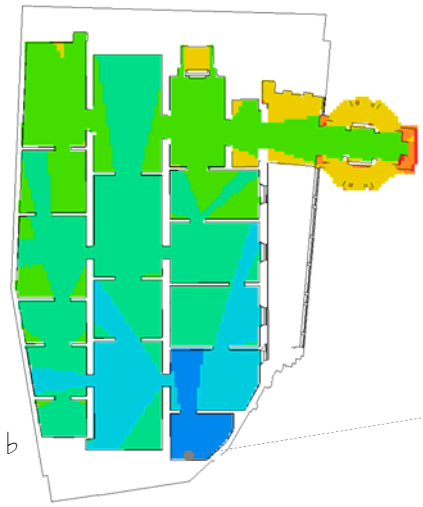
second half of the fifteenth century, and culminates with the dead-end room (66), where visitors '*would be encouraged to sit*' (National Gallery Archive, HSI.39b). It should be noted that the two dead-end spaces, 56 and 66, are distinctive in the sense that the geographical/chronological sequence is provisionally disrupted: the east side, devoted to the Italian works, ends with Netherlandish paintings, and respectively, the Northern rooms (63-65) of the west side terminate with Piero della Francesca.

Enhancing the impact of objects

As evoked in the opening of the previous section, the key properties of the gallery layout are closely related to the curatorial intent. The powerful axiality and the synchronic visibility become the spatial tools that serve the placement of paintings in strategic positions, at the end of long lines of sight or in the deepest spaces of the complex. Paintings with great visual strength, such as Cima's *The Incredulity of Saint Thomas*, Pollaiuoli's *The Martyrdom of San Sebastian* and Raphael's *The Crucified Christ* receive special axial treatment and are used as 'attractors'. [**B-D** in **Figure 5.28**] They occupy conspicuous locations, at the end of vistas, and can be seen from distance and at a right angle. [**Figures 5.4, 5.5, 5.29a**] The perception of works from the right reference point is important, especially in the case of Renaissance paintings that establish eye contact with the viewer and seem to require his active presence. It is also of interest to note that the technique of axial vistas respects the scale of the paintings displayed. The axes on the side galleries are more fragmented, creating spaces of a more enclosed character. For example, Van Eyck's *The Arnolfini Marriage,* with the small scale and detailed representation, is placed on the axis, but in the small cul-de-sac room that provides seclusion and containment, and is visually shielded. [**A** in **Figure 5.28** and **Figure 5.29b**]

In addition to the axial treatment, the spatial distribution of paintings is also determined by their scale and character: '*These paintings are located here*', wrote the Deputy Keeper, Michael Wilson, to the architect David Vaughan, '*because they would seem to be large and strong enough on the whole for the*

^ POLLAIUOLI'S, *The Martyrdom of San Sebastian*



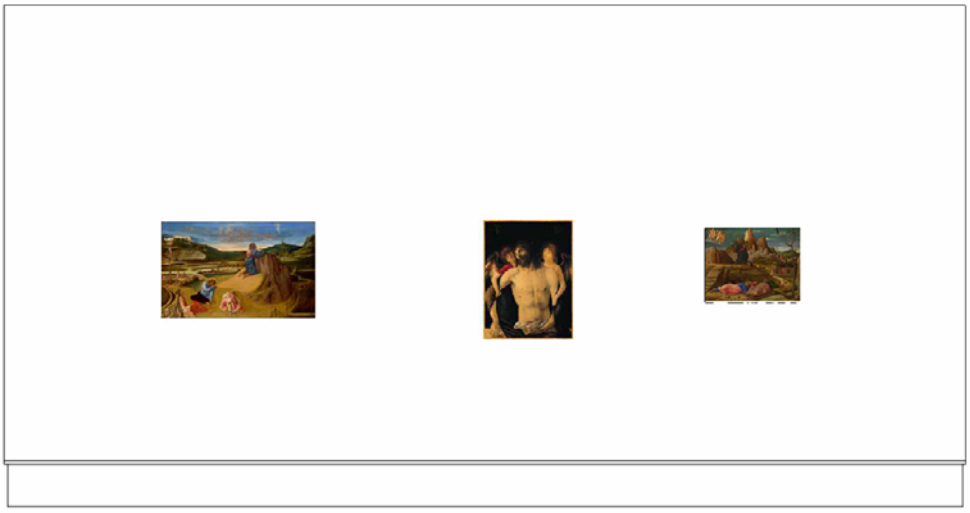
^ JAN VAN EYCK, *The Arnolfini Marriage*

^ **FIGURE 5.29** Examples of the axial treatment of paintings in the Sainsbury Wing

imposing central enfilade'. As previously seen, the longest and highest galleries are located at the centre of the new wing designed to become the '*central focus of the layout*' (National Gallery Archive, HSI.69), and planned to show major Italian Renaissance paintings, while the smaller galleries that parallel this sequence on the east and west sides, are conceived for the more intimate paintings. This suggests that the hierarchy among spaces corresponds to the hierarchy of the works displayed. In contrast to the emphasis placed on the Italian art, the German works are shown in the west side galleries 64 and 65. Moreover, the two rooms are given a strong diagonal axiality, which begins with the gallery 62, dedicated to Venetian masters, and ends with the cul-de-sac room 66, emphasizing the work of another Italian artist, Pierro della Francesca.

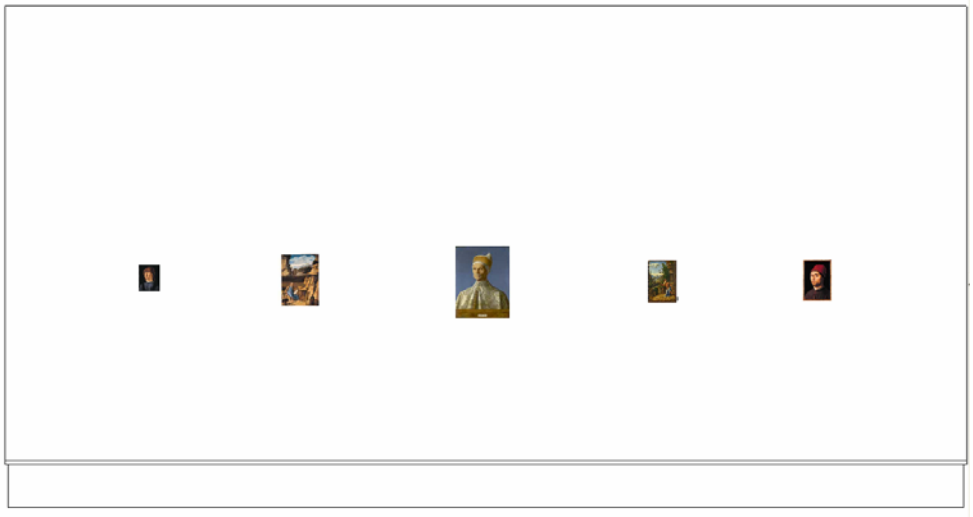
It is also of interest to note that the hierarchy expressed by the spatial means suggested above, is intensified by the mode of display itself: the centre-line alignment of the paintings is the dominant principle and the directionality of the pictures is systematically taken into account. For example, on the east wall of room 62, [**F** in **Figure 5.28** and **Figure 5.30b**] the bigger in scale painting is placed in the middle, framed by two symmetrically arranged pictures of diminishing size. The central painting depicts the portrait of '*The Doge Leonardo Loredan*' and creates a harmonious visual composition with the two portraits, *of a Man* and *a Boy*, at both ends of the composition, all three figures looking in the same direction. Moreover, the two paintings that mediate between the three portraits represent the same theme, '*Saint Jerome in a Landscape*', complete the creation of an aesthetically balanced group.[31]

But associations between works are not restricted to the limits of one room. The maximization of axiality eliminates distancing effects, and in combination with the open spatial relationships, allows for freedom and flexibility in expressing relationships between works by different artists shown in neighbouring rooms, or presenting works by the same artist in different contexts. Indeed this strategy may be seen as reflecting the developments in the fifteenth-century art, when artists travelled and influenced each other. The display of the works of two contemporary Venetian artists, Mantegna and Bellini, in two adjacent rooms (61 and 62) is a case in point. Both have treated the same theme, *The Agony of*



GALLERY MO62 WEST ELEVATION

a



GALLERY MO62 EAST ELEVATION

b

^ **FIGURE 5.30** The arrangement of paintings on the west (a) and the east (b) wall of room 62 of the Sainsbury Wing.

the Garden;[32] so the two compositions are shown in the same room (62), next to each other,[33] [**E** in **Figure 5.28** and **Figure 5.30a**] and in close proximity with the rest of their work, so that the viewer can step back and make comparisons between the two pictures, while at the same time getting glimpses of the other Bellinis and Mantegnas in room 61.

We may therefore argue that the determinant property of the Sainsbury Wing is that it is all about glimpses and views from, through and into spaces to come, or spaces just navigated. The arrangement is built on vistas that punctuate the narrative. The overall sequence is characterized by powerful isovists and a succession of omni-directional and overlapping visual fields. The display is structured as a network of galleries whose door openings become the frames of visual compositions. [**Figure 5.27**] It is no accident that the gallery is centred on the door rather than on the wall. The pictures in room 65 are eccentrically arranged on the west wall, so that the two southern paintings[34] fill the viewer's field of vision, seen from room 55. This also applies to room 63: the bigger in scale painting is placed eccentrically to fit, both aesthetically and thematically,[35] the vista from room 53.

This technique of intentional vistas and axes that reinforce each other, suggests a theatrical idea, a dramatic organization of the display, rather than implying the original setting of the paintings. Seen from distance, Cima's and Pollauioli's works with perspective construction and centricity of composition, work well visually. But originally they were not placed in so conspicuous locations; on the contrary, they were seen in more intimate places, hung on the side walls of chapels.

It is, therefore, tempting to consider that there is a certain spatial mannerism, in the sense that doorways are arranged diagonally to create a proliferation of visual connections, large and imposing paintings are placed as stops to long vistas, major works are put on the axes of the deepest spaces. This mannerism aims to create a visual effect and thus induce movement, '*draw people through and persuade them to linger (in the deepest spaces) rather than rushing through*' (National Gallery Archive, HSI.39a), but we recall that the foregoing analysis demonstrated that the pattern of movement does not work in this way at all, but in quite a different way.

CASTELVECCHIO MUSEUM

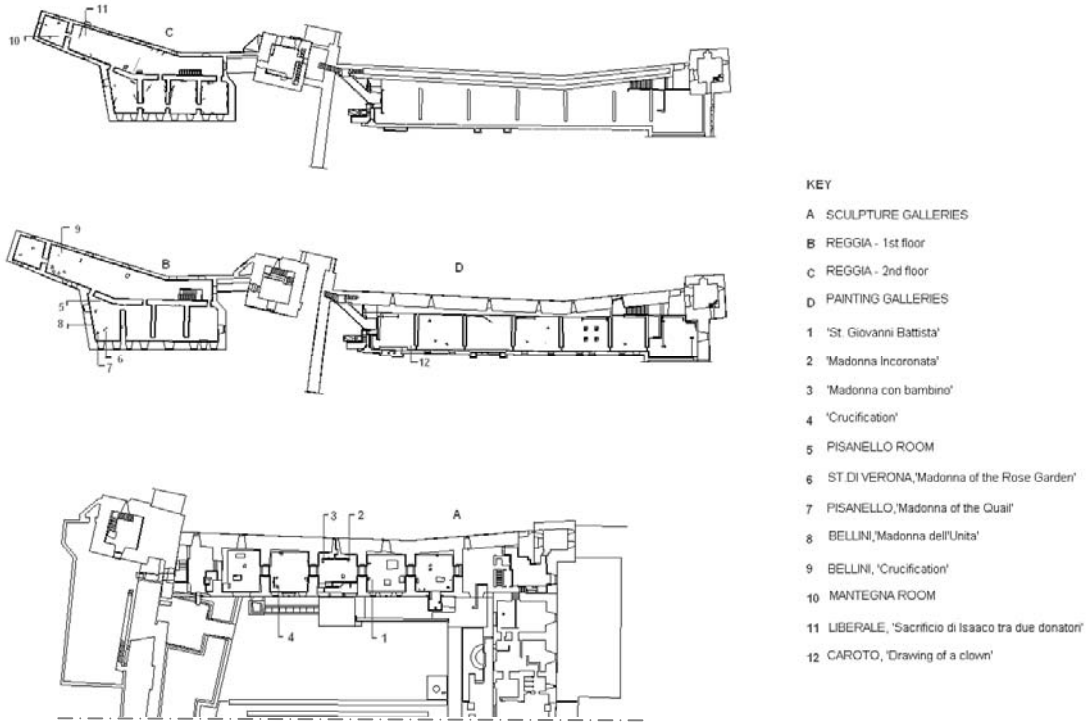
The local art collection

At Castelvecchio, Scarpa acts both as architect and curator.[36] Commissioned by the museum director, L. Magagnato, to design and organize the display, he was given complete freedom in selecting the works to be shown and even removing to other museums those previously on display (Magagnato 1982, p. 28; Murphy 1990, p. 48; di Lieto 1993, p. 7). Scarpa had already displayed his knowledge of art and awareness of the intrinsic value of works of art in his previous museum designs.[37]

'*I have a great passion for works of art*', he pointed out. '*I have always taken the trouble to learn, to know, to understand... I have a lively sense of critical values and they move me. Indeed, I would rather, on the whole, build museums than skyscrapers... It can be very important for the presenter of works of art to have a critical appreciation of them, because presentation can be a form of interpretation, of drawing attention to collocation –to the advantage of the works, naturally, not to the advantage of the presentation itself.*'(Olsberg 1999, p. 45)

We think that the underlying principles of the organization of works at Castelvecchio can be discerned in this statement.

The collection of the Castelvecchio Museum is broadly chronologically arranged but the emphasis is placed on the creation of visual compositions. [**Figures 5.31**and **5.32**] The five galleries, arranged in enfilade, on the ground floor of the *Napoleonic* wing, are devoted to the Veronese sculpture from the late medieval and Romanesque periods to the beginning of the fifteenth century. The chronological narrative continues in the *Reggia,* with the display of paintings, Veronese and Venetian (and few Flemish and German), together with some frescoes and sculptures. The first floor comprises works from the fourteenth to the fifteenth centuries, and the second, from the fifteenth to the beginning of the sixteenth century.Taking the latter as their starting point, the rooms located over the sculpture galleries are dedicated to painting and span a longer period,until the



^ **FIGURE 5.31** Plan of Castelvecchio showing the locations of key paintings (arrangement recorded in February 2002)

^ **FIGURE 5.32** Spatial relationships between statues at Castelvecchio

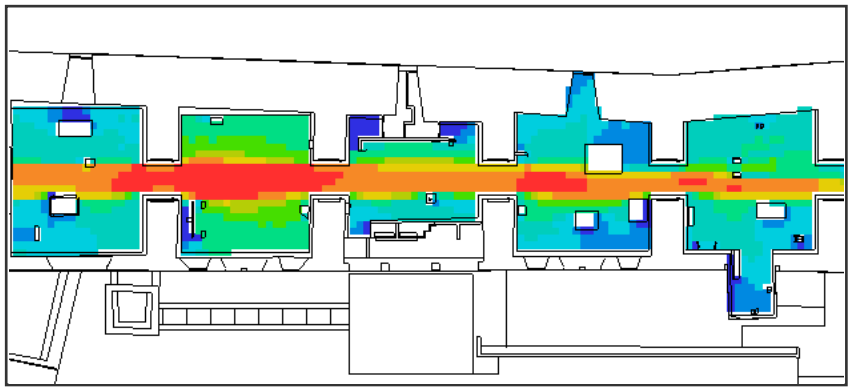
eighteenth century.[38] It is clear that, though works by major artists, such as Mantegna, Bellini, which are also shown in the Sainsbury Wing, are included in Castelvecchio, the two collections differ emphatically in terms of scale and importance. This only begins to describe the surprising pattern of differences between the two museums in terms of display layout.

Creating a spatial structure

In complete contrast to the Sainsbury Wing, at Castelvecchio objects are not placed axially, but off-centre; they are not positioned at the end of long lines of sight, but on the sides of the main axes. This is best illustrated by the arrangement of statues along the central perspectival axis, the 'core' of the sculpture galleries.[39] [see the pattern of visual integration in **Figure 5.33a**] The figurative sculptures, carefully positioned[40] on thin pedestals that mediate between them and the floor, in an asymmetric arrangement and in varying depths,[41] seem like human figures stepping out into the axis, creating a sense of spatial flow. [**Figure 5.33b**] This sense of continuity is also suggested by architectural details -the slabs on the walls that line the openings, the geometric pattern of the floor that provides a kind of coordinates, the visually unbroken straight line created by the steel beam of the ceiling.[42] It is clear that the arrangement is conceived as a single composition and that objects can not be experienced independently of the space that contains and displays them. On the contrary, it is the space that becomes the link between the objects, creating continuities and relationships.[43]

In addition to the spatial relationships between statues in the sculpture galleries, visual connections between pictures, [**Figure 5.34a**] tend to be created in the painting galleries within the boundaries of a room or a spatial unit. The fact that paintings are imbued with three-dimensionality may also be accounted for this. At Castelvecchio the idea of walls as extensions of pictures is systematically rejected. Either off-set from the walls, suspended from the ceiling, or mounted on free-standing easels, specially designed by Scarpa, paintings are treated as three-dimensional objects, systematically arranged in relation to the viewer's field of vision as he enters or leaves the room (as for instance the two paintings shown in

a



b

^ **FIGURE 5.33** The arrangement of statues along the central perspectival axis (b), the '*integration core*' of the sculpture galleries (a)

^ **FIGURE 5.34** Views of the arrangement of paintings in the Reggia

Figure 5.34b set diagonally and orientated towards the door opening of room 33). This device, detaching paintings from the walls, allows paintings displayed in the same room to be seen together, in order to bring out common characteristics or differences. In the '*Pisanello room*' (room 21), on the first floor of the Reggia, the arrangement of a set of easels -shaping an imaginary triangle in space-, creates a series of overlapping planes that encourage visual comparisons between three versions of the same subject by different artists: '*Madonna of the Quail*' by Pisanello, '*Madonna of the Rose Garden*' by Stephano di Verona, *and* '*Madonna dell'Unita*' by Bellini. [**Figure 5.35a**]

A similar strategy is used in the picture galleries, where the arrangement of objects becomes a key factor in creating a *continuum of space.* Pictures mounted on easels or hung on movable panels in the galleries, and those hung on the wall of the north axis are laid out so as to be seen together, to form one view, rendering thus the circulation zone an extension of the gallery space. [**Figure 5.35b**]

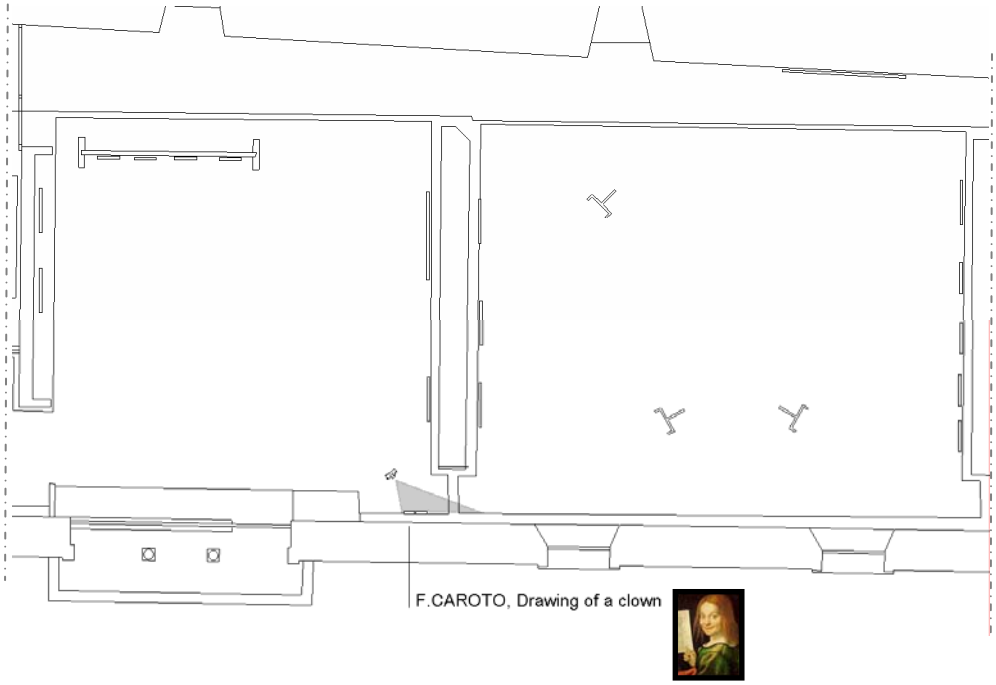
Interestingly, the paintings, seen at first from distance, are then proposed to the visitor for closer inspection. The key painting, the '*Drawing of a Clown*' by the Veronese artist Francesco Caroto hung on the wall of the south axis is a case in point. The small scale painting might escape visitor's attention when he enters the gallery (room 41). But his path crosses it again on the way to the next room, drawing attention to the details of the composition. [**Figure 5.36**]

The determinant feature of Castelvecchio is that it discourages a static point of view. Curiously, the viewer comes up to the objects from behind, an atypical arrangement that requires him to move around and among them, in order to face their front and capture the sense of the whole. [**Figure 5.37**]

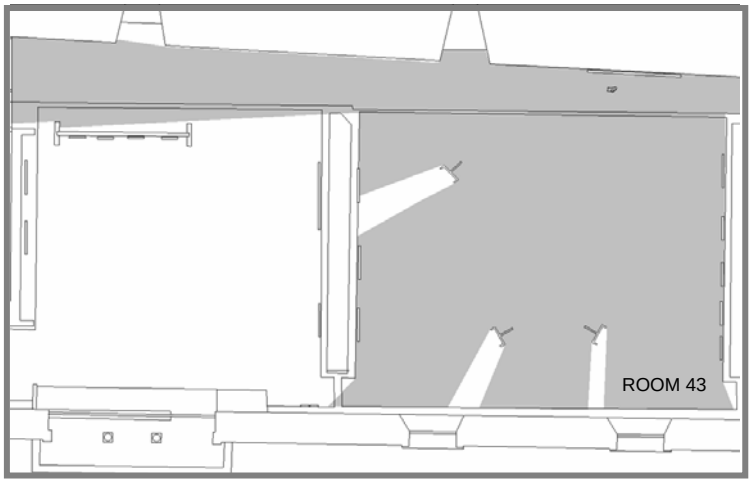
'*I could have turned them…,*' says Scarpa, '*but it seems that this is the visitor's duty... to look to right and left... come back to see it again, and walk around it*.' (cited Olsberg 1999, p. 14)

Moving along the north axis of the painting galleries, and directing the gaze towards room 43, the viewer is presented with the back of three pictures mounted on easels. '*Scarpa demands that we look around as we look ahead*', argued Guidi

^ **FIGURE 5.35** Views of the arrangement of paintings on easels in the '*Pisanello room'* (a) and the painting galleries (b) at Castelvecchio



^ **FIGURE 5.36** The positioning of the small scale painting on the wall of the south axis of movement in the painting galleries, Castelvecchio

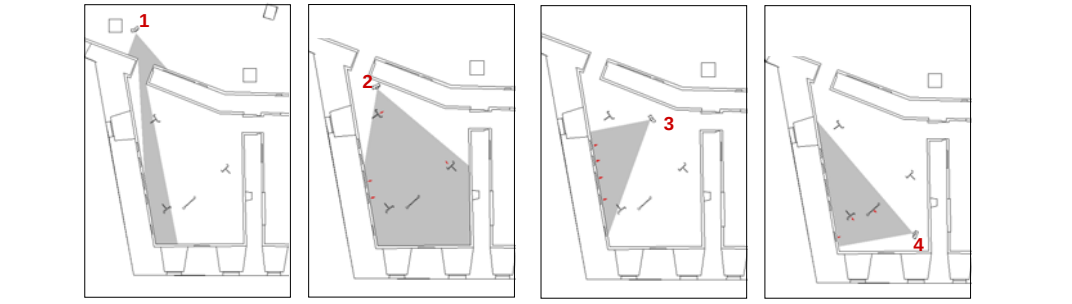


^ **FIGURE 5.37** At Castelvecchio the viewer comes up to the objects from behind. For example, the visitor moving along the north axis of the painting galleries is presented with the back of three paintings mounted on easels in Room 43.

(1999, p.208). In the case of the '*Pisanello room*', [**Figure 5.38**] he first invites the viewer to enter and explore, hinting the back of an easel, and then moves him around, offering a series of visual experiences concerned with discovery: from point 3, for example, the eye is directed towards the visual composition of the paintings hung on the wall; from point 4, the paintings already seen recede to allow the pictures on the easels, out of sight until then, to come to the fore. This technique, of unfolding the display as an aggregate of visual experiences, like shots in a sequence of montage, maximizes the interaction with the peripatetic observer and re-focuses his attention. Perhaps more importantly, in this way Scarpa places the emphasis on what happens locally, slows down the time of reading, and leads the viewer step by step from one display to the next.

If we pursue the analysis a step further, we find another key difference between the two museums in terms of disposition of objects, equally important in moving the visitor around. Unlike the Sainsbury Wing, Castelvecchio offers a space that is organized in asymmetrical arrangements which are the harmonious result of discordant elements. Similarly to the statues in the sculpture galleries, positioned asymmetrically along the strong perspectival axis, the exhibits in the main galleries of the Reggia are carefully off-centre disposed and organized in a sparse arrangement, combining vertical and horizontal elements together. [**Figure 5.39a**] This display practice enhances the sense of movement within the room and becomes a tool that allows reordering space. The big scale painting, '*Il Sacrificio di Isaaco tra due donatori*', a work by the well-know Veronese artist Liberale, positioned perpendicularly to the wall and at the far end, in the main gallery of the second floor of the Reggia, [**Figure 5.39b**] determines the visual orientation by directing the eye to the work, but at the same time acts as a visual boundary that subdivides space as well as a physical obstacle to the visitor's progression towards the visually blocked dead-end room behind the picture.

So, the mannerism at Castelvecchio lies in Scarpa's careful arrangement of objects and the fact that this becomes an integral part of the design of space.[44] On the whole, exhibits are arranged in the way they should be seen, as interpreted by Scarpa, often in innovative ways. The group of the '*Crucifixion*', displayed in the fourth room of the sculpture galleries, is presented in a different from the original



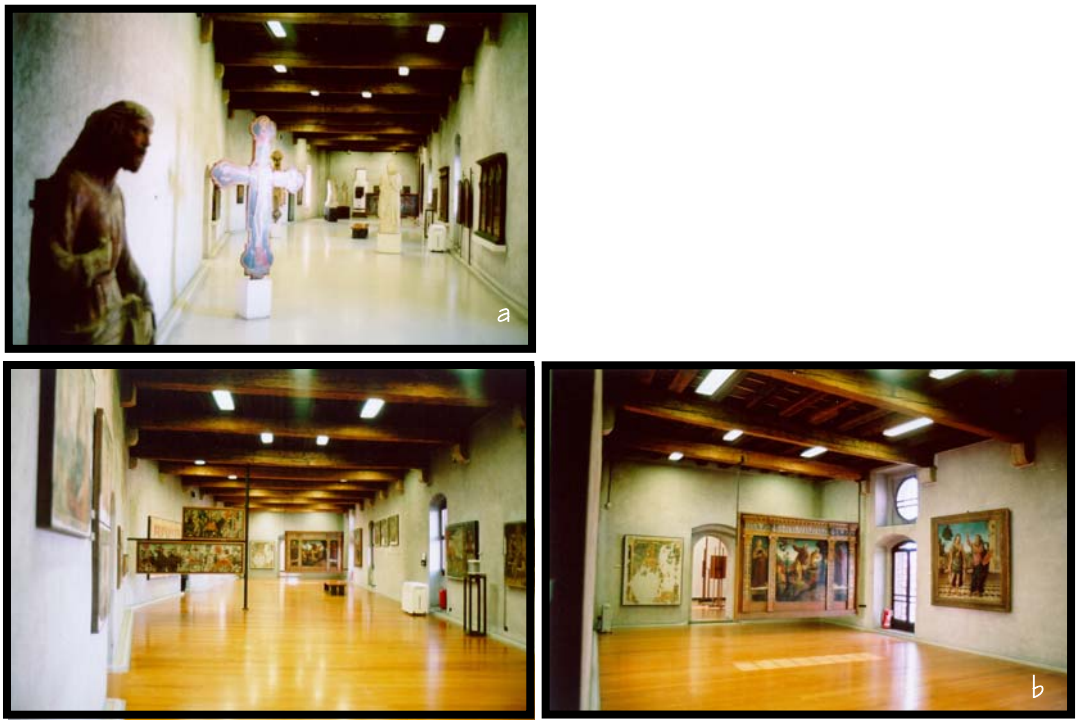
^ VIEW FROM THE MAIN SPACE TO THE 'PISANELLO ROOM'

^ VIEW UPON ENTERING THE ROOM

^ ONCE BEYOND THE ENTRANCE THE VIEWER IS INVITED TO EXPLORE THE DISPLAY

^ THE PICTURES ON EASELS COME TO THE FORE

^ **FIGURE 5.38** Visual fields enclosing all the area frontally visible 60^0 around some selected points in the '*Pisanello room*'



^ **FIGURE 5.39** Views of the main galleries of the first (a) and the second floor (b) of the Reggia

arrangement.[45] [**Figure 5.40**] Works on display are treated as 'specific' rather than 'anonymous' objects [**Figure 5.41**]: the figure of '*San Giovanni Battista*' looking down, is lifted above the eye level, adjusted to the observer's optimum viewing height; [**Figure 5.41c**] the '*Madonna con Bambino*', is also placed at carefully calculated height, and presented to the viewer from the three sides and in different angles, suggesting once again a cinematographic approach; [**Figure 5.41b**] unframed pictures or small scale fragments of statues are backed with coloured panels, the colour setting off the picture or the outline of the figure, as in the case of the '*Madonna incoronata col bambino*'. [**Figure 5.41a**] For Scarpa, there is a close connection between seeing and knowing (Los 2002, p.10). Groupings and compositions are deliberately created for visual delectation and are seen as means for revealing the meaning of objects, acknowledging that there is not a single way of looking at things.

To summarise, the two museums are profoundly different in terms of the display layout. In the Sainsbury Wing, the emphasis is placed on presenting the highlights of the collection and to this end, the layout is used to enhance the impact of objects and structure relations between spaces and by implication between displays; paintings, symmetrically arranged, at the end of vistas, transform the circulation axes into goal-directed tracks, and are confronted frontally. In contrast, at Castelvecchio, it is not the individual work that assumes enhanced importance nor the mediation of relationships between spaces, but the creation of relationships within spaces, a strategy which often entails presenting together major works and less well-known; objects, asymmetrically arranged, become the short-term goals, and are revealed through a succession of diagonals. We can therefore suggest that, while in the Sainsbury Wing, space tends to be manipulated to enhance exhibits, at Castelvecchio exhibits are manipulated to enhance space.

5.5 Quality of the experience

Against this background we now come to our third issue, the spatial character of the itinerary, as a by-product of both the spatial layout and the arrangement of the

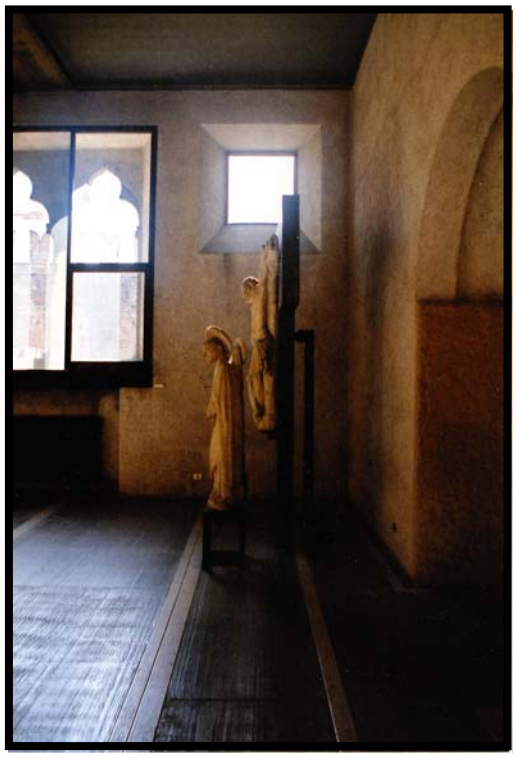
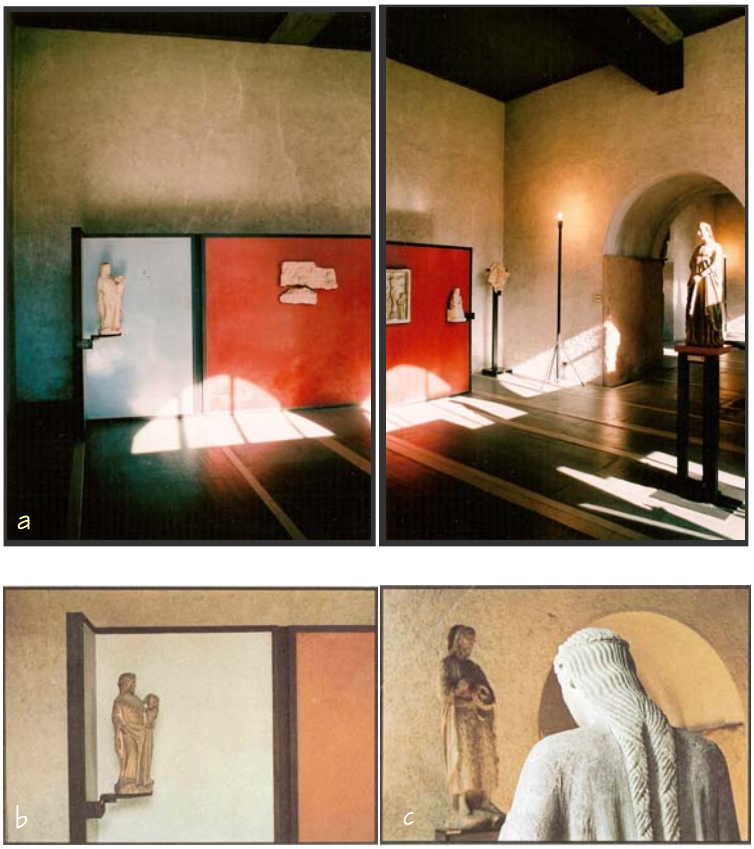


FIGURE 5.40
The group of '*Crucifixion*' seen as one enters ^ or leaves the room >



^ **FIGURE 5.41** Examples of the careful arrangement of objects at Castelvecchio

display. On the whole, the Sainsbury Wing is designed in the Beaux-Arts conception of circulation; the enfilade of rooms, though impregnated with modern elements, follows the traditional concept of the narrative: the visitor is considered as a peripatetic being who gathers information from accumulative juxtapositions of paintings rather than the contemplation of a single work. In this kind of configuration, that seems to support a specific theory of art history -that the perception of art takes place through associations-, the importance of the whole collection appears to override the value of the individual work of art. The intention is accordingly to create a unified and coherent spatial experience.

An integral part of this spatial experience is the presence of other people. The formally organised layout emphasises the public aspect of the visit, rather than encouraging a more private appreciation of the paintings. The intention, as explicitly addressed in the Design Brief, emphasizes the role of the spatial design in creating a social pattern through the way it shapes movement -people would meet in procession moving through the central enfilade. It seems, however, that in the case of the Sainsbury Wing, visual contact, as another aspect of the social function of space, is far more powerful than physical co-presence: a pattern of co-awareness and co-visibility is generated the way space modulates visual fields, making visitors constantly aware of other people appearing at varying depths in their fields of vision.

Reference to space organization brings us to our last comment on the Sainsbury Wing, the elimination of the sense of self-exploration, as surprises are already set up for the viewer. For instance, for the visitor who is moving through the central spaces, on the axis of symmetry, the presence of pictures remains invariant, eliminating any sense of uncertainty or surprise; what the visitor sees does not change as he arrives in the second room and then proceeds beyond it. The long '*tunnel*' isovist[46] which strikes the paintings at both ends at a right angle, and is designed to separate the viewer from the moment he will be able to appreciate them and thus intensify his anticipation, produces the opposite effect: the key paintings become '*negative attractors*' (Hillier 1996, p. 231, 238) in that their freeze framing[47] at the end of the line is maximized, the time of their visual exposure prolonged, and conversely, their effect reduced. The fact that the central

sequence is omitted from the majority of visitors' itineraries may be also due to this. Moreover, the repetitive perspective vistas through spaces, deprive the visitor of any sense of discovery while, at the same time, providing a rush of information changing quickly as he moves around. The spatial experience becomes deterministic in the sense that, though the sequence is not strong and rigid, there is a '*repetitive and symmetrical pattern of visual exposure*', that accommodates '*little probability and a great deal of repetition and certainty*' (Psarra 1997).

The opposite tendencies are identified at Castelvecchio. Rather than creating a unified experience, the emphasis is placed on unveiling the visual logic of each object and sculpturing a space that demands careful observation and extensive exploration. The route consists of a series of sudden discoveries, and accommodates a great deal of unexpectedness and surprise. At first sight, spatial experience might seem deterministic: the existing configuration imposes a predetermined global route and maximises depth without leaving much room for short-cuts or alternative paths. But closer inspection reveals its dynamic character, which counteracts sequencing. The spatial logic of the museum cannot be learned from the entrance, in other words, prior to exploration; so the spatial progression becomes an act of discovery and visitors become '*space explorers*' (Hillier 1996) Scarpa delays access to a final understanding of how the spatial sequences relate to each other; and it is precisely this prolonging sequential experience coupled with the carefully controlled vistas that intensify the mystery of parts and objects unseen, and enhance the sense of self-exploration.

This stimulating effect of exploration is further reinforced by the viewer's step by step progression. On the whole, it seems that we have to do with a slow narrative sequence that winds its way through a considerable number of spaces, lengthy intervals and breaks. Additionally, the works themselves are organized to generate a slowly-paced rhythm of perception; pictures and sculptures subdivide the route, stand in the way as temporary obstacles, and require the viewer to slow down by offering short-term goals, and screening what is ahead.

By placing the emphasis on what happens along the path, Scarpa designs a space that creates the potential for social relations but of a different kind. Since there are no major circulation loops, re-encounters between people moving in different

directions in the layout are not likely. Yet patterns of common presence between local groups are reinforced as visitors are brought together while being engaged in the three-dimensional inspection of objects.[48] It seems that the key determinant of the morphology of encounter between visitors is the way objects are laid out in space, rather than the way space is laid out, as it was the case in the Sainsbury Wing.

Conclusion

In conclusion, our arguments suggest that the two museums resolve in different ways the tension between spatial design and object layout. In the case of the Sainsbury Wing, the layout of the display uses and exploits the qualities of the setting in order to maximise the impact of the exhibits; but the power of space overrides the intentions of the curators when it comes to the morphology of movement and exploration. In the case of Castelvecchio, Scarpa organizes objects in a manner which articulates and elaborates space; and this seems to have an effect, by making the visitor culture more exploratory. These strategic differences derive form the opposing intentions: in the former case, the narrative is in the information and the attention is focused on promoting the uniqueness of the collection and enhancing the public aspect of the visit. At Castelvecchio, the narrative is not in the information, but in the subordination of the objects to space, and attention shifts to rendering the museum visit an architectural experience, a spatial event. Fundamentally, the two cases discussed here seem also to suggest that exhibition set up can work with the building design to create a richer spatial structure, and conversely, that the relation between building design and exhibition set up can create unanticipated problems that detract from the quality of experience.

Notes

[1] A report of the Sainsbury Wing analysis was presented at the 3th International Space Syntax Symposium (see Tzortzi 2003). Also, for an earlier version of this comparative study see Tzorzti 2004.

[2] This study involved investigating the National Gallery Archive and in particular, the rich correspondence between the Director N. MacGregor, the Project Manager E. Gabriel, the Deputy Keeper M. Wilson, and Venturi, Rausch and Scott Braun and Architects, dating from January 1986 to May 1991 (National Gallery Archive, HSI.39a, b). It mainly concerns adjustments to the gallery layout, comments on interior elevations, room sizes, proportions of doorways and door positions.

[3] For a detailed discussion on the building, see Amery 1991a, p.7-14; Wilson 1991. Also, a comparative analysis of the 1980's winning scheme and the Venturi design is to be found in Barker and Thomas 1999, p.73-77.

[4] The Sainsbury Wing was proposed as '*a fragment of the old*' and its façade echoed classical elements of the main building. It was this solution of '*contextualism*' and Venturi's interpretation of the Classicism that raised much criticism. For a discussion on this see Blundell-Jones 1987; Cruickshank 1987; Curtis 1987; Farelly 1987; Januszczak 1987; *Lotus International* 1987, pp.91-109. Brief comments on the Sainsbury Wing are also to be found in Amery 1991b, p. 184-185; *Apollo* 1991, pp.3-6; Saumarez Smith 1995; Rosenblatt 2001, p.68-7.

[5] See National Gallery Archive, HSI.71. and Venturi 1992.

[6] One of the best accounts of the history of the Castelvecchio is to be found in: Murphy 1990, the most comprehensive study of the museum; and in Magagnato 1982, p.7-34. For a chronology of the interventions see also Olsberg et al. 1999, p. 68-76.

[7] The following is a selection of the most important texts analysing critically the work of Scarpa at Castelvecchio: Crippa 1986, p. 131-153; Los 1995, p. 54-59; Huber 1997, p.149-155; di Lieto 1999, 2000; Polano 1999; Los 2002, p. 72-83; Beltrami et al. 2000; and Albertini and Bagnoli 1992, p.16-56 (the latter presents his work not chronologically but thematically, discussing in separate chapters key issues, such as the invention of the itinerary in the museums he designed, the creation of a rhythm, the design of the exhibition spaces, and the display strategies).
It is also worth noting that two recent publications, that propose a different approach to museum, looking not at its didactic function but its potential 'poetic' aspect and 'delirious' character, deal with the Castelvecchio Museum: Spalding 2002, p.133-134; Storrie 2006, p.140-146. A brief account is also offered by: *GA*, no 51.

[8] Much has been written on the carefully considered placement of this statue at a location that constitutes the synthesis of the different layers of the history of Castelvecchio, which makes it the central and recurrent element in the visit. Magagnato 1984, p.159-160; di Lieto 1993, p.13-15; Los 1995, p56; Murphy 1990, p.88-121; di Lieto 1999, p.231-234 ; Olsberg et al. 1999, p. 73.

[9] For the most recent interventions at Castelvecchio, as for instance the 1989 design of an exhibition space on the second floor of the *Torre del Mastio* (rooms 35-36 in **Figure A.1b**) see di Lieto 2002.

[10] The interplay between interior and exterior is one of Scarpa's main traits.

[11] In this respect, it is characteristic that at the top of the staircase, the entry has the proportions of an early Renaissance, Brunelleschian opening.

[12] The term '*centrality*' is used in a syntactic point of view, meaning that it does not take into account metric distance but the direct accessibility of a space from the rest of the building.

[13] It is surprising that travelling through the museum one has to pass through eight doors to traverse the whole complex.

[14] Magagnato writes: '*Scarpa hated symmetry and thought that the dislocation of forces, the nuclei of concentration of forms, followed not the law of the centre, but points of tension'* (cited Huber 1997, p.149).

[15] It is important, however, to note that the Brief stated that '*while it is felt that the treatment of the interiors should be unified and help to identify the early Renaissance galleries as a coherent group, some variation would be welcomed, particularly where it would help to distinguish between different groups of paintings (for example, between Northern and Italian)*'.

[16] Term proposed by Peponis to describe areas within which visual information remains relatively stable. An exactly analogous idea, the single long '*tunnel*' isovist, is advanced by Hillier (1996, p.238). He argues that the longer the tunnel isovist that strikes the façade of a building the more invariant the view and the more dominant its presence. Significantly, this concept brings time into a consideration of space.

[17] As reported in Belcher (1991, p.191) people can see without moving the head everything within a cone of vision extending outwards from the eyes at an angle of about 50^0 or 60^0**.**

[18] The observation study was carried out between 29 October-21December 2002. Twenty-one rounds of observation were undertaken to cover different times of day; the observation periods were from 10am to 5pm.

[19] A Preliminary Outline of the National Gallery's Design Brief for the Hampton Site Extension, National Gallery Archive, NG 16/115.8.

[20] These numbers were confirmed by the results of the National Gallery's Visitor Survey carried out in 1993. The latter showed that 25% of visitors use the Sainsbury Wing entrance, while 69%, the Trafalgar Square entrance.

[21] The viewing rates are based on static snapshots (for the observation techniques see chapter 4). The observation took place in 2002, on the 29th October, on the 2nd, 11th and 19th November, and on the 21st December. In total twenty-one snapshots were made, over three time periods (10-12am, 12-2 and 2-4 pm.)

[22] It should be reminded that the term 'total occupancy rates' includes all the static activities, in other words, people standing, sitting and moving in each room at any moment in time, while the term 'viewing rates' refers only to the number of people standing and looking at works.

[23] By contrast there is a relation between tracking score and number of stops (R^2= .583, p= .0005, see **Table 4.6**).

[24] The sum of viewing rates in the rooms of the east side is 106.2 per minute, while 54.6 per minute, in the central rooms, and 53.5, in the west. Respectively, the total number of stops made by the 100 visitors observed is 1496 (east sequence), 730 (central) and 949 (west).

[25] For a discussion of the basic syntactic properties see chapters 3 and 4.

[26] The observation study was carried out during the week of 3rd February 2003. It should also be pointed out that the empirical data are based only on tracking records and not on flows across the thresholds of the rooms of the museum, as the number of visitors was too small. (According the curator A. di Lieto, the average number of visitors per year is 100.000.)

[27] An argument established by syntactic studies on museums (see Choi 1991, p.253).

[28] As in the case of movement rates, we use the logarithm of tracking score for technical reasons.

[29] For the reasoning behind the proposed variables see chapter 4.

[30] This section discusses the re-hang of the collection in 2001. For a brief account of the display see *The Burlington Magazine* 2001, p.521; Cambell-Jonhston 2001; MacGregor 2001.

[31] The works hung on the east wall of room 62 are as follows (reading from north to south): '*Portrait of a Man'* by Antonello da Messina (NG 1141), '*Saint Jerome in a Landscape'* by Cima (NG 1120), '*The Doge Leonardo Loredan'* by G. Bellini (NG 189), '*Saint Jerome reading in a Landscape*; by G. Bellini (NG 281), '*Portrait of a Boy'* by Jacometto (NG 2509),

[32] It has been suggested that the work of Giovanni Bellini, brother-in law of Andrea Mantegna, '*was painted in homage to –perhaps partly in competition with- Mantegna's painting*' (Dunkerton et al 1991, p. 294).

[33] The two paintings (NG 1417 and NG 726) are divided by another work of Bellini, '*The Dead Christ supported by Angels*' (NG 3912), placed in the middle, and characterized by centricity of composition.

[34] '*The Trinity with Christ Crucified*' (NG 3662), one of the recent acquisitions of the National Gallery, and the '*Portrait of a Woman of the Hofer Family*' (NG 722).

[35] The vista aligns the *Wilton Diptych* (NG4451) in room 53, and David's '*Virgin and Child*' (NG 1432) in room 63, two works that represent the same theme - the Virgin with Child and Saints.

[36] Scarpa studied at the Academy of Fine Arts in Venice in 1920s. It is worth noting that Rafael Moneo compares his design approach to that of a painter; in the sense that he was particularly concerned with the way in which his ' last stroke' determines the whole work (Moneo 1984, p. 236).

[37] Before his work at Castelvecchio, Scarpa had completed his major museum projects, at the Gallerie Dell'Academia, and the Correr Museum, both in Venice, the Palazzo Abatellis, in Palermo, and the Gipsoteca Canoviana, in Possagno.

[38] The collection is discussed in greater detail in: Marinelli 1991.

[39] The sculpture gallery had been provisionally arranged by Scarpa in 1959, and finally restored, during the second phase of his project, in 1962-1964.

[40] Scarpa argued: '*It was necessary to place them on the floor with a great deal of precision, so as not to interfere with the geometry of these rooms or with movement.*' (See *Quaderns d'Architecture* 1983, p.27)

[41] Many authors have argued that the particular treatment of the paving, always kept at a certain distance away from the walls, recalls a theatrical stage. See for example Crippa 1986, p. 132; Murphy 1990, p.19; Stavroulaki and Peponis 2003, 66.11.

[42] Nevertheless, the floor of each room was individualized, as if they were a series of platforms, kept in distance from the walls, as a kind of moat, suggesting the idea of water surrounding the walls of the castle. (See *Quaderns d'Architecture* 1983, p.27)

[43] The idea of spatial relationships between objects is suggested by Murphy 1990, p. 59, and Guidi 1999, p. 207, 210; but it is systematically and explicitly dealt with by Stavroulaki and Peponis, (reviewed in chapter 3).

[44] The argument that it would be unthinkable to re-arrange, move or re-move the objects displayed from the space in which they are displayed is a recurrent theme in the literature. See for example, Los 2002, p.28; Crippa 1986, p. 131-132.

[45] Series of drawings allow re-tracing the different versions of grouping explored by Scarpa before the final installation.

[46] See above note 16.

[47] An idea due to J.Peponis, lending emphasis to the fact that as one moves through space, the frame remains the same.

[48] A different interpretation of the Castelvecchio visit as a social occasion has been proposed in the literature. According to this, the social character results from the theatricality of the setting and the design of spaces which are '*populated equally with objects and visitors*' (see Murphy 1990, p. 19). See also Stavroulaki-Peponis 2003, p. 66.11.

Chapter Six
Pompidou compared to Tate Modern

Introduction

This chapter presents the comparative analysis of the National Museum of Modern Art, in the Pompidou Centre, Paris, designed by R.Rogers and R.Piano (1972-1977), and the Tate Gallery of Modern Art, London, the conversion of an industrial building by J. Herzog and P. de Meuron (1995-2000).

The two museums share a set of conspicuous similarities so that their parallel investigation seems self-evident. Both are big scale national museums of modern art, extending in two floors, in buildings that constitute urban landmarks. [**Figure 6.1a-b**] Moreover, their ground floors are conceived as a space you walk through, as a 'piazza'; their spatial organization is modular and flexible; their visual construction, punctuated by powerful views to the city. Their affinities extend to their collections -both begin with the turn of the twentieth century and extend to the twenty-first century-, and their curatorial practices -they illustrate two recent developments in museum reality: first, the practice of reprogramming the galleries on a regular basis,[1] and second, the increasing involvement of artists in the museum space and the installation design.

Yet there is tendency to discuss the two museums as two different models. In the Competition Brief for the Tate (1994, p.2), the Pompidou is seen as one of the two urban models of the museum of modern art in the twentieth century;[2] it is clearly stated that '*the challenge for the Bankside is therefore to create a new urban model, on the scale of, but distinct from those of the Museum of Modern Art, New York and the Centre Georges Pompidou, Paris*'.

No doubt, the two museums lie at the two extreme possibilities, in terms of the way they are telling the story of modern art: the chronological structure of the Pompidou collection is the complete opposite of the ahistorical arrangement of the Tate. But could this obvious difference hide deeper affinities between the two

museums? This study will show that the two museums remarkably resemble each other on a number of fundamental levels: they share in common underlying organizing principles and similar spatial themes. On these grounds, it will then propose that their strategic differences derive from the way they link together the above principles and themes, and the way they handle them in respect to display decisions.

6.1 Description

It is clear that in comparison to the newly designed Tate Modern, Pompidou is the complete opposite, with a long history and influential evolution that made it a landmark in the history of architecture in general and in museum design in particular. It is therefore evident that we will deal with their historical overview in different length.

The evolution of the Pompidou [3]

The National Museum of Modern Art opened on January 31, 1977 as one of the departments of the 'Centre national d'art et de culture Georges Pompidou', a mixed-use cultural centre.[4] Pompidou was proposed as a laboratory, as a place of experimentation for all the forms of creation and innovation, and intended to define a new relationship with culture. This intention was clearly expressed in the design of the building, by Renzo Piano and Richard Rogers,[5] characterized by the ideology of flexibility, transparency, and openness. Piano argued that:

'*The fundamental concept of the building eliminates the traditional closed façade. By fading away, the envelope helps to realise the prime objective of the Centre, which is to disseminate culture. It becomes transparent. Thanks to the escalators suspended from the west façade, like a gangway thrown on the hull of a ship, visitors may comprehend both the building and the city, the aerial route is a very powerful invitation to discovery and initiation*' (cited Banham1977, p.288).

He pointed out that:

'*..instead of a building we thought of it as a machine knowing it would be modified each time it became necessary*.' (cited *Connaissance des Arts* 2000)

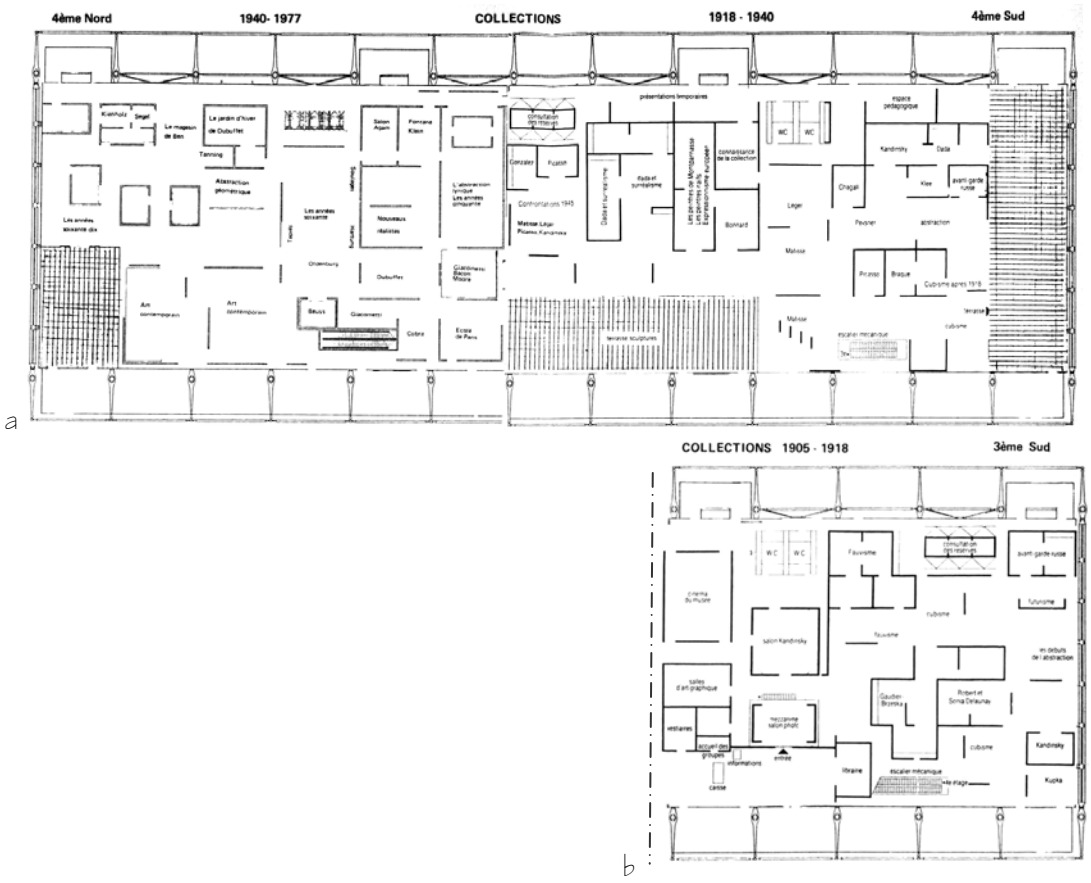
Two of the five identical open-plan floors (166X48m., 7m.high) are currently occupied by the Museum, and display the ever-growing modern and contemporary art collection. They were originally designed with no partitions or other vertical interruptions, and all the mechanical services and circulation devices (i.e. staircases, elevators) were limited to the exterior. It is of particular interest to review three critical moments that marked the museum's history from 1977 to the present day, which also reflect the changes in the display practices in the last quarter of the twentieth century.

Like the building, the original layout of the Museum[6] -which then occupied the fifth floor and the south part of the fourth-[7] was characterized by flexibility. [**Figure 6.1**] It was designed as an open plan layout that was articulated by movable panels, placed in clusters or dispersed in space. The intention of the first Director of the Museum, P.Hulten, was to create a spatial structure that resembles a city, with interlocking spaces, squares, paths and dead-ends. One wandered around in the museum like in a street complex; the arrangement of panels opened up long vistas, and allowed views into different sections of the display. [**Figure 6.2**] Hulten (1974) explained the analogy between the spatial design and the city structure as follows:

'*Take for example the city.. it consists of squares, streets, dead-ends…one can move about, pause, start again. The museum that finds inspiration in the form of cities acknowledges the alternation of motivation, interest, and fatigue. It is a system of galleries; lofty spaces, intimate rooms that relate and alternate to each other. One should have the possibility of losing oneself …. The museum must offer visitors a loose thread to follow….*' [8]

Though the display was based on chronology and works were grouped by schools and artists, the uninterrupted spaces suggested a random, not sequential approach, a labyrinthine route which was associated with a sense of informality and relaxation. To Hulten,

'*the 'path (through the museum) should not be made into a dogmatic programme, because especially in smaller museums, the exploration and discovery of little deviations, cul-de-sac, bays and odd rooms can be a delight*' (Piano cited Fondation Beyeler 1999, p. 89).



^ **FIGURE 6.1** The original layout of Pompidou (1977-1985): 4th (a) and 3rd floor (b) plans

^ **FIGURE 6.2** Installation views of the collection at Pompidou 5 in 1977 (a) and in 1982 (b) [*MNAM archive*]

Despite the fact that the layout was seen to work well, as it was originally planned in relation to the specific objects on display, as soon as display changes were envisaged, the re-arrangement of the panels became an issue. Shortage of funds impeded regular alterations in the exhibition set up, following the re-hang of the collection, and this in turn led to displays being difficult to read. This among other things (as for instance the lack of space for the continuously growing collection) was the reason why in 1985 the Pompidou, under the direction of D. Bozo, commissioned G. Aulenti to re-design the fifth floor (the fourth floor at that time) of the museum (for financial reasons the re-design of the fourth floor was carried out by in-house architects).[9] The work was carried out in two phases, the northern part between September 1984 - February 1985, and the southern, from February 1985 until September 1985, and led to a highly ordered layout, the complete opposite of the original open plan. [**Figure 6.3**] However, as we shall see -as the focus of our analysis is the 1985 design-, Aulenti maintained the idea of the museum as continuous space and as a place one walks through. She created room-like spaces that referred to the spatial conditions where the art of the first half of the twentieth century was conceived and to the domestic setting of private collections where it was intended to be seen. [**Figure 6.4a**] Moreover, Aulenti's design made reference to two recurrent themes in painting, perspective and frame (Croset and Milanesi 1985, p.128). The former was expressed by the views to the city, through the longitudinal and the transversal axes, and the latter was alluded by the way the slabs suspended from the ceiling to conceal the visible pipes and tubes created a cornice of light, that framed the ceiling of the building, left in shadow. A different kind of space was created on the lower floor, dedicated to contemporary art, with lofty galleries and the original architecture as a background for the display. [**Figure 6.4b**]

In 1997-1999 the Pompidou Centre was renovated by J.F. Bodin, an in-house architect, in collaboration with R. Piano, and the fourth floor, given over in its entirety to the museum, was re-designed. Minor changes were carried out in the design of the fifth floor. The museum re-opened in 2000, a few months before the opening of the Tate Modern. Finally, it should be noted that at the time of the

^ **FIGURE 6.3** The layout of Pompidou in 1985:
(a) 4th floor (by G.Aulenti) and 3rd floor (b) plans

^ **FIGURE 6.4** Installation views of the collection in 1985 at Pompidou5 (a) and Pompidou4 (b) [*MNAM archive*]

study (2005) the museum closed for refurbishment and is due to re-open in the first quarter of 2007.

The development of the Tate Modern [10]

Tate Modern, opened in May 2000, is the conversion of the mid-twentieth century power station designed by Giles Gilbert Scott.[11] It is not however a conversion in the conventional sense. The architects J. Herzog and P. de Meuron made extensive interventions, maintaining essentially the shell of the original building. Their strategy consisted in accepting its physical power, taking maximum advantage of the existing structures and enhancing its industrial character. It was precisely this design decision that made the Herzog and de Meuron's competition design, the winning scheme.[12] Like the central chimney, on the northern side, that emphasizes the symmetry of the exterior, the former turbine hall (23X155, h.35m), now left void, determines the main axis of the interior of the building; it is planned to play the strategic role of the Duveen gallery at Tate Britain (Moore 2000, p.39), when the area to the south (currently accommodating the London Electricity switch-station) will be made available for museum use (Serota 1998, p.14). To the display of the permanent collection are dedicated two of the three floors on the north side of the turbine hall, the third and the fifth, separated by the temporary exhibitions floor.

Setting out from the key idea that '*a large museum requires a simple plan*' (Serota 1998, p.14) -idea opposite to the guiding principle of the labyrinthine route at Pompidou-, the spatial design of Tate Modern was mainly aimed at making a building easy to use ('*giving visitors ease of movement and an immediate perception of how parts fit within the whole*', Serota 1998, p.55) and dividing the exhibition space in manageable units for visitors. The space use patterns at Tate Britain had clearly shown that people cannot easily view the whole collection in a single visit, but can only do a certain size of spaces. So the underlying idea of the design of space in the new gallery was that there is a '*geography of visiting*' which should correspond to the '*geography of the building*'.[13] Hence the idea of organizing each floor into two architecturally coherent suites.[14] Of particular

interest for our point of view are also two explicit requirements formulated in the Design Brief: first that the galleries consist of rooms - '*we do not wish*', it is said, '*to have the ability to create our own architecture within an empty box: we require a set or rooms which can be slightly modified to suite different hangs*' (Tate Gallery Archive 1996a); and second, that in these spaces it is the experience of objects that is made dominant ('*the galleries.. need to be rooms in which the art will be the dominant visual experience*').

6.2 Morphology of space

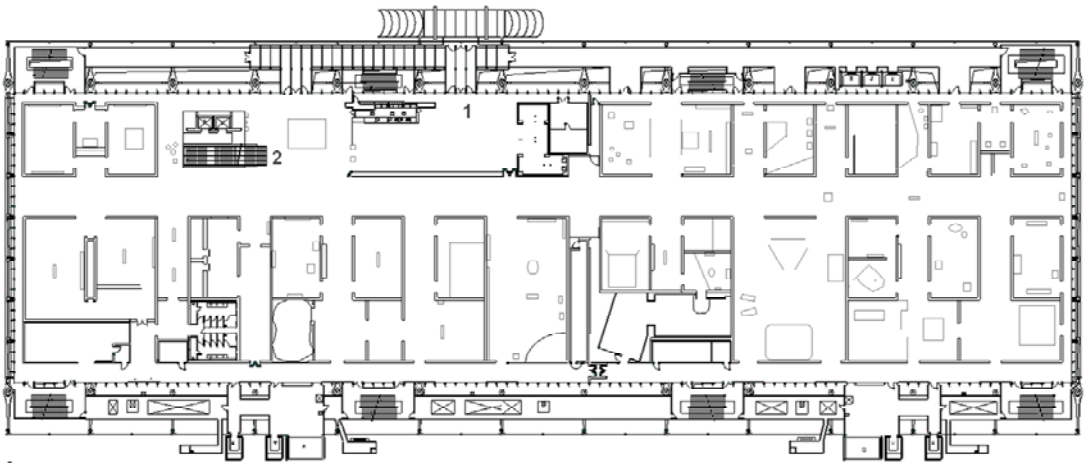
We can now move to discuss the overall characteristics of the spatial configuration of the two museums, seeking first to identify critical affinities as the necessary background against which we can then consider their differences. Precisely, the discussion will be organized around the arrangement of space, as recorded in June–September 2003. It should be noted that the Pompidou consists of two quite different floor plans (to which we will refer as Pompidou4 and Pompidou5), [**Figure 6.5a-b**] while Tate Modern repeats, with slight differences, the same plan on both floors (Tate3 and Tate5). [**Figure 6.6a-b**]

Grid organization and redundancy

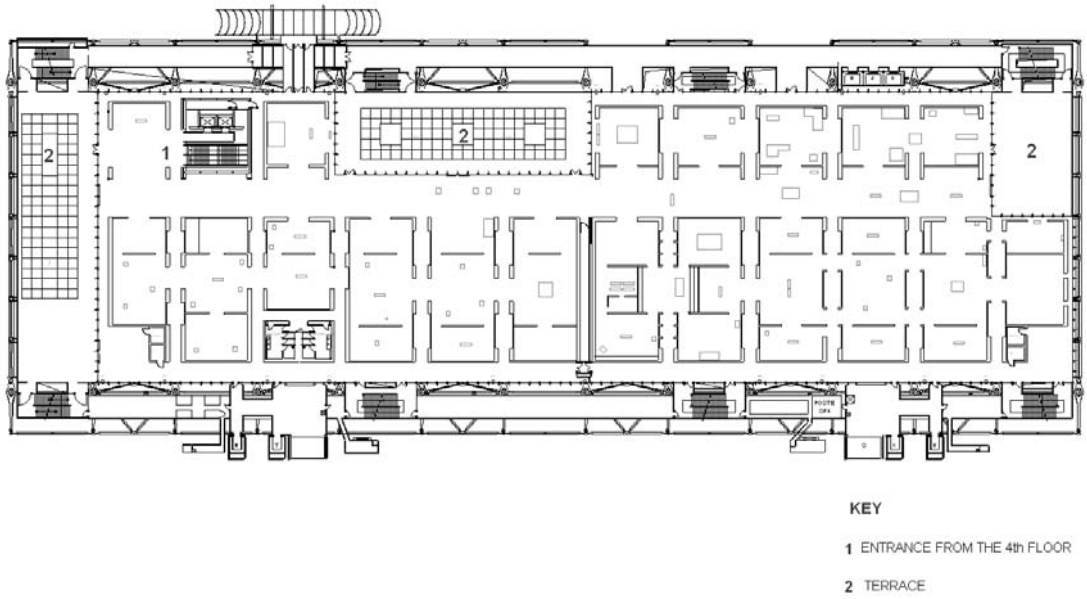
All four layouts are rectilinear, of similar length (166m the Pompidou, and 155m the Tate), but of different size (see **Table 4.3**), strictly articulated on the basis of a modular grid (with the exception of Pompidou4). [**Figure 6.7a-b**] In both case studies we have therefore to do with repetitivity of the elements and the relations that make up the layout, emphasizing a sense of *order* and *redundancy*.

More specifically, the layout of Pompidou5 is organized around a long axis -often referred to as the '*grande avenue*'-, that runs the length of the building and gives access to spatial units, of identical width (9.80m., with the exception of the smaller first and last units), arranged on both sides. The articulation of these units adopts the order of the traverse bays that divide the building lengthwise, bringing thus an element of th e exterior to the organization of the interior space (Botti

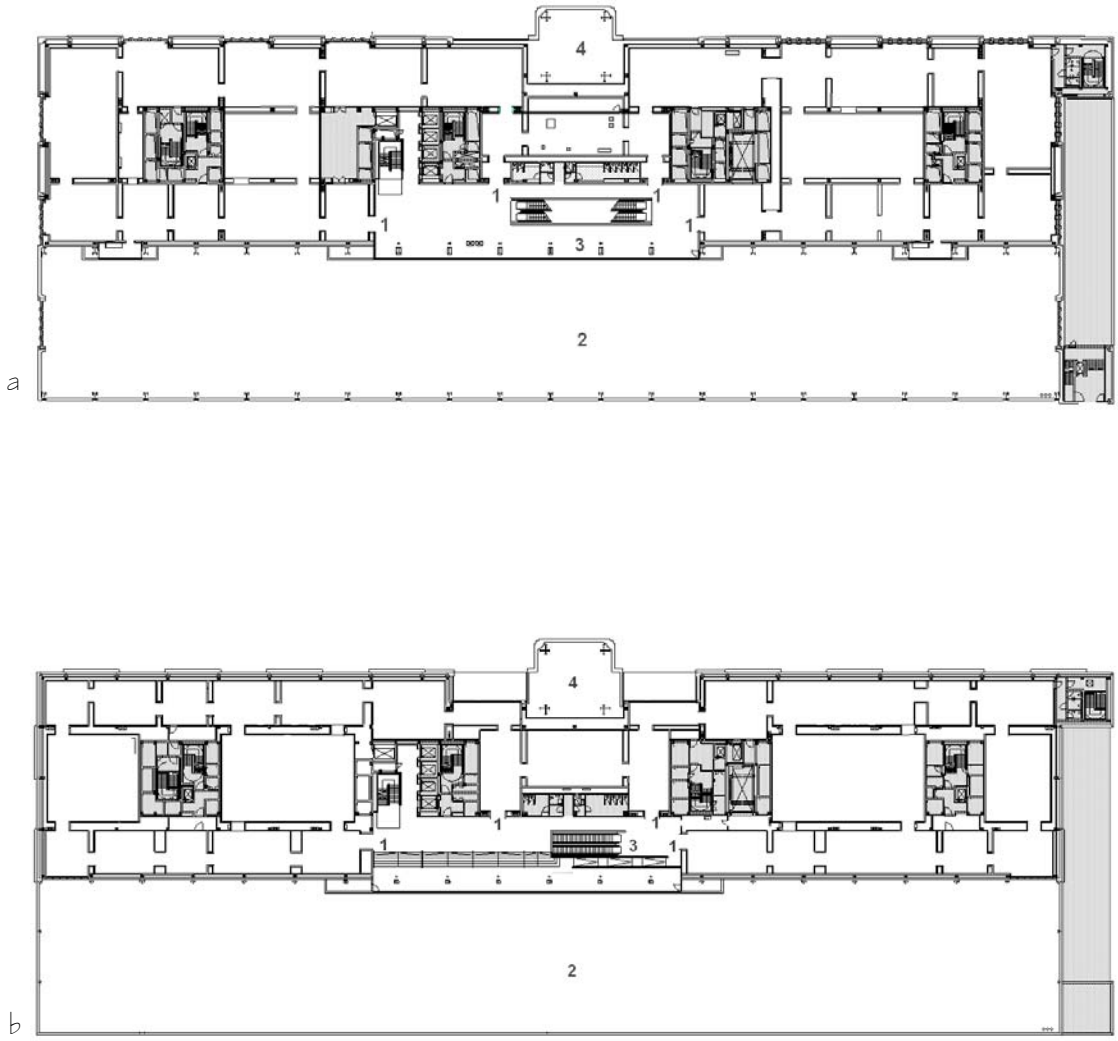
a



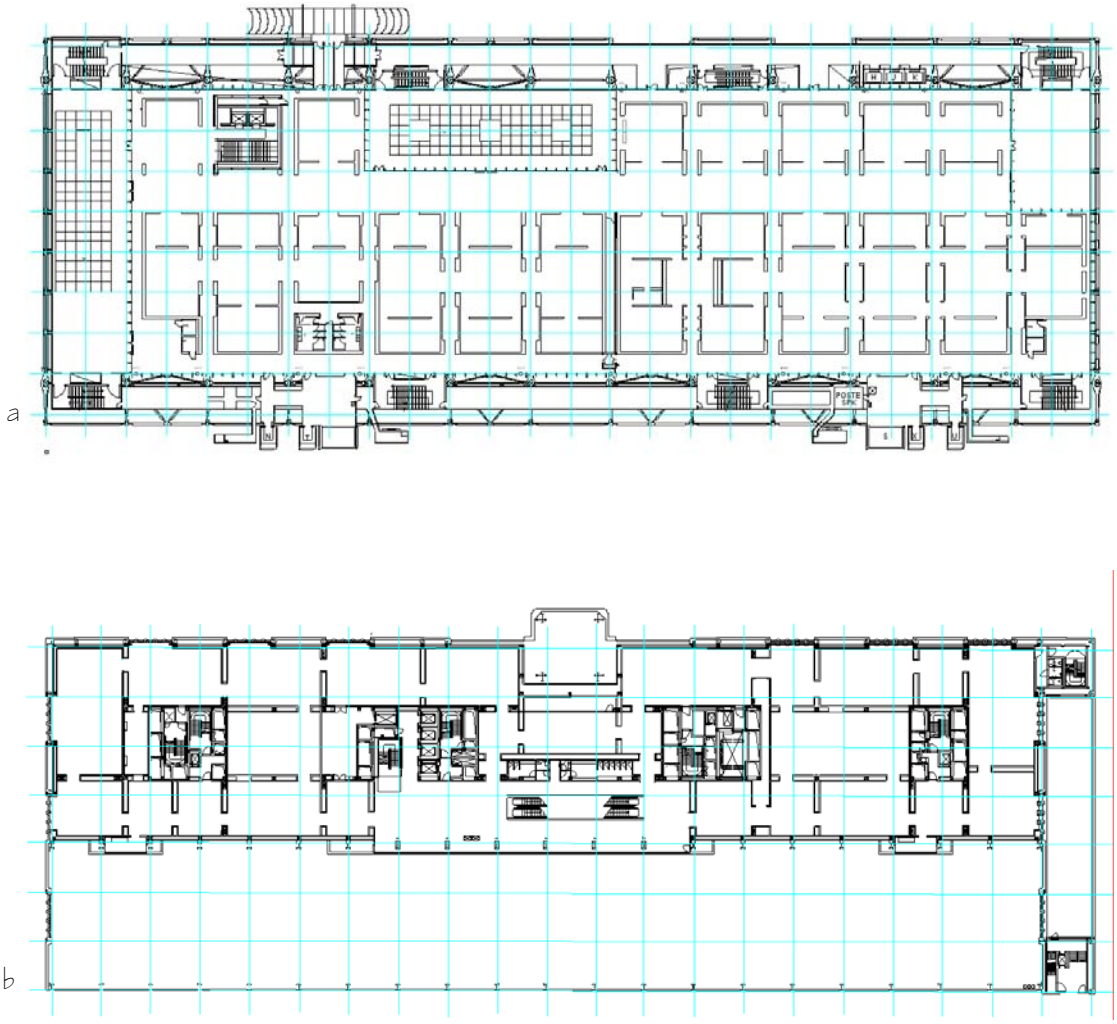
b



^ **FIGURE 6.5** Floor plans of Pompidou4 (a) and Pompidou 5 (b)
[arrangement recorded in August 2003]



^ **FIGURE 6.6** Floor plans of Tate3 (a) and Tate5 (b) [arrangement recorded in June 2003]



^ **FIGURE 6.7** The layouts of both Pompidou5 (a) and Tate3 (b) are articulated on the basis of a modular grid

1987, p.65). At the same time, these units have a clear internal order: each consists of an external gallery, in most cases open onto the axis, and two ranges of internal galleries, all linked up to form a cluster. [15] Moreover, the central range of galleries is organized in groups of three, so that each gallery is connected directly to the next one, structuring an internal axis parallel to the circulation core of the museum. In contrast to the three-layered right complex, the corresponding on the left (west) side is much shallower, consisting of two-layered units. Between the spatial units, narrow (1.80m) corridor- like galleries act like transition spaces,[16] which although they play a secondary role in terms of display, they have a controlling function, in terms of organization of circulation. This alternating rhythm of small and large, open and closed spaces emphasizes a sense of rhythmic repetition and creates an interesting play with the geometrical order established by the grid and the asymmetry created by the axis.

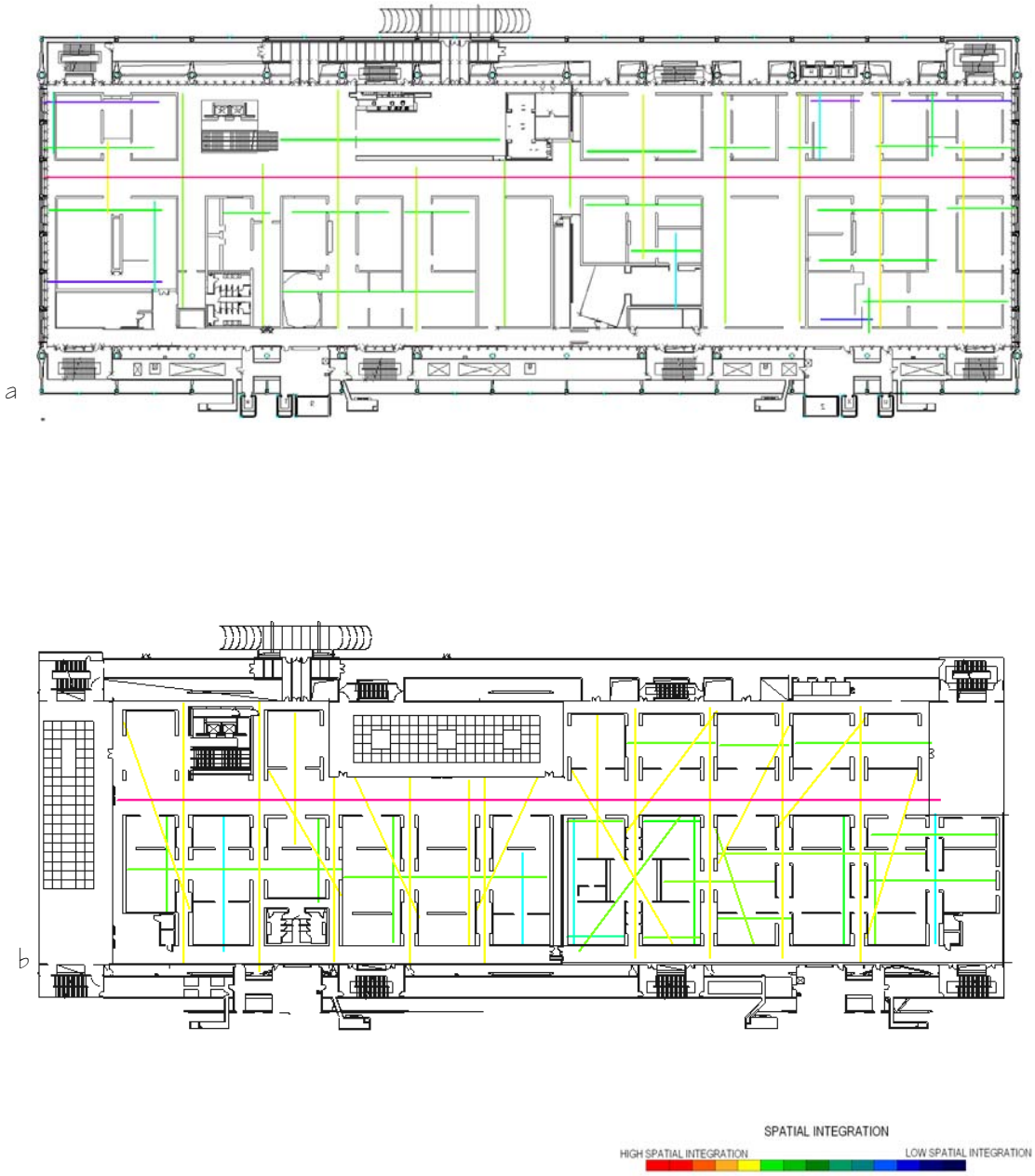
A similar structure characterizes also the fourth floor, although this lacks both the repetitive modular character and the rigid organization of Pompidou5. Once again the main axis encompasses the galleries on both sides, but the latter are not self - sufficient from the point of view of internal circulation and consequently, become highly dependent on the central circulation space; they essentially form a star centred on this, rendering the whole structure much simpler.

Coming to Tate Modern, the layout on both floors, is composed along two axes, the north/south of the chimney and the east/west of the turbine hall. While the latter is the dominant axis of the plan, it is the former that defines the two symmetrically disposed sets of rooms. Like Pompidou, Tate Modern displays a tripartite suite layout: it consists of three ranges of rectangular rooms of similar width (10-10-10m on the lower floor and 8-14-8 on the top floor). But unlike Pompidou, neither the symmetry nor the tripartite structure, displayed in the plan, are allowed to appear as one moves about in space. Galleries are organized in the periphery of a central space that contains the vertical connections, and can form either two rings of spaces or a continuous sequence (the rings being joined by the linking gallery behind the chimney). Each of the two rings is also organized around a central space, on a sequential basis.

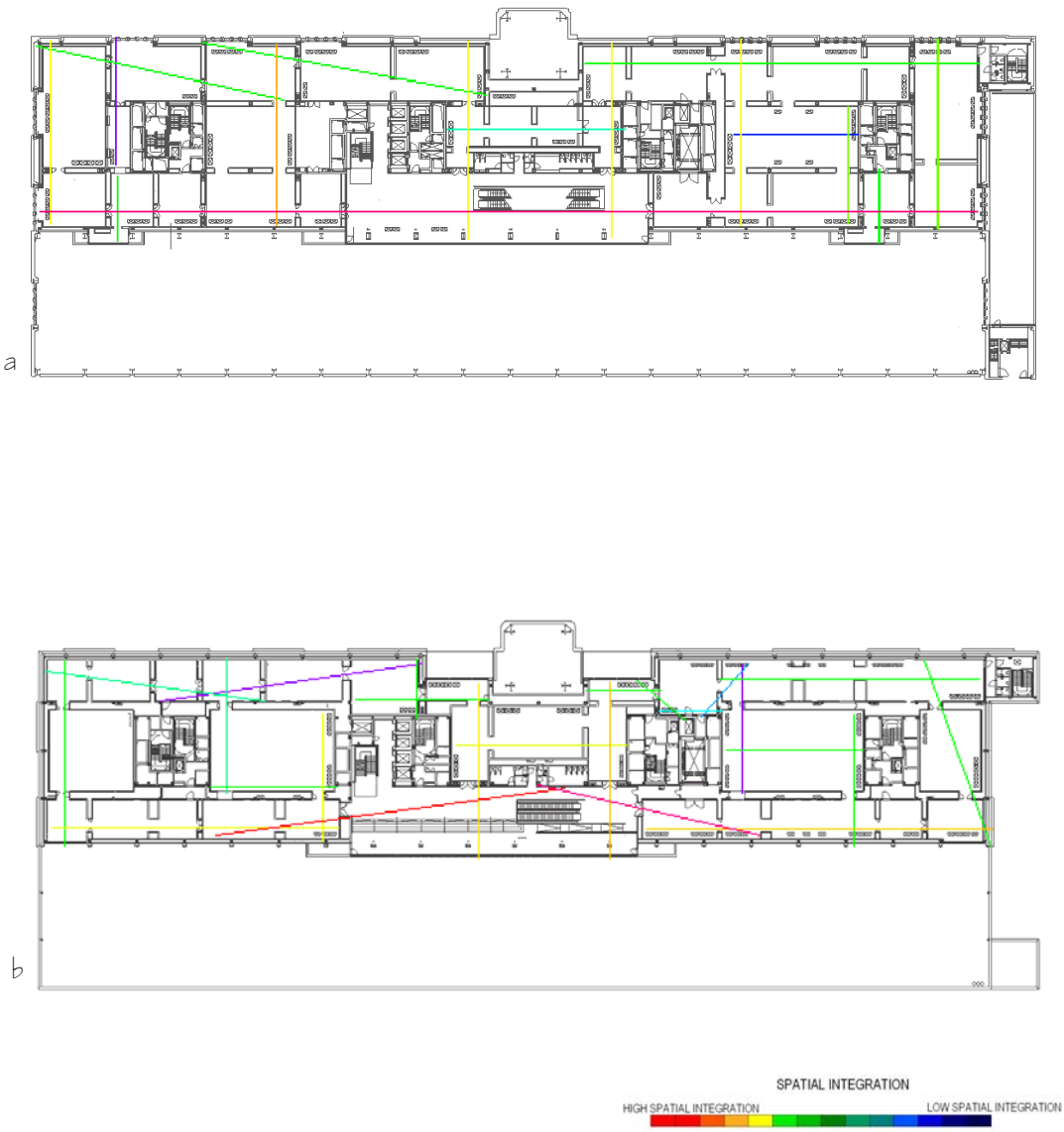
Axiality

Though it seems that the layout of Pompidou emphasizes the sense of an aggregate of spatial units, while Tate Modern the single totality of space, in both cases the axis is the key spatial element. At the highly broken up structure of Pompidou5 (cf. *number of galleries* in **Table 4.3**) there are always lines, which link the units together, usually several at a time, and ensure strong connections between the circulation zone and the gallery spaces, and the gallery spaces with themselves. [**Figure 6.8**] If we look at **Table 4.4**, we find that Pompidou5 has the highest *convex* and *convaxial connectivity* and *mean axial line index* (that is, the number of convex spaces that are traversed by an axial line). Subdivision does not therefore lead to the loss of axial connections. The powerful axiality becomes immediately felt, as once beyond the entrance, the viewer is placed at the beginning of the long perspective axis. Its linear dynamic is however tempered by the repetitive transverse, east to west, axes, which regularly cross the floor in its width. Moreover, a second major axis is created by the alignment of the middle rooms on the right side complex; though it might seem to duplicate the main circulation core, it is interrupted and, by implication, less powerful. Interestingly, axial lines at Pompidou5 are systematically end-stopped by carefully positioned walls, so as to link up to three galleries in both directions. This structure suggests, if not imposes, a different rhythm of progression inside the galleries, off the circulation axis.

A comparable axial organization is to be observed in Tate Modern. [**Figure 6.9**] Axial lines are also clearly defined, the overall axial organization of the plan is however comparatively simpler. Again the main axis extends the whole length of the layout, though the entrance is located along the axis, bisecting it in two parts. This however, does not reduce its impact, as it still allows an unimpeded perspective vista through the whole south enfilade of spaces[17] and its strong visual presence is further reinforced by the alignment of the door openings. Thus, on the way in, the visitor sees the whole range of rooms right to the end in both directions, so that from the outset of a trip to a suite, he knows how long it is.



^ **FIGURE 6.8** Axial organization of Pompidou4 (a) and Pompidou5 (b)



^ **FIGURE 6.9** Axial organization of Tate3 (a) and Tate5 (b)

Similarly to the Pompidou layout, the main axis has close relation to the rest of the axial organization of the plan: shorter axes cross it at right angles, so that most galleries are few steps away from the central space, affording visitors an easily read building. Once inside, the staggered door openings stop the visitor from knowing what happens in these spaces, aiming at slowing down its physical rhythm, and only views out, to the central space, are regularly afforded so that he can orientate himself. In other words, we find again the tendency -already seen at Pompidou- that lines tend to be shortened as we go deeper in the gallery. This feature is even more pronounced at Tate5, where the staggered alignment of all the internal galleries creates a less powerful and more informal sequence.

Core

A further related issue that arises from the axial organization is the creation of a reference point in the spatial sequence. It is clear that in the case of Pompidou, the long axis constitutes the spread integration core of the gallery [**Figure A.2d**] and assumes the role of the recurrent space in the sequence. All seems to prioritise this space that gathers the key functions, from providing orientation and imparting movement to the galleries, to acting as a perambulation space, as the obvious social gatherer. Its importance is further reinforced by the fact that the internal circulation path is not continuous, so visitors must return at various stages to the main axis to make transitions from one spatial unit to another. More fundamentally, it works as the only way back to the starting point. But this also suggests that, despite initial appearances, the axis constitutes a compulsory space. By controlling access to the galleries and by guiding visitors' exploration, it seems to enforce movement and consequently, substantially determine the pattern of co-presence.

Like Pompidou, the integration core of the Tate is the main axis that spreads east-west, the whole length of the plan. [**Figure A.2c**] However, its embedding in the layout could hardly be more different: partly structured by the

south enfilade, it is not an independent circulation space which one walks through, end-to-end, as its continuity becomes disrupted by the escalator space. Moreover,

unilaterally linked to the central range of rooms, it does not provide a structure to the exploration of the galleries nor does it become the recurrent space in the sequence. This distinction could be best clarified by using the syntactic concepts of *synchrony* and *description*[18] (Hillier and Hanson 1984, p.93; Hillier 1996, p.232), two concepts that allow us to distinguish between spaces that look similar but are embedded differently. *Synchrony* refers to the scale of a space and *description*, to the whole embedding of the space in its context. So we could say that the main axes at Pompidou and Tate Modern have identical *synchrony* –both increase *axial synchrony*- , but different *descriptions*, that is, different syntactic embedding.

Only the escalator space of Tate can be seen as assuming the practical function of a gathering space. Located at the intersection of the north/south and the east/west axes, and with 'views' onto the turbine hall, it provides a spatially differentiated experience, and acts as a global orientation device, as the space from which one starts and returns. But it is in effect engaged in a passive role: detached from the viewing sequence, it allows visitors to omit spaces; but, once they started their itinerary, it does not play any role in the organization of circulation. It can therefore be argued that it assumes an instrumental function, rather than social.

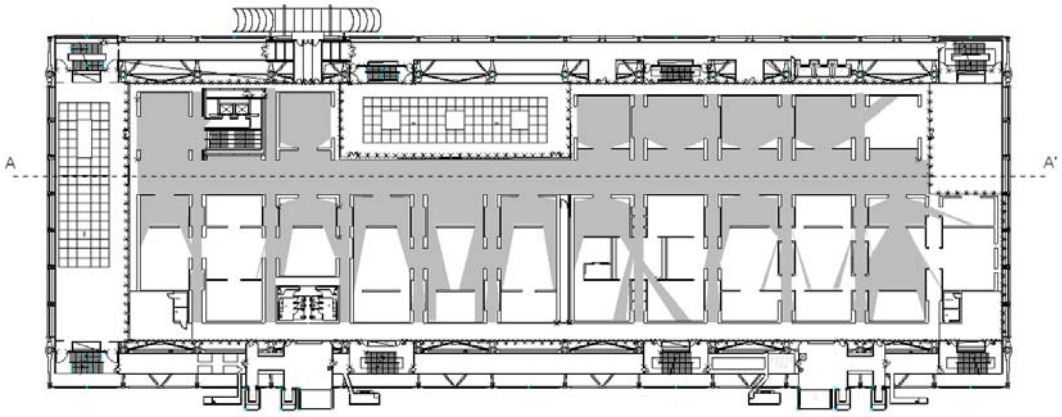
Visual organization

The visibility structure offers another valuable parallel between Pompidou and Tate Modern, which begins to suggest some critical differences between the two cases. At Pompidou5 the characteristic of the visual organization is the dense and multi-directional pattern of connection which constructs constantly changing visual relations and offers overlapping planes. If we look at the *local property of visibility* -defined as the average number of spaces visible form each space -, we find that Pompidou5 has by far the highest value, as compared to the four layouts. [**Table 4.4**] This however does not mean that space is immediately revealed to the viewer. On the contrary; it offers variability in the visibility relations but not generous visibility across rooms. Though they cover spaces in many directions, isovists are carefully engineered so as to allow glimpses through the narrow openings, without exposing the neighbouring spaces to direct view. The

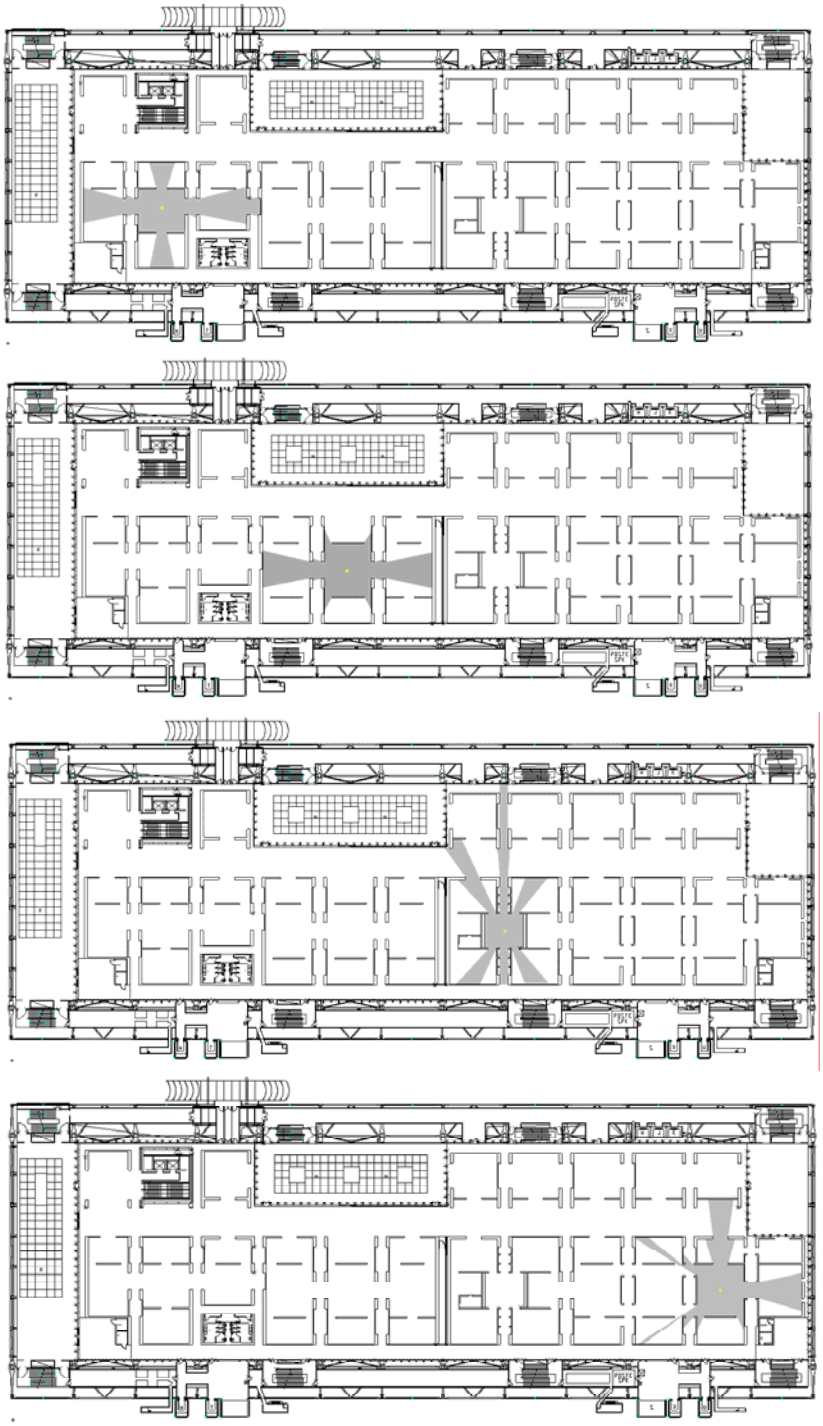
penetrating -but not revealing and systematically incomplete- diagonal views offered to the viewer moving along the axis, illustrate the point. [**Figure 6.10**] Furthermore, vistas systematically come up against the boundaries of the spatial units, so that the majority of visual fields are restricted to the local scale of two or three convex spaces. This creates a local rhythm of perception, suspending the awareness of spaces beyond. But it also means that, though moving within the boundaries of a spatial unit produces isovists that may overlap with the previous or the next one, proceeding to the next unit offers visual fields that expose new parts of the gallery, which have nothing in common with the ones already traversed or just seen. [**Figure 6.11**] Thus an engaging recurrent tension is created between stability and redundancy on the one hand, and informationally sharp changes on the other.

Another key aspect of the visual structure at Pompidou is that the variety in the disposition of openings forms isovists of extremely heterogeneous shapes; even isovists that look symmetrical are not identical. [**Figure 6.12**] It could therefore be argued that by allowing a simultaneous perception of different spatial locations, and hinting at spaces as destinations to be explored, the visual organization invites movement and distracts attention away from the space one is standing. The rich visibility across rooms emphasizes a *dynamic* dimension of space, inviting the viewer in exploration, relieves the repetition of the plan, and provides unity to the compartmentalized layout.

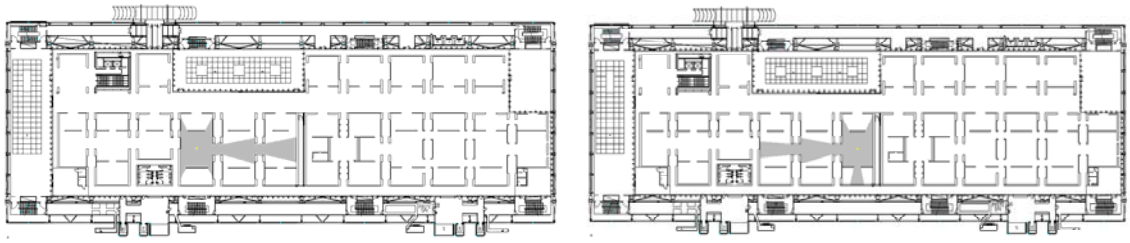
At first sight, this contrasts with the visibility structure at Tate Modern. To the richness and variety of visual links of Pompidou, it opposes mainly unidirectional vistas, and minimally connected spaces, that reinforce the sense of travelling along a sequence of spaces. But on closer examination, we can discern two opposing principles that govern the visual organization at Tate Modern, and which can be paralleled to the tension between stability and change observed at Pompidou. On the one hand, the south enfilade of rooms creates a long perspective vista, from which an almost stable impression is gained; [**Figure 6.13**] and on the other hand, the staggered north galleries tend to structure views which are much shorter and limited to the spaces that are in the visitor's path of



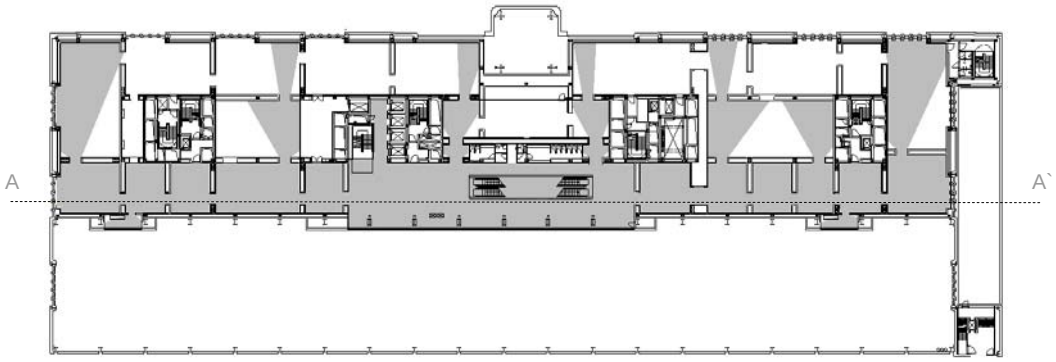
^ **FIGURE 6.10** Line isovist drawn from the main axis of Pompidou5



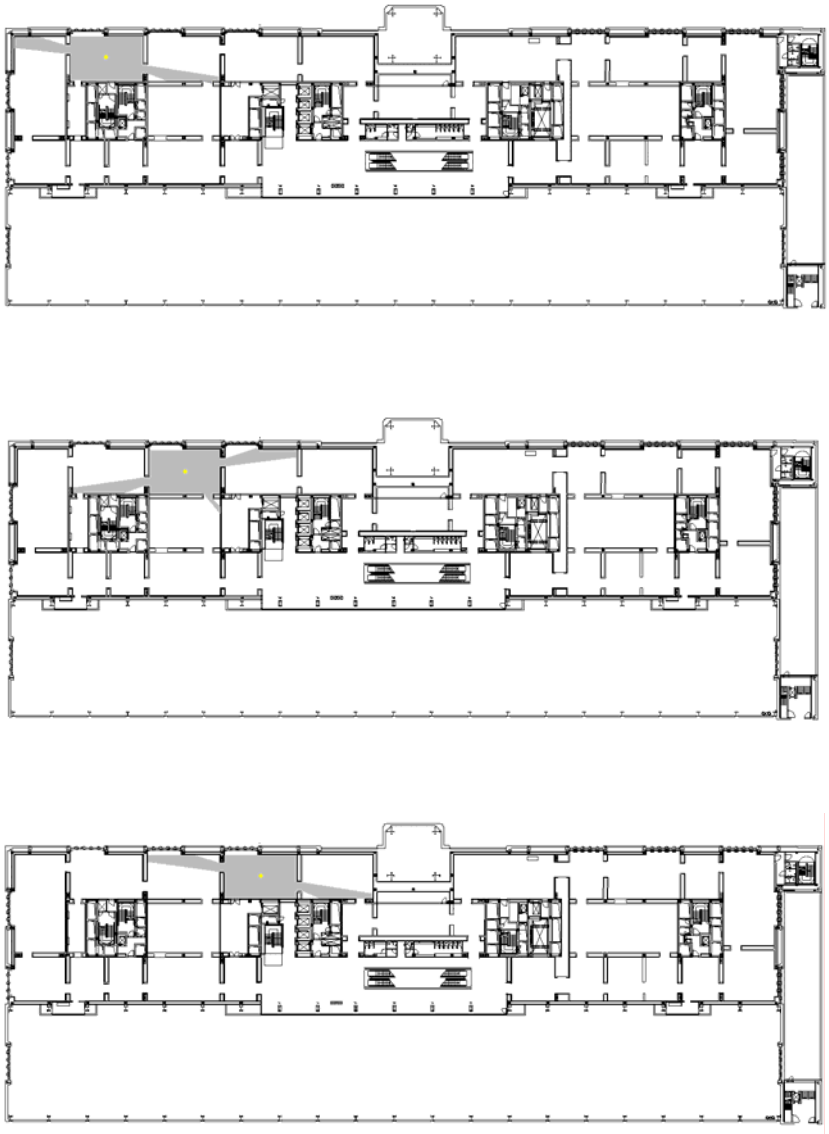
^ **FIGURE 6.11** Isovists taken at central points of the Pompidou5 galleries



^ **FIGURE 6.12** Examples of almost symmetrical visual fields constructed from central points of the Pompidou5 galleries



^ **FIGURE 6.13** Line isovist drawn from the main axis of Tate3



^ **FIGURE 6.14** Isovists taken at central points of the Tate3 galleries

immediate physical progress. For example, the isovists drawn from the centre of the northwest galleries of Tate3 partially expose the room to be entered and allow a narrow glimpse of the following room. [**Figure 6.14**]

But, in opposition to the heterogeneous shapes of the penetrating views generated by the configuration of space at Pompidou, visual fields at Tate tend to be rather uniform and more expansive. Furthermore, Tate employs the reverse resource to the diagonal views of Pompidou: a smooth, successive exposure that consistently re-focuses attention locally, encourages concentration and contemplation, and generates a rather static impression. This sense of space is further reinforced by the display layout. The sparse arrangement of objects (cf. *number of objects* in **Table 4.3**), their placing off the major axes, the use of movable panels to create enclosed spaces, are among the curatorial strategies, fully discussed below, that critically affect the visibility structure of the gallery and render visitors' steps much less revealing than the isovists drawn on the plan might suggest.

The construction of the route, hierarchy vs sequencing

If the lucid organization of the plan and the large-scale intelligibility is the main focus of concern for both museums, and the powerful axiality and the *information stability*[19] are the spatial means to this end, the way space is arranged is diametrically different. In the case of Pompidou, the itinerary is a prescriptive, yet open route. The linearity of the main axis suggests a general direction of movement and guides visitors' paths, but at the same time, by being linked to rings of spaces, it allows a certain degree of flexibility in respect to local choices. As indicated in **Table 4.3**, Pompidou5 has the lowest ratio of *c-* to *d- spaces* and the highest *d-ringTotal* and *d-ringMean*, measures that, as suggested in chapter 4, give a picture of the amount of choice in the layout. Moreover, because the galleries are not directly linked to each other but through the mediating corridor-like galleries (mostly *d-spaces*, as shown in the graph in **Figure A.3d**), the vast majority of galleries are a few steps away from the axis, creating a structure that resembles that of the urban grid; many spaces can work as both starting points and points of aim that are diffused in the layout. This is not to deny however that there

is complexity off the axis. The route through the galleries involves several turnings, and continuous changes of direction, but also a considerable degree of backtracking, especially since the ordering of rooms creates loops back, either to the main circulation zone or the internal axis.

We recall that circulation flexibility was among the initial intentions of the Pompidou. Reminiscent of this is, we believe, the current circulation pattern. The matrix of spatial connections creates a maze-like situation that retains something of the labyrinthine route of the original open plan layout. Moreover, the design of a central circulation space with a network of routes intersecting at right angles[20] may be seen as an interpretation of the urban metaphor proposed by Hulten. The spatial units can be read as building blocks opening onto the main 'street', which can be explored or by-passed. Although space is now organized into an ordered, rational pattern, the idea that the visitor should be able, while wandering around, to make choices, change direction and change his mind, is maintained.

Closely connected to the organization of circulation is the issue of hierarchy, statements of which are to be found at several scale levels. At the global scale, hierarchy is suggested by the fact that there is a single entry point on the fourth floor, which controls access not only to that level, but also to the level above.[21] If we focus attention on the local scale of the fifth floor, we find that the plan is bisected between left and right side (as it is also divided between north and south part by a fire wall), giving a strong controlling function to the axis. That the right side is given prominence over the left is obvious, explicitly suggested by its depth and complexity. And if we turn to the micro-scale of the right side complex, additional hierarchal relations are created among the gallery spaces, that is, among the external galleries -open onto the axis-, the central ones -open on to each other, and the deeper rather segregated, dead end-spaces. This hierarchical organization of space can be seen as a means to create visitable units and allow different depths of exploration -from the simplest linear progression through the main axis to the selective viewing of the central spaces or the exhaustive exploration that includes the most segregated galleries.

More or less similar intentions characterize the organization of circulation at Pompidou4. The key difference lies in the overwhelming predominance of the

central axis: the minor sub-loops on its sides and the absence of choice spaces in the layout (see the graph in **Figure A.3d** and the ratio of *c*- to *d-spaces* in **Table 4.3**) hinder a continuous exploration independent from the main axis.

The situation at Tate is once again simpler. The layout reduces, if not eliminates, the tension between local and global. It has already been suggested that the two autonomous and distinct suites of galleries form two interconnected, large loops, potentially structuring a continuous sequence. Thus, the minor choices, offered by the alternative entry/exit points (two main entrances to the galleries and two secondary),[22] and the two middle spaces, are eventually submerged into the more global choice of either of the two loops. [**Figure A.3c**] This means that in contrast to the constant dilemma that the Pompidou viewer is confronted with, because of the bilateral arrangement of galleries along the main as well as the interior axis, at Tate much less input is required; once he has selected the initial direction to go (west or east suite), the viewer has essentially to follow the natural progression of spaces. The distinction between spaces for contemplation and spaces of movement is also negated.

Furthermore, instead of the hierarchal structure of Pompidou, Tate proposes a counter statement of what we might think of as an egalitarian ideal, expressed by the strong sequencing (see lower *d-ringMean* value of Tate, as compared to Pompidou, in **Table 4.3**) and the availability of the four entry points Thus, the galleries, opening off each other, are more or less equivalent, with the exception of the two middle spaces. The latter, by means of their strategic location and permeability potential, contribute to eliminating depth effects between different parts of the layout [cf. M*ean depth (entrance)* in **Table 4.4**]. This peripheral ordering of the galleries around the middle spaces could also be seen as the equivalent of the hierarchical structure at Pompidou5, in that it allows the creation of manageable sequences, an idea already found in the Design Brief.

What emerges from the analysis is that the two museums have built their spatial design on similar organizing principles -such as the grid structure, the strong axis running the length of the building, the articulation of space in manageable sequences-, and on common spatial themes –as for instance, the need to make the spatial depth visible in order to facilitate orientation, the shortened

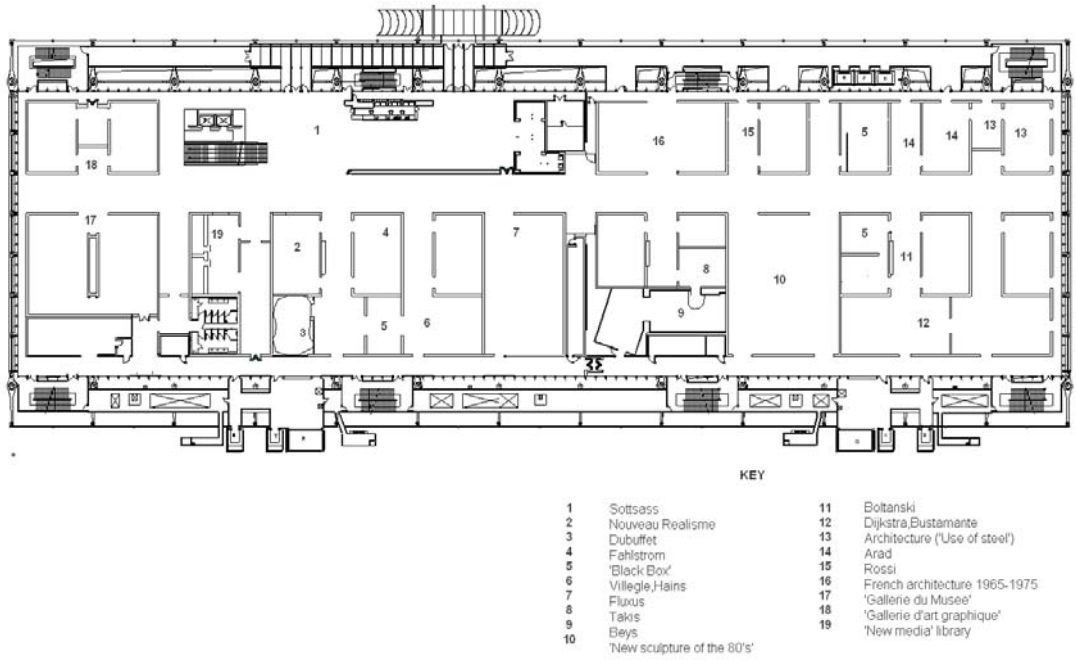
axes and the controlled views that lengthen the time of exploration and create a 'process' of discovery. But what determines their spatial structure is the manner in which these principles are organized and linked to a global pattern. The main axes best illustrate this point: though both have more or less the same morphology, they are embedded in different syntactic contexts (see the above conceptual distinction between the *synchrony* and the *description* of a space). This, by implication, leads to two opposing compositions: a complex and hierarchical arrangement at Pompidou and a simple and equalitarian organization at Tate.

To be able to better understand these affinities and differences, we will now turn to the display layout and focus on how the two museums relate their spatial design to the presentation of their collections. Are the morphological principles analyzed above used as a means to a particular curatorial intention, or do they constitute an end in itself?

6.3 Morphology of display[23]

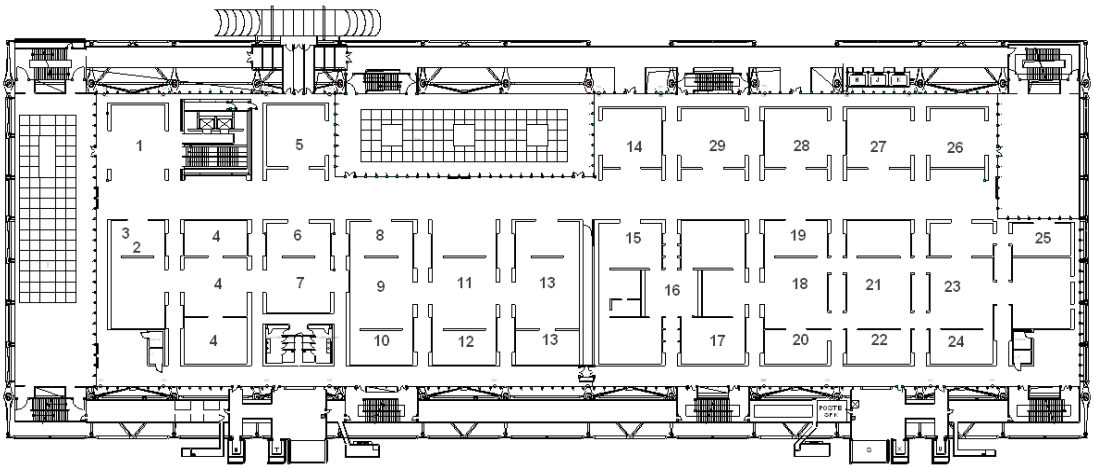
POMPIDOU: '*diachronic*' *view of art*

The twentieth-century art collection of Pompidou, widely acknowledged as one of the most comprehensive in the world, is divided in two sections: modern art -from the early twentieth century[24] to 1960s-, and contemporary -from 1960s onwards. [**Figure 6.15**] The re-opening of the museum in 2000 marked a radical shift in the display with the reversal of the sequence of the collection galleries: visitors encounter the contemporary galleries first, on the fourth floor, and then move to the fifth floor galleries that cover the earliest years of the collection. [**Figure 6.16**] This choice was clearly spatial. Given that few visitors travelled through all the galleries to go to the contemporary part of the collection, at the end of the sequence, it was decided to move the entrance to the fourth floor, and make thus the contemporary collection directly accessible, at the beginning of the route -a strategy that seems effective, as shown by our empirical investigation and the 2002 Visit Audit carried out by the museum (see below).



a

^ **FIGURE 6.15** 4th (a) and 5th floor (b) plans of Pompidou showing the locations of key displays (arrangement recorded in August 2003)



KEY

1	Miro
2	Matisse, early works
3	Fauvism
4	Cubism
5	Dada
6	Magnelli, Matisse, Lipchitz
7	Suprematism
8	Kandinsky,Jawlensky, Hausmann
9	Bauhaus
10	Orphism (Delaunay)
11	De Stijl
12	Purism (LeCorbusier)
13	Leger
14	Miro,Calder
15	Ernst, Dali, De Chirico, Magritte
16	Picasso,Giacometti
17	Breton
18	Ecole de Paris
19	Bonnard, Braque, Matisse,Picasso
20	Rouault
21	Giacometti, Fautrier, Bacon
22	Reigl
23	Pollock, Rothko, and Soulages
24	Photographie (Kertesz)
25	Cesar,Fontana,Manzoni,Tapies
26	Architecture ('The use of wood')
27	LeCorbusier
28	Architecture ('Rationalism')
29	Matisse,late works

b

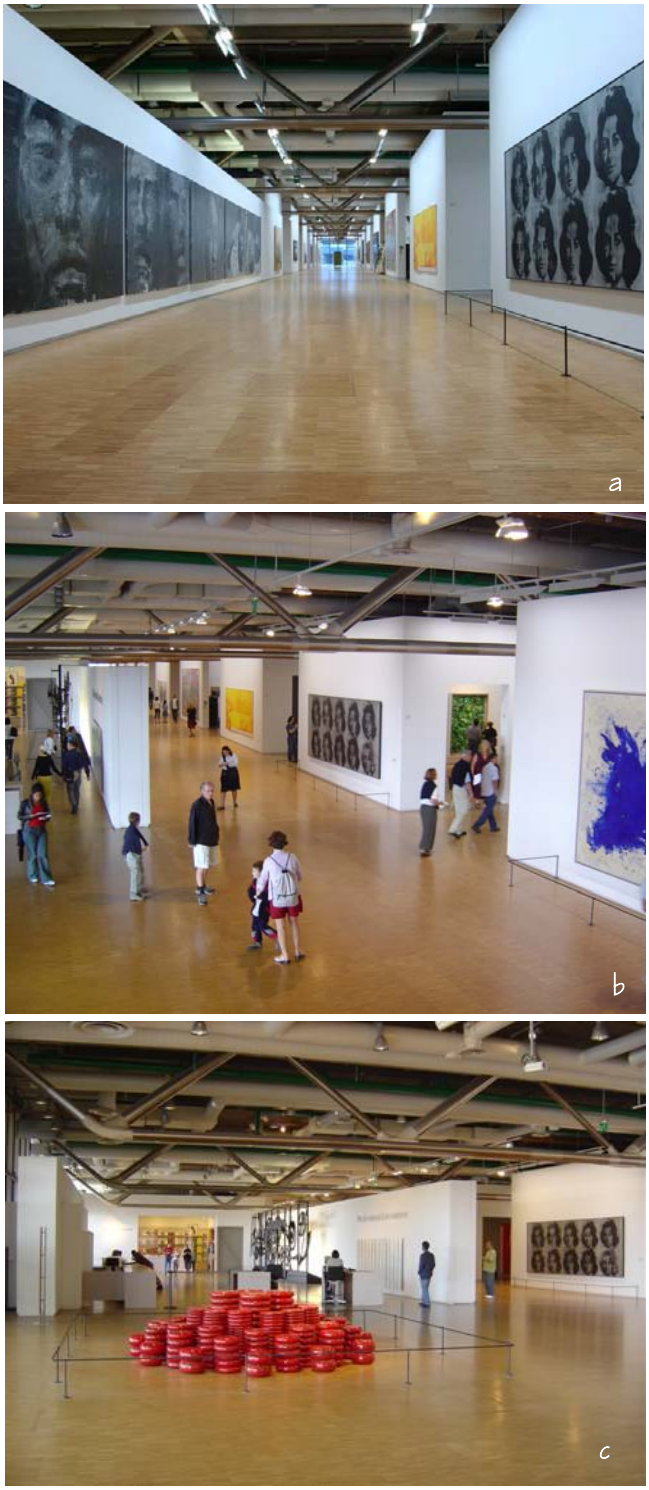
^ FIGURE 6.15 continued

The re-opening was also marked by the innovative gesture to integrate in the display, collections of architecture and design.[25] To announce and make evident the multidisciplinary approach, the display opened with a design object, the '*Grande altare*' by Sottsass. [**1** in **Figure 6.15a** and **Figure 6.16c**] It should be noted however that a clear distinction was established between architecture, design, and traditional visual arts.[26] On both floors, the galleries devoted to the former were located in the northwest corner of the plan, and structured the last part of the itinerary. Thus, at Pompidou5 LeCorbusier's painting '*Nature morte*' was shown in the room dedicated to '*Purism*', [**12** in **Figure 6.15b** and **Figure 6.16d**] presented separately from his architectural creations, that consisted a separate, monographic display. [**27** in **Figure 6.15b** and **Figure 6.16e**]

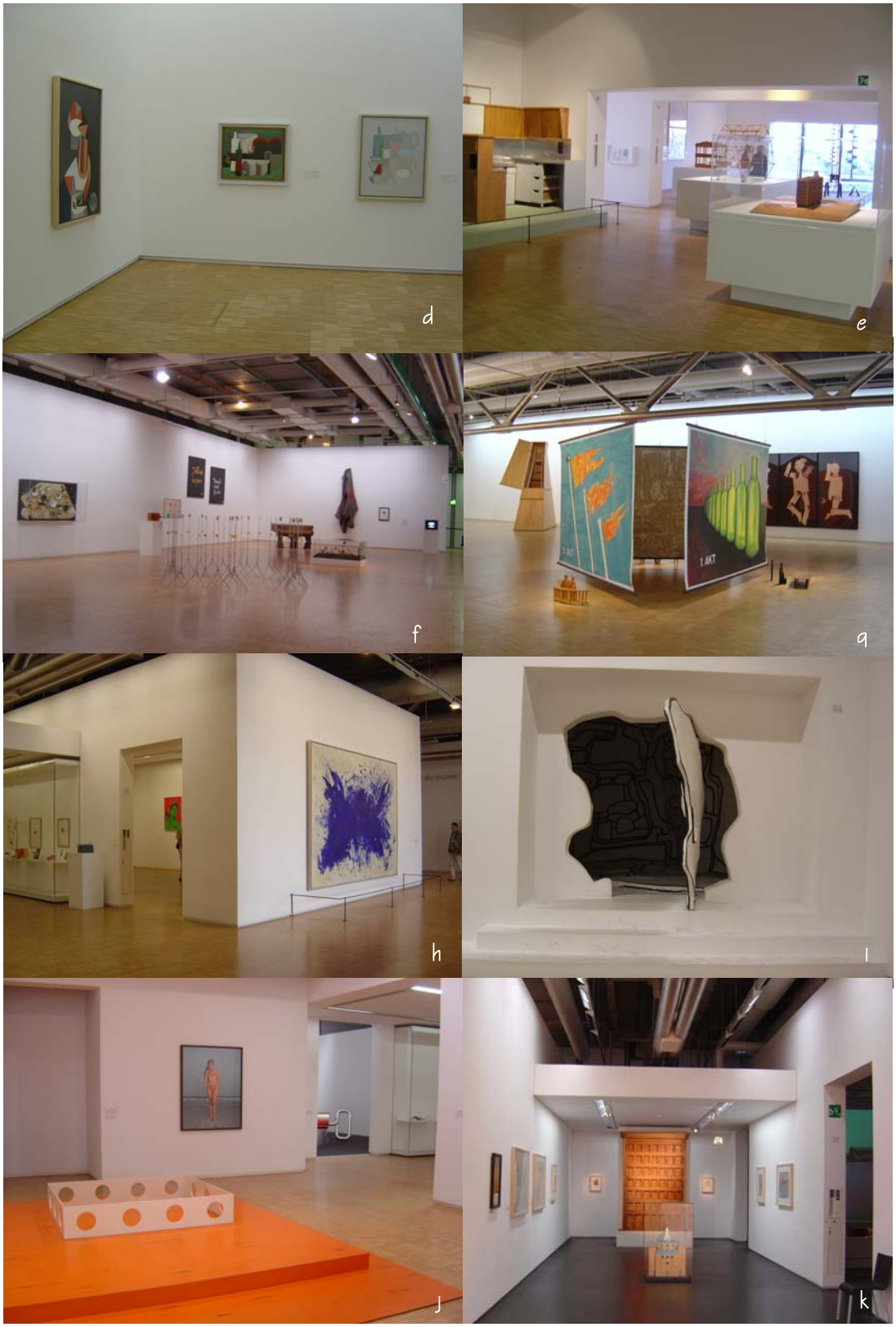
The spatial unfolding of the story of modern and contemporary art

The general organization of the display at Pompidou followed the art historical scheme hanging by movements and artists, in a chronological framework. Additionally, the works on display were inscribed within a specific overall concept, which is annually re-defined. The fourth floor contemporary galleries were organized around the theme of '*figurative art*',[27] as clearly manifested in the display along the main axis. Like a picture gallery, the axis offered an overview of the major trends in figurative art, and worked independently from the side galleries mainly devoted to installations and new media. [**Figure 6.16a, b**]

The installation of the contemporary art began in the 1960s, with galleries dedicated to the *Nouveau Realisme* [**2** in **Figure 6.15a**] and could be seen as a 'flash forward' since it was this decade that constituted the ending point of the display on the upper floor. [**Figure 6.16h**] To punctuate the chronological narrative, spatial units represented decades and were devoted to an artistic movement that marked the period. For example, rooms 25 and 31 were dedicated respectively to the *Fluxus* movement, developed around 1960s [**7** in **Figure 6.15a** and **Figure 6.16f**] and to the *new sculpture* of the 80s. [**10** in **Figure 6.15a** and



^ **FIGURE 6.16** Installation views of the collection at Pompidou4

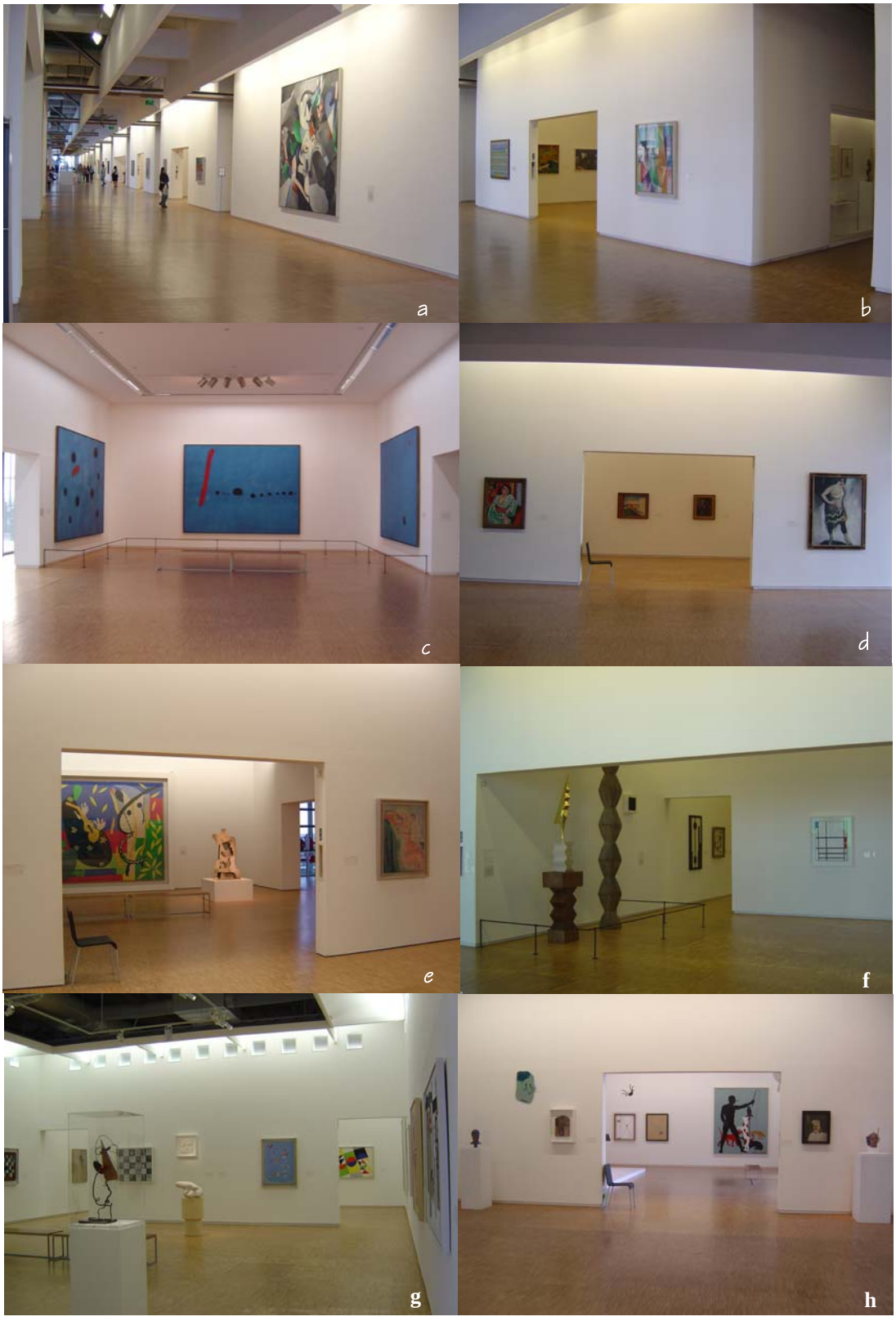


^ **FIGURE 6.16 continued**

Figure 6.16g] Within this framework, there was a considerable number of monographic displays (*O. Fahlström* in room 4, *Boltanski* in room 12, *Takis* in room 14a), [**4, 11, 8,** in **Figure 6.15a**] but the majority of gallery spaces were dedicated to installations, like the three-dimensional work of Dubuffet '*Winter garden'*, in the form of a cave, [**3** in **Figure 6.15a** and **Figure 6.16i**] or Beuys *'Plight'* which occupied a whole room [**9**].[28] The auxiliary, corridors-like spaces that mediated between individual galleries made the link between movements shown in neighbouring rooms. They constituted spaces of confrontation between artists of different styles working together (for example, the French artsists *Hains and Villeglé)* [**6** in **Figure 6.15a**]- or put in dialogue artists expressing similar themes through different media (as for instance, the juxtaposition of the large sculpture by *Bustamante* and the photographic works by *Dijkstra*, both emphasising the horizontality of the work and its reading as a map, in room 37). [**12** in **Figure 6.15a** and **Figure 6.16j**]

The west complex was almost exclusively dedicated to the architecture and design collections, either in the form of monographic displays (for example, room 50, devoted to the Italian architect *A. Rossi*, [**15** in **Figure 6.15a** and **Figure 6.16k**] and rooms 44-45, to the work of the American designer R. Arad [**14**]), or in the form of thematic displays (like '*The use of steel in modern architecture*' in room 42, [**13**] or the '*French architecture of the period between 1965 and 1975*' in room 51, [**16**]). 'Black box' galleries for media were also integrated in the itinerary and dispersed on both sides (rooms 21, 33 and 47, [**5**]). It should finally be noted that the northern part of the museum was dedicated to temporary exhibitions ('*Gallerie du Musee*' and the '*Gallerie d'art graphique*', spaces 9-11 and 5-8 respectively, [**17-18**]) and also included a media library area (rooms 13-15, [**19**]).

The display continued on the fifth floor, and moved backwards in time. [**Figure 6.17a-b**] It proposed to look back to the first half of the twentieth century, as it started with Fauvism and ended with the French and American Abstraction. Like the fourth floor display, it was organized around a theme -the preoccupation of modern art with pure colour as form and subject; but unlike it, the narrative structure was more strictly chronological. The first space was dedicated to *Miro*,



^ **FIGURE 6.17** Installation views of the collection at Pompidou5

whose oeuvre summarizes the achievements of the art of the first half of the century and whose monochromatic triptych (‘*Bleu*’, 1961) introduced the unifying theme of the display. [**1** in **Figure 6.15b** and **Figure 6.17c**] Then *Matisse* with two early works confronted the viewer at the entrance of the west side complex; [**2** in **Figure 6.15b** and **Figure 6.17d**] it also constituted the ending point of the itinerary with his late works, shown in the penultimate space of the left side complex (room 62). [**29** in **Figure 6.15b** and **Figure 6.17e**] The first part of the itinerary was dedicated to *Fauvism* (room 4), [**3** in **Figure 6.15b**] and mainly *Cubism*, the evolution of which was developed in four rooms (5-8). [**4**] The following displays were devoted to artistic movements that are considered to derive from Cubism -as for instance, *Suprematism* (room 14), [**7**] *Bauhaus* (**9** in **Figure 6.15b** and **Figure 6.17f**), *Orphism* (room 18), [**10**] *De Stijl* (room 21), [**11** in **Figure 6.15b** and **Figure 6.17g**] *Purism* (room 22). [**12**] In parallel and in reaction to cubism was developed the *Dada* movement, shown through the works of *Picabia* and *Man Ray* and the ready-made of *Duchamp*, in room 12, [**5**] on the opposite, left side -a detour that perhaps expressed physically the rupture in art. [**Figure 6.17h**] *Dada* was the precursor of the *Surrealism*, introduced by the display in room 29, also on the left side, which grouped the works of *Miro* and *Calder*, [**14**] partially Surrealist-influenced (Blistène 2001, p.149). The development of the wide-ranging Surrealist movement was given special prominence: nine rooms (29-37), located almost at the centre of the plan, explored its expansion from painting and sculpture into film, and though the works of key artists, such as *Ernst, Dali, De Chirico, Magritte* in room 29, [**15**] *Picasso* and *Giacometti* in room 33. [**16**] The key space was room 31, dedicated to *Breton*’s personal collection, which included the reconstruction of the wall of its studio with 260 objects.[29] [**17**] Rooms 40-45 bridged the gap between figurative and abstract art, with the expressionism of the *Ecole de Paris* (Modigliani, Soutine, Van Dongen -room 40), [**18**] and the works of *Giacometti*, *Fautrier* and *Bacon* (room 44). [**21**] The last section of the right side complex was dedicated to the European and American abstract art, represented mainly by *Pollock*, *Rothko*, and *Soulages* in room 48. [**23**] The compressions of *Cesar*, the abstractions of *Fontana*, *Manzoni* and *Tapies*, were shown in room 52, [**25**] the last space of the

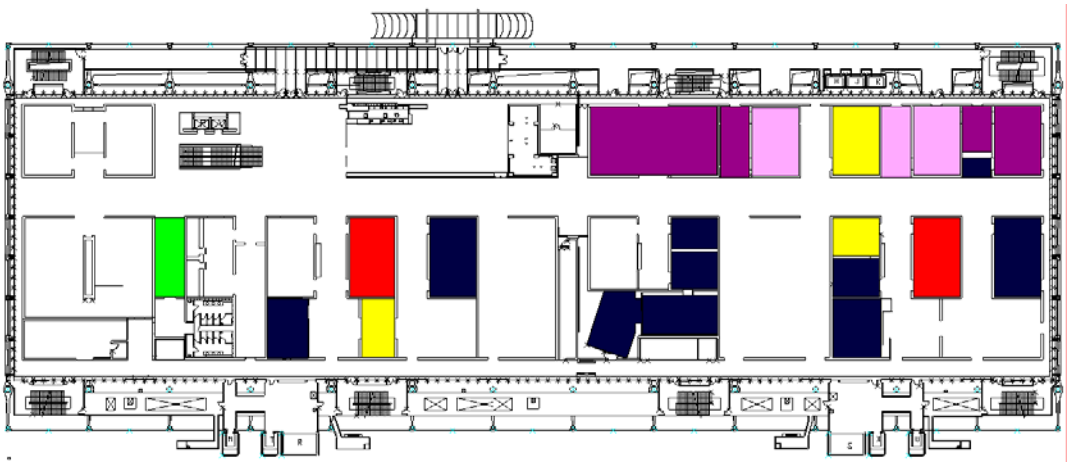
right sequence, making thus the link with the movement of *Nouveau Realisme* which opened the display of the contemporary collection.

To balance perhaps the rigidity of the narrative and reduce the sequential laying out of the history of modern art, a set of displays dispersed among the strictly chronological ones, proposed a more flexible, rather thematic orientation. [**Figure 6.18**] For example, room 13 [**6**] gathered together works by *Magnelli, Matisse, Lipchitz,* artists who have been dealing with black colour; room 39 [**19**] explored the theme of the *artist's studio* and its symbolic character, as illustrated by *Bonnard, Braque, Matisse* and *Picasso*.

As outlined earlier, the thematic displays of *design and architecture* collections were shown in the adjoining northwest galleries;[30] photography was also represented in the display, shown in a dead-end room (49). [**24**] Unlike the fourth floor axis, the main axis on the fifth floor was not read independently of the side galleries; on the contrary, paintings hung on the exterior walls of the compartments served to announce their content; at the same time, it allowed the observer moving down the axis, to trace the developments of modern art, since in effect the intention on the fifth floor was to provide a synopsis of modern art, rather than suggest sampling, as it was intended in the contemporary galleries.

TATE MODERN: *a 'synchronic' view of art*

Like the Pompidou Collection, the Tate Collection of modern art comprises works which span the twentieth century through the present, and are shown in two separate floors; but unlike it, it was organized in four separate themes[31] that cut right through history -*landscape, still life, nude* and *history painting*-, an intention implied in the Brief ('*different organizing principles will also be considered .. which might make it easier to create more frequent juxtapositions between early and late twentieth-century art.…*'). [**Figure 6.19**] The organization of the collection focused on the subject matter and drew parallels between periods, seeking to identify themes and tendencies that transcend movements and show continuities across time.[32] This approach aimed at questioning '*the widely*



a

b

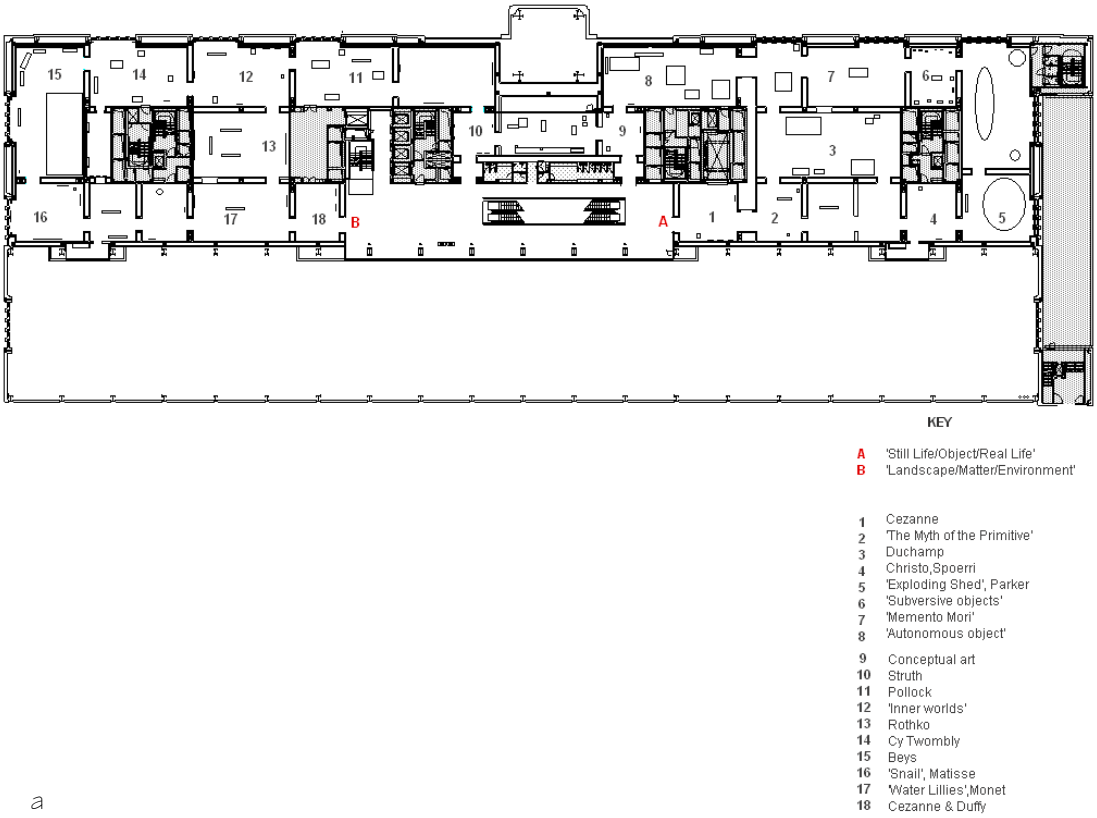
^ **FIGURE 6.18** The display layout of the 4th (a) and 5th floor (b) galleries at Pompidou

accepted model for exhibiting the art of the twentieth century that is inspired by Alfred Barr's idea of a linear and evolutionary succession' (Blazwick cited Birnbaum 2000, p.40). It eliminated the distinction between modern and contemporary art[33] and gave at everything shown a contemporary relevance. The guiding belief was, according to the Programme Curator F. Morris (2003), that '*people are familiar with the art now but not with that of the beginning of the century*'.

The display of each room was self-contained: works were arranged for their similarity or for their contrast, and related by a conceptual theme. The overall message arose from the accumulation of the display units as illustrations of the pre-given concept. The east suite of Level 3 '*Still Life/Object/Real Life'* [**A** in **Figure 6.19a** and **Figure 6.20a**] showed how the representation of objects has been continuously reinvented over the last century: from the still lives of *Cezanne* (room 1) [**1** in **Figure 6.19a**] to the incorporation of 'real' materials, such as fragments of newsprint and wallpaper, of *Cubists* (room 2), [**2**] the designation of mass-produced objects as works of art by *Duchamp* (room 3) [**3** in **Figure 6.19a** and **Figure 6.20b**], the incorporation of actual objects to the works of *Christo* and *Spoerri* (room 6) and the emphasis on the idea underlying the work of art, rather than the physical object itself, by the *minimal* and *conceptual* art (rooms 12-13). [**8-9** in **Figure 6.19a** and **Figure 6.20c**]

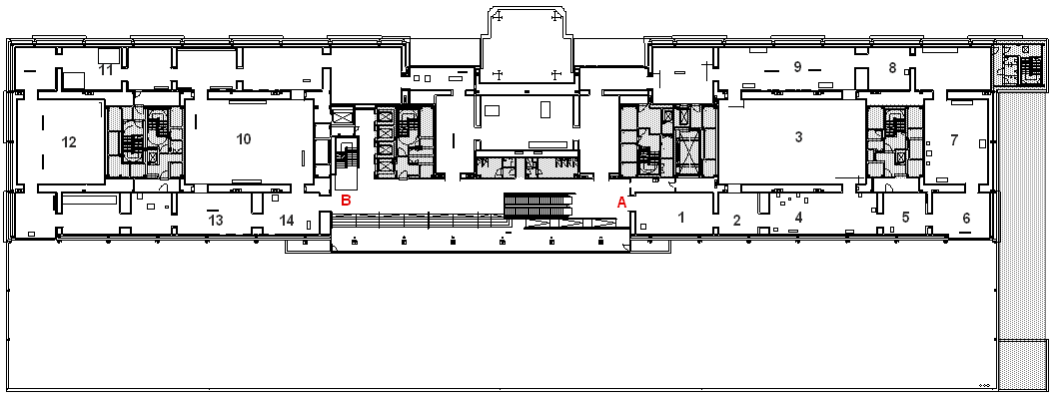
The west suite dedicated to '*Landscape/Matter/Environment*' [**B** in **Figure 6.19a** and **Figure 6.20d** brought together the *Impressionists* artists that found inspiration in the appearance of the natural world (as for example *Cezanne* and *Dufy* in room 27), [**18**] the *Surrealists*, who used the landscape to represent the mental world of memories and dreams (room 18 features works by Dali, de Chirico, Ernst, Giacometti, Miro), [**12** in **Figure 6.19a** and **Figure 6.20e**] *abstract* artists [**11** in **Figure 6.19a** and **Figure 6.20f**] whose works became a form of environment (like *Rothko*'s Seagram Murals in room 19), [**13**] to photographers, like *T. Struth*, who capture images of urban spaces. [**10**]

On Level 5, the east suite, '*Nude/Action/Body*', [**A** in **Figure 6.19b** and **Figure 6.21a**] explored the question of how to represent the human figure, through the impact of primitive art on the development of *Cubism* (room 4), [**3** in **Figure**



a

^ **FIGURE 6.19** 3rd (a) and 5th floor (b) plan of Tate Modern showing the locations of key displays (arrangement recorded in June 2003)



KEY

A 'Nude/Action/Body'
B 'History/Memory/Society'

1 Bonnard
2 Horsfield
3 Cubism
4 Viola
5 Klimt, Matisse, Picasso
6 'Nude Woman with Necklace',Picasso
7 'Transfiguration'
8 Sherman
9 Nauman
10 'Concept for Anarchy' , Horn
11 Balka & Beys
12 politically-committed works
13 Soviet posters
14 Grosz,Picasso,Lichtenstein

b

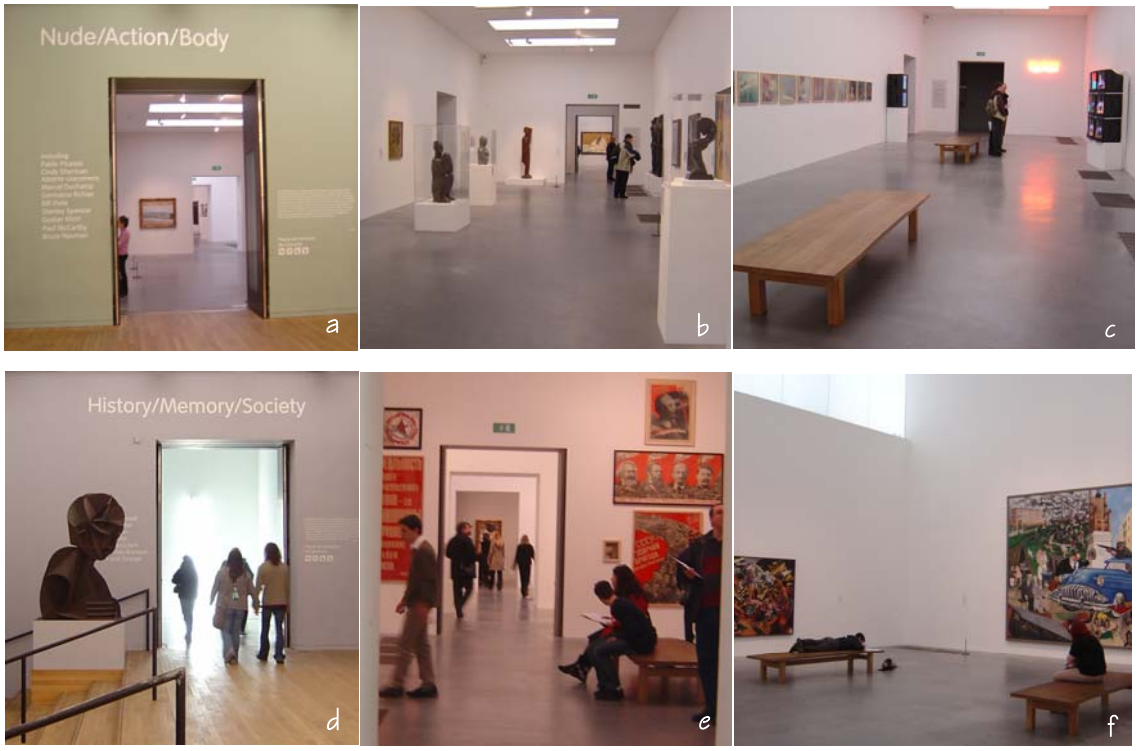
^ FIGURE 6.19 continued

^ **FIGURE 6.20** Installation views of the collection at Tate3

6.19b and **Figure 6.21b**], the portraits of woman painted by male artists, like *Klimt*, *Matisse*, and *Picasso* (rooms 5-6), [**5**] the use of the artist's body as a medium, (as for instance, the photographs by *S.Sherman* exploring the theme of personal identify*)*, [**8**] and as a raw material in his work (as, for example, the video performances by *B.Nauman*), [**9** in **Figure 6.19b** and **Figure 6.21c**] the preoccupation with death (manifested in the video installations of *B.Viola*), [**4**] and the expression of the themes of anxiety, suffering and isolation through the works of postwar sculptors (like the elongated figures of *Giacometti* and the distorted creatures of *Richier*). [**7**]

Finally, the west suite '*History/Memory/Society*' [**B** in **Figure 6.19b** and **Figure 6.21d**] examined how artists responded to the historical events of the twentieth century and addressed themes of memory, from the display of soviet posters (room 27), [**13** in **Figure 6.19b** and **Figure 6.21e**] and the politically-committed works by left-wing artists, dating from the second world war (room 23), [**12** in **Figure 6.19b** and **Figure 6.21f**] to the sculptural installations of *Balka* and *Beys* that reflect personal war memories, [**11**] to *R.Horn's* upturned piano '*Concept for Anarchy*' (room 28) expressing a subversive gesture. [**10**]

However, if we look more closely at the display at the time of the field study, we note that its determining characteristic was the co-existence of multiple narratives rather than the thematic structure. [**Figure 6.22**] In effect, the display encompassed a variety of display typologies, ranging from the interpretative and speculative displays by groups of artists that brought together the historic and the contemporary, to displays which explored historical movements or periods. Interestingly, many displays (31.5%) were monographic, focusing on the oeuvre of a single artist (for example, *Beys* in room 22, Tate3) [**15** in **Figure 6.19a**] or on a single work (like C. Parker's '*Exploding Shed*' in room 7, Tate3). [**5**] A considerable number of galleries also explored historical movements or periods, presented as thematic units: the Surrealism, under the theme of '*Inner worlds*' (room 18, Tate3), [**12**] the Cubism, as '*The Myth of the Primitive*' (room 4, Tate5), [**3**] the Minimal art, as '*Autonomous object*' (room 12, Tate3). [**8**] This eventually left only a limited number of galleries (11%) juxtaposing works from



^ **FIGURE 6.21** Installation views of the collection at Tate5

^ **FIGURE 6.22** The display layout of the 3rd (a) and 5th floor (b) galleries at Tate Modern

very different eras, that is, works form the beginning of the twentieth century and works from its later part.

It is also of particular interest to note that, if we look comparatively at the apparently very different displays of Pompidou and Tate Modern, we find that they share in common typical juxtapositions of artists (such as *Braque-Matisse, Matisse-Picasso, Picasso-Giacometti, Bellmar-Giacometti, Mondrian-Van Doesburg, Pollock-Rothko-Smith* and *Fontana-Tapies-Manzoni*), and more interestingly, we encounter similar confrontations of artists from disparate periods that are not self-evident (as for instance, the juxtaposition of *Bacon, Fautrier, Giacometti*, under the theme '*Reality*', in Pompidou, [**21** in **Figure 6.15b**] and of *Richier, Bacon, Lam, Fautrier, Dubuffet,* under the theme '*Tranfiguration*', at Tate Modern). [**7** in **Figure 6.19b**] It should finally be noted that like Pompidou, Tate Modern mixed up all forms of modern visual arts, integrating in the itinerary 'black boxes' for media[34] and galleries devoted to photography, but did not include displays on architecture and design.

In the light of the above discussion, we can now move to explore how telling the story of art, in a canonical or in an atypical way, relates to the existing spatial qualities of the museums. How does the spatial design affect the presentation of the collection? Are specific spatial conditions required for a particular type of displays?

POMPIDOU: *Installing works 'like unfolding cards'*[35]

At Pompidou, the ordered and compartmentalized layout (especially of Pompidou5) suits the spatial unfolding of the narrative as an orderly series of movements and artists.[36] Each spatial unit brings together works which stand in close historical relationship to one another, and constitutes an episode in the history of modern art (as, for example, rooms 7- 9 exploring the evolution of *Cubism*). The constituent units can be independently accessed either from the main axis or the corridor-like galleries, suggesting that modern art is a composition of individual achievements, the product of the mutual influence between artists, movements and styles. For example, the two galleries, 12 and 13,

that face each other across the axis, are devoted to the *Russian Constructivism* and *Dada*, two movements engaged with the social and political realities of the First World War.

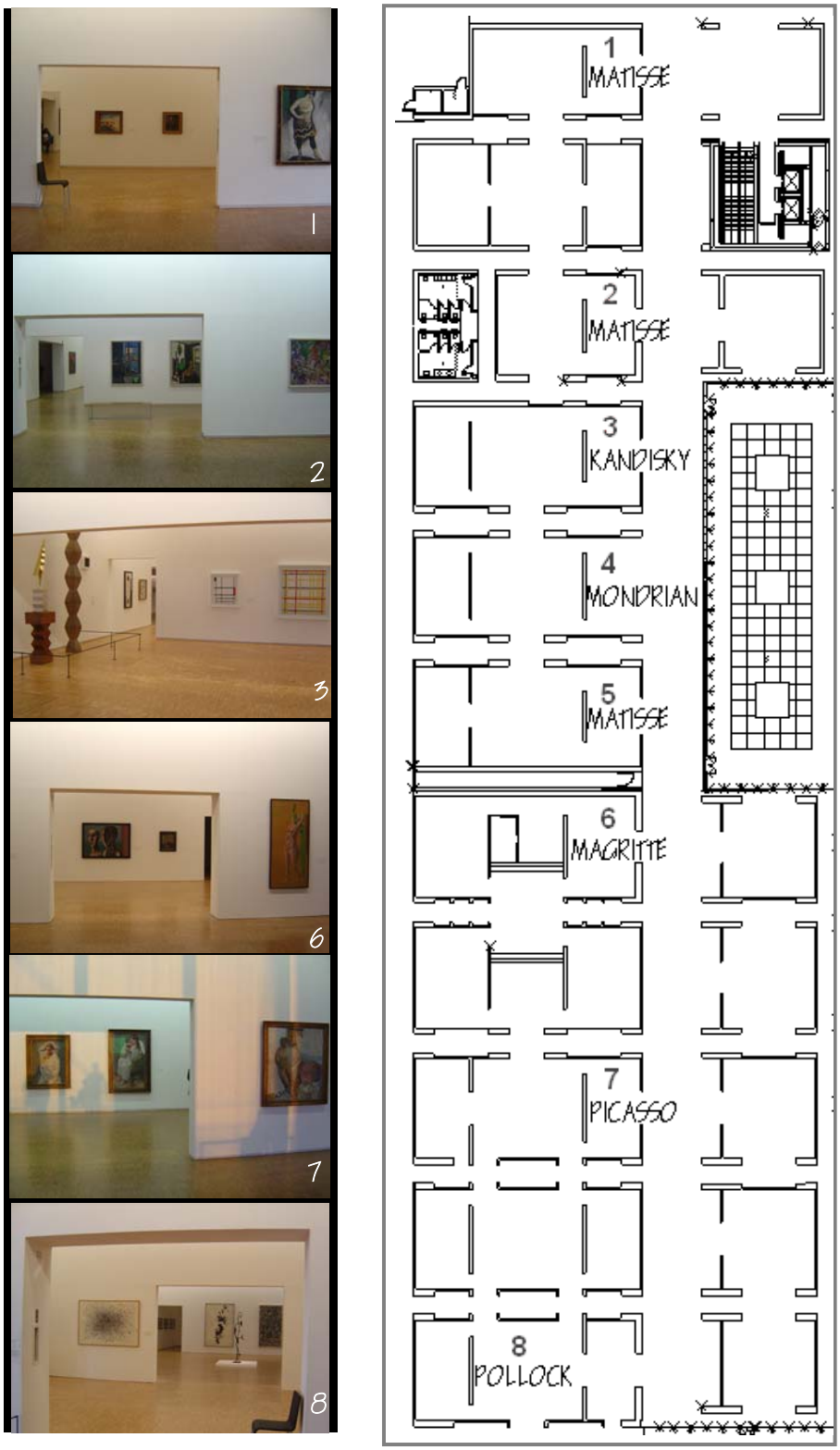
It is also worth noting that the installation of the collection recalls Barr's famous diagram outlining the genealogy of modern art (see chapter 2). It has already been suggested that the display opened with a gallery devoted to *Miro*, an artist considered by Barr as the most important figure of the surrealists, and a great influence on abstract artists. More significantly, the arrangement of the collection emphasized the supremacy of *Cubism*, *Surrealism* and *Abstract Expressionism* - the culminating point of modernism, according to Barr's chart. To these movements were dedicated the central, axially disposed, spaces which structured the main route and exerted control upon their adjacent spaces. Off the main route and in dead-end spaces was shown the work of single artists (i.e. *Delaunay*, *Leger*, *Rouault*). [**10,13,20** in **Figure 6.15b**] Thus a kind of symmetry was created in the layout between rooms devoted to individuals and those showing groups. Works by artists outside the main stream (i.e. *Reigl*) [**22**]were also presented in secluded spaces, while the left side complex galleries, which required a detour from the main route, were devoted to *Dada* and *Matisse* that acquire significance in relation to the above central movements.

It is clear that the defining feature of the display at Pompidou is that the arrangement of the collection consistently uses configurational properties of the layout and that a spatial decision is systematically related to objects positioning and categorization. Key works which attract visitors' attention are hang in the most accessible spaces -in the galleries open onto the central circulation space or those structuring the continuous interior axis-, placed in strategic locations, in relation to door openings, or on the axes of the viewer's passage, while the deepest and secluded spaces are devoted to monographic displays or parts of the collection of a more specialized interest. It seems not accidental that along the main axis, the walls are perforated to frame a pair of paintings by a single artist, key figure of the movement to which the display unit is devoted: [37] *Matisse* (rooms 4 and 13), *Kandisky*, (room 16), *Mondrian* (room 20), *Picasso* (room 24), *Magritte* (room 29) and *Pollock* (room 48). Thus, while giving special weight to

renowned works of major art-historical figures, the door opening of each unit makes clear the methodology of the display, -a uniform and ordered hanging. [**Figure 6.23**]

Furthermore, the axial dispositions of rooms are consistently used to enrich the views of objects. [**Figure 6.24**] The proliferation of openings allows looking at them from a variety of distances and angles of sight, but also and more importantly, structures visual links that are imbued with significance and invite exploration. The door opening linking rooms 8 and 9 is sufficiently open to allow a simultaneous view of Picasso's painting *Arlequin et femme au collier* in room 8 and sculptural works, shown in room 9. Similarly, the oblique view from room 20 through to room 26 involves the viewer in making visual connections between Magritte's painting '*The double secret*' and H. Bellmer's '*Doll*', both suggesting that the human image was submitted to metamorphosis by Surrealist artists. [**Figure 6.24b**]

It seems that looking at a specific object at Pompidou5, means discovering new relationships, perceiving simultaneously various surrounding visual realities that create a composite image. Positioned in the middle of room 48 is the sculpture by D. Smith '*Personage of August*', a work which cannot be taken in at a single glance, but affords specific individual images with each new angle (Walther 2005, p. 496). [**Figure 6.25**] The multiple entrances of the particular room structure a constantly changing field of relationships, according to the viewer's movement and changing positions; the sculpture can be viewed against the background of *Pollock*'s paintings and *Kertesz*' black and white photographs, on the east wall, [**Figure 6.25a**] *Soulage*'s monochrome black canvas, on the south wall, [**Figure 6.25c**] or *Newman*'s colour field canvas, on the west wall. [**Figure 6.25b**] A completely different image unfolds when the viewer looks diagonally from room 30, though the staggered alignment of openings, to room 48, which provides an opportunity for cross-reference with the tactile character of *Dubuffet*'s figures. [**Figure 6.25d**] This visual layering is a recurrent theme in the display. However, given the fact that the pattern of visual links is elaborate and not obvious upon first sight, the reading entails a process of exploration and discovery, inviting the viewer to shift positions and look around exploring relations. On the whole,



^ **FIGURE 6.23** The arrangement of the collection along the main axis of Pompidou 5

^ **FIGURE 6.24** Examples of axial disposition of rooms at Pompidou5

^ **FIGURE 6.25** Visual layering at Pompidou 5 (room 48)

the dense spatial arrangement of objects encourages comparative looking and ensemble, and tends to shift attention beyond the viewed object. Aesthetics reigns as a main tool for the arrangement. Objects are systematically organized so as to create harmonious compositions, and pictorial representations visually associated with sculptural forms.

There is no doubt that to the aesthetic experience of the museum in movement, contributes significantly the matrix of visual links analyzed above. We may think of it as reflecting the shift brought about by the post-cubist movements from the fixed perspective to the vision in relationships, from looking at an object from a single vantage point to viewing it from several angles of sight. But an alternative interpretation might also be proposed: the spatial design becomes a manifestation of the variety of modern art as much as its unity, and provides a means to weaken the boundaries between the well-defined groupings. Although objects are organized in an essentially chronological sequence, the connection network permits an arrangement that is neither prescriptive nor hermetic. Similarly, it allows progression to be non-linear, counteracting the inference that modern art evolved along a single path.

On these grounds, it can therefore be argued that the spatial arrangement of objects acquires a symbolic function, and becomes a visible display of the underlying conceptual scheme. This argument is also supported by the fact that the above design choices and display strategies are not adopted in the contemporary galleries, on the fourth floor. It seems that the absence of a clear articulation of movements and the blurring of groupings and clear links between contemporary artists do not allow a similar approach. Works are hung sparsely, rooms are in majority given over to monographic displays, and objects are more often perceived individually than in carefully considered relationships. The narrative is more subtle and the architecture supports it: galleries are conceived autonomously, sequences of spaces are restricted, and visual links are either absent or devoid of meaning.

TATE MODERN: *a paradox between sequencing and fluid display*

Instead of this critical distinction in the display of modern and contemporary art, Tate Modern proposes a homogeneous layout and an 'anti-narrative' structure. We have already seen that in contrast to the art-historical narrative of Pompidou, Tate consists of discrete display units, loosely linked by a thematic thread. It is of particular interest to note that the four-fold display structure evolved partly as a response to the 'problem' of four relatively distinct architectural units, developed in advance of curatorial thinking (F. Morris, personal communication, July 9, 2003). We recall that a key requirement was to create manageable units; so by taking each suite as distinct unit, the visitor is given the possibility to see in a single and complete visit works that span the century, and eventually see '*the full display over a longer period of time*' (Tate Gallery 1994, p. 3).

As already noted, both floor plans consist of autotelic rooms, intended to be experienced individually and not in series: each gallery is conceived autonomously and is devoted to a single subject. It is the very absence of a '*plot*' (Cobley 2004, p.5) in the narrative that allows a flexible viewing order and availability of multiple entry points that does not affect the reading of the whole. Some galleries are loosely tied to the room before and the one after, as for instance, the monographic display of *Cy Twombly* (room 20) [**14** in **Figure 6.19a**] suggests seeing his work in relation to his antecedents in Europe (i.e. Surrealists in rooms 18) [**12**] and America (i.e. Rothko in room 19). [**13**] But in general each suite does not embrace displays that provide information continuity nor is the relationship between individual rooms strictly articulated.

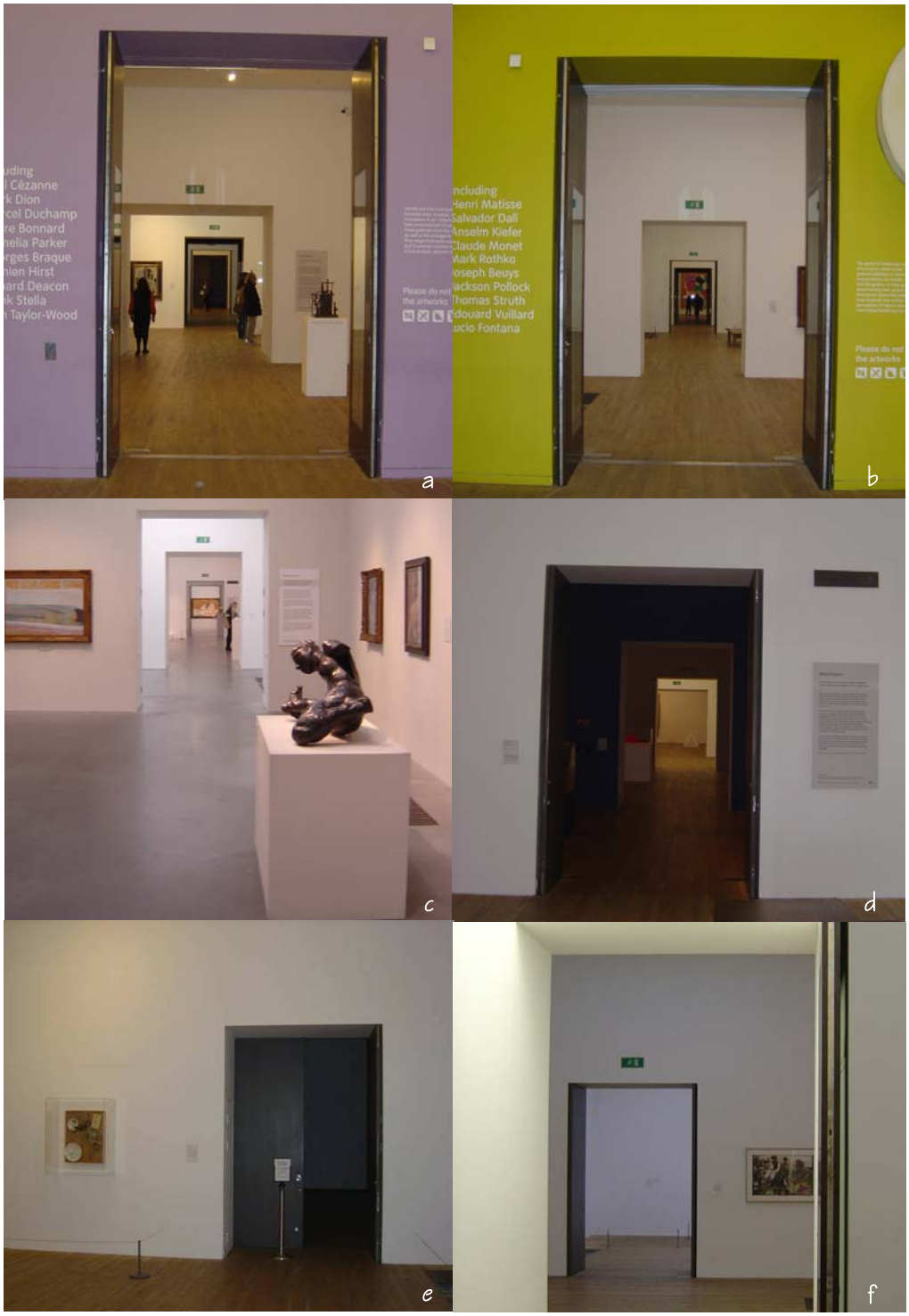
The absence of a single overriding imperative in the spatial arrangement of the collection seems to be the underlying idea of the Tate display (F. Morris, personal communication, July 9, 2003). This absence of a systematic approach is also reflected in the relation between the spatial qualities of the building and the layout of objects in space. It is intriguing to find that, though characterized by similar to Pompidou properties, Tate does not systematically use them in the presentation of the collection. The powerful axiality, a key spatial property of the layout that contributes to the clarity of the plan, does not appear to enhance the impact of

objects or add to the narrative. Major lines do not end by striking objects, but tend to be end-stopped by blank walls or dark spaces, as for example, in the case of *Parker*'s installation, the east end point of the strong axis that runs through the length of the building, on Level 3. [**5** in **Figure 6.19a** and **Figure 6.26a, e**] In two cases a key painting is placed on the main axis: Matisse's *Snail*, on level 3, [**16** in **Figure 6.19a** and **Figure 6.26b**] and Picasso's *Nude Woman with Necklace* on Level 5. [**6** in **Figure 6.19b** and **Figure 6.26c**] However, it could be observed that this positioning fulfills an instrumental, rather than aesthetic, function, that is, to anchor the vista from afar and offer a dramatic pull to visitors entering the suite. [**Figure 6.26d**]

Similarly, the technique of vistas and overlapping visual fields is also rejected as a consistent organizing principle of the display. Dialogues between individual works, opportunities for contrasts or links, tend to be restricted within the single gallery and are immediately revealed to the viewer. An illustrative and familiar example is the juxtaposition of two 'garden paintings', Monet's *Water-Lillies* and P. Heron's *Azalea Garden: May 1959.* The conceptual reason for the pairing is that both artists focus attention on the surface of the canvas and approach it as an environment on its own. [**17** in **Figure 6.19a** and **Figure 6.27a**]

Limited are the cases where the disposition of displays encourages oblique visual connections between objects located in neighbouring rooms, as for example, in the case of the large photographic work by *C. Horsfield* (room 2): it was deliberately placed in a small gallery to enhance the audience's reading of its frieze-like aspect, and allow a visual association with the reclining nude in *Bonnard's* painting in the preceding gallery (room 1). [**2** and **1** in **Figure 6.19b** and **Figure 6.27b**]

In contrast to the dense hang of Pompidou, at Tate Modern works are presented in spacious arrangements and the viewer is dealing mainly with blank walls rather than an elaborate pattern of visual links. [**Figure 6.26f** and **6.28**] It seems that the aim is to show individual works and favor the appreciation of single, autonomous objects, rather than encouraging comparative attention. Besides, the proposed connections between objects do not necessarily rely on eloquent visual associations or stylistic similarities. On the contrary, conceptual links take



^ **FIGURE 6.26** Relation of spatial qualities of the building and the layout of objects in space at Tate3

^ **FIGURE 6.27** Dialogues between individual works within a gallery (a) and across galleries (b) at Tate3

^ **FIGURE 6.28** Presentation of works in spacious arrangements at Tate Modern

precedence over formal, which often leads to comparative readings that are intellectually challenging but, at the same time, generate visual discontinuities and fragmentary impressions. For example, in room 10 (‘*Memento Mori’*) at Tate3, [**7** in **Figure 6.19a**] the monochromatic painting by Picasso *Goat’s Skull, Bottle and Candle* (1952) and D. Hirst’s installation *Forms without life* (a glass cabinet with a collection of ornate shells as emblem of mortality, 1991) share the concept of Vanity. [**Figure 6.29a**] Similarly, a satirical painting by G. Grosz (*Suicide*, 1916), the motif of a woman in tears in the paining of Picasso (*Weeping woman*, 1937), and a wall-mounted sculpture based on an image taken from comic books by P. Lichtenstein (*Wall Explosion II,* 1965), shown in room 29 at Tate5, are closely related conceptually -they all constitute an implicit criticism of war-[38] but create a visual composition not easily read. [**14** in **Figure 6.19b**]

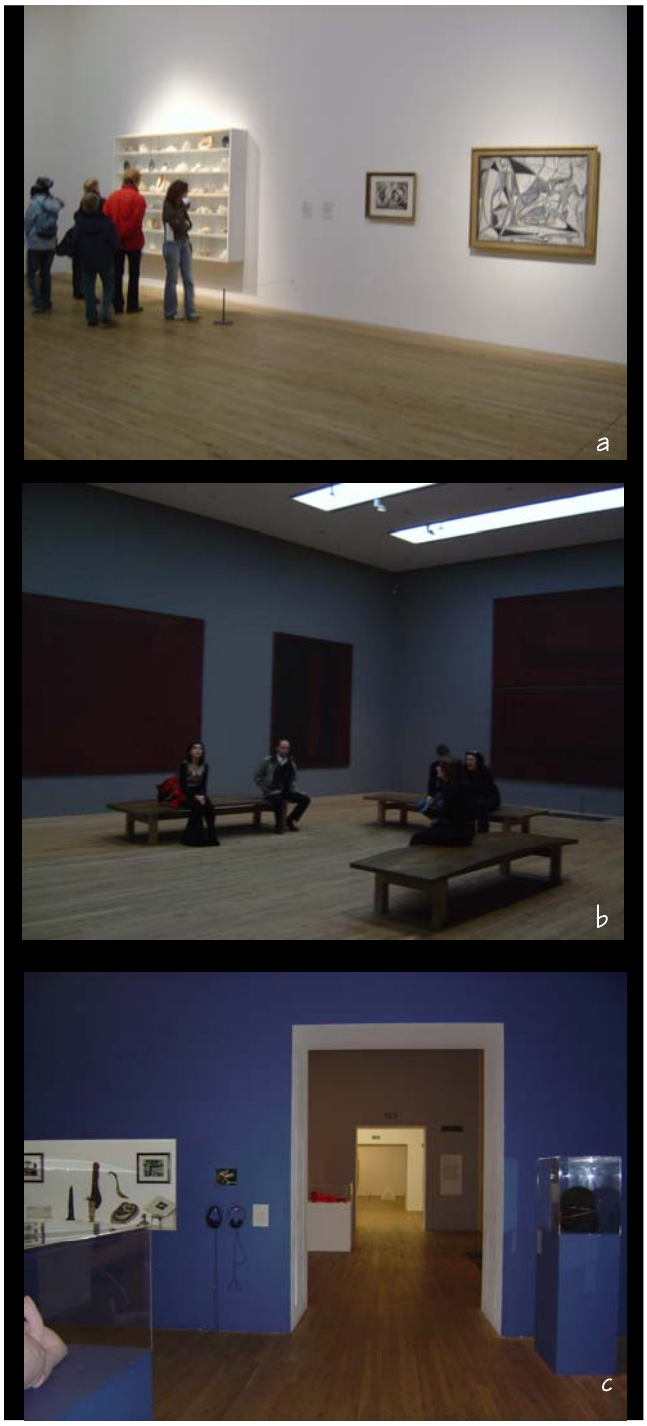
On the whole, the fluid display is accompanied with the heterogeneity that characterizes the treatment of space and the distribution of objects. Enfilades of galleries following the white cube tradition alternate with intensively coloured spaces, and rooms that work as an entity -like the Rothko room- [**13** in **Figure 6.19a** and **Figure 6.29b**] with displays where we have to do with single, disparate objects -as for instance in the case of ‘*Subversive Objects’* (room 9), a display of small things deliberately closely laid out in small, claustrophobic space. [**6** in **Figure 6.19a** and **Figure 6.29c**]

But if we accept that the relation between space and display is mainly based on mutual autonomy, then there seems to be a paradox between spatial design and display structure. How can we interpret, for instance, the relation between linear progression and non-linear view of art? Information is not arranged in sequence, yet the sequence is largely dictated by the layout; the narrative lacks the ‘*unfolding of a master plot*’ (Krauss 1996, p.343) and the viewing order can sometimes seem haphazard, yet the ‘*beads-on-a-chain*’ sequence implies continuity and consequence. According to a possible interpretation, the configuration of space creates a non-hierarchical structure which can support the elimination of hierarchies between modern and contemporary art, the collapse of the distinction between senior figures and a younger generation of artists, as intended by curators. But an alternative, more

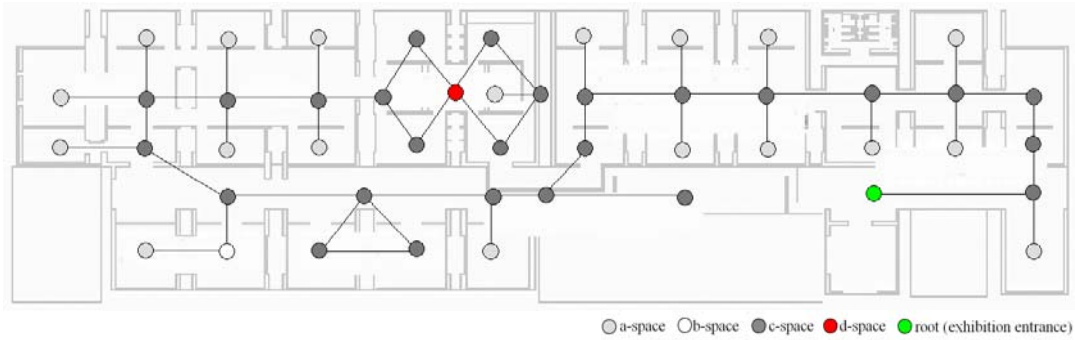
plausible, interpretation would emphasize the fact that strong space rules are required to express the conceptual organization of the collection, as envisaged by the curator. Let us explain this point further. It has been suggested above that at Tate the spatial organization of objects is based on conceptual, rather than visual, links. This means that, in contrast to Pompidou5 where the arrangement is based on an 'objective', established, way of telling the story of art, at Tate it derives from a subjective organization of objects. It is based on concepts and juxtapositions set up by the curator, which means that there is high originality and low *redundancy* in the intended message (see chapter 4). The spatial structure is therefore required to ensure that the proposed links between works are read as planned: displays are kept apart, visual connections between galleries restricted, and space, not allowed to add new relations between works.

To clarify, and perhaps lend support to this argument, we propose to digress for a moment and return to the display of Pompidou, and more specifically to the re-hang of the collection in June 2005-February 2006 (Big Bang 2005). Ahead of the opening of the refurbished galleries, it was decided to present the permanent collection in an ahistorical arrangement, structured as a set of conceptual themes (i.e. '*destruction*', '*disfiguration*', '*war*'), which would contribute to the development of the argument implied by the title of the exhibition '*Big Bang*': that the artists of the twentieth century have led to the emergence of new artistic forms and innovative approaches by questioning and subverting the established ideas and values.[39]

It is intriguing to find that that the changes in the display principles led to radical changes in the spatial layout. [**Figure 6.30**] The key feature of fifth floor plan, the dominant main axis, was fragmented and divided both vertically and horizontally. Moreover, it was devoid of its organizing function and in contrast, handled as an additional gallery space. The dense network of views and system of permeabilities were considerably restricted, and the choice of galleries, or routes to a gallery, eliminated. The visitor was rigidly constrained to a particular viewing sequence. This example raises most clearly, we believe, the key question whether the conceptual originality of the message, and the high degree of conceptual intervention by the curator, tend to be associated with a spatial design where



^ **FIGURE 6.29** Heterogeneity of the display layout at Tate3



^ **FIGURE 6.30** The space type analysis of the *'Big Bang'* exhibition layout at Pompidou5

everything is programmed, so as to structure the interface between objects and viewers that must occur. Of course, two case studies do not allow general theoretical conclusions; nevertheless, they provide some important insights that will be fully discussed in the final section and will help us formulate theoretical questions for future investigation.

Looking back at our case studies, it could be argued that in terns of morphology of display, the two museums lie at two different possibilities: at Pompidou5 the organizing principles are familiar, and the proposed groupings, likely to be familiar to the viewer. At Tate, the modes of grouping are not a priori known and the juxtapositions, unexpected. Moreover, while in the case of the latter, the spatial layout is used to *present* a new account of aesthetics, in the case of the former, it is used to *re-present* a specific view of art.

6.4 Morphology of movement and exploration

This section will now shift the attention to the movement and space use patterns, proposed here as another layer of 'reality' that can be interpreted and more importantly, that can enhance our understanding of key aspects of the museums' spatial and display strategies. Does, for example, the provision of movement choices at Pompidou5 generate differentiation in visitors' itineraries? Can we detect any effects of the presentation of the collection on patterns of display exploration at Tate?

POMPIDOU

Before discussing in detail the movement pattern of visitors at Pompidou, it would be of interest to look at the data that concern the use of the two levels and provide the framework of our argument. Tracking 50 people through the galleries during their whole visit showed that the majority gets to both floors (74%) and begins by exploring the contemporary galleries on the fourth floor before ascending to the modern galleries on the fifth.[40] This means that 16 % get first to the upper floor starting their itinerary chronologically from the historical collection.[41] Also, 12% of people observed skip the fourth floor, and 14% the fifth. [42] This absence of

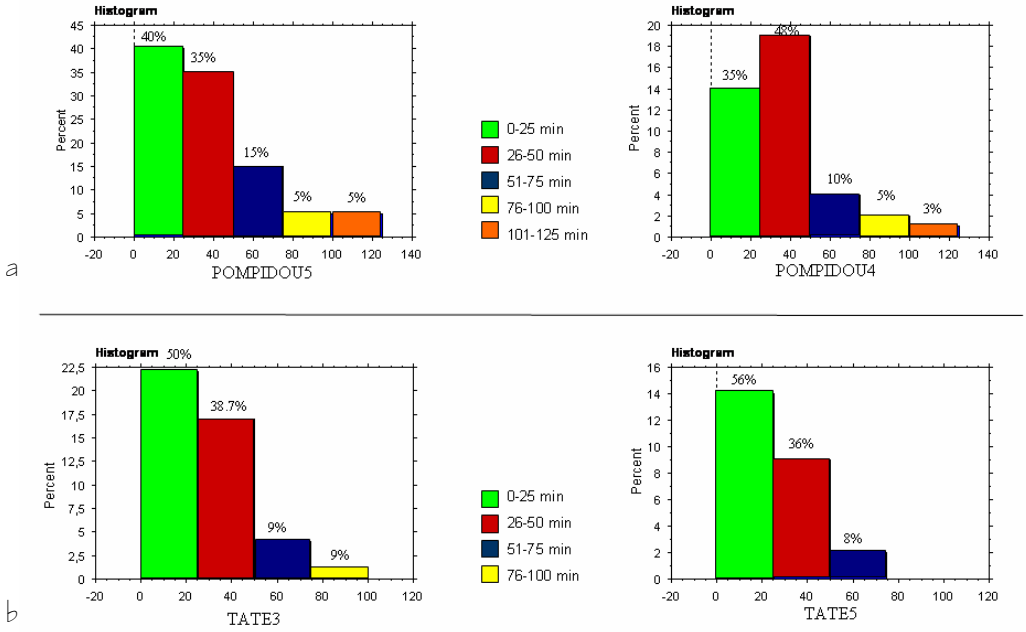
outstanding differences between the two floors is also reflected in the average time spent: 34.1 minutes at Pompidou4, and 37 minutes at Pompidou5, though about one-quarter of visitors observed (that is, 27.5% at Pompidou 4 and 24.3% at Pompidou5) stay longer that this (up to 110 min). [See **Figure 6.31a**, **Table 4.7**]

The pattern of movement and space use in the fifth floor galleries

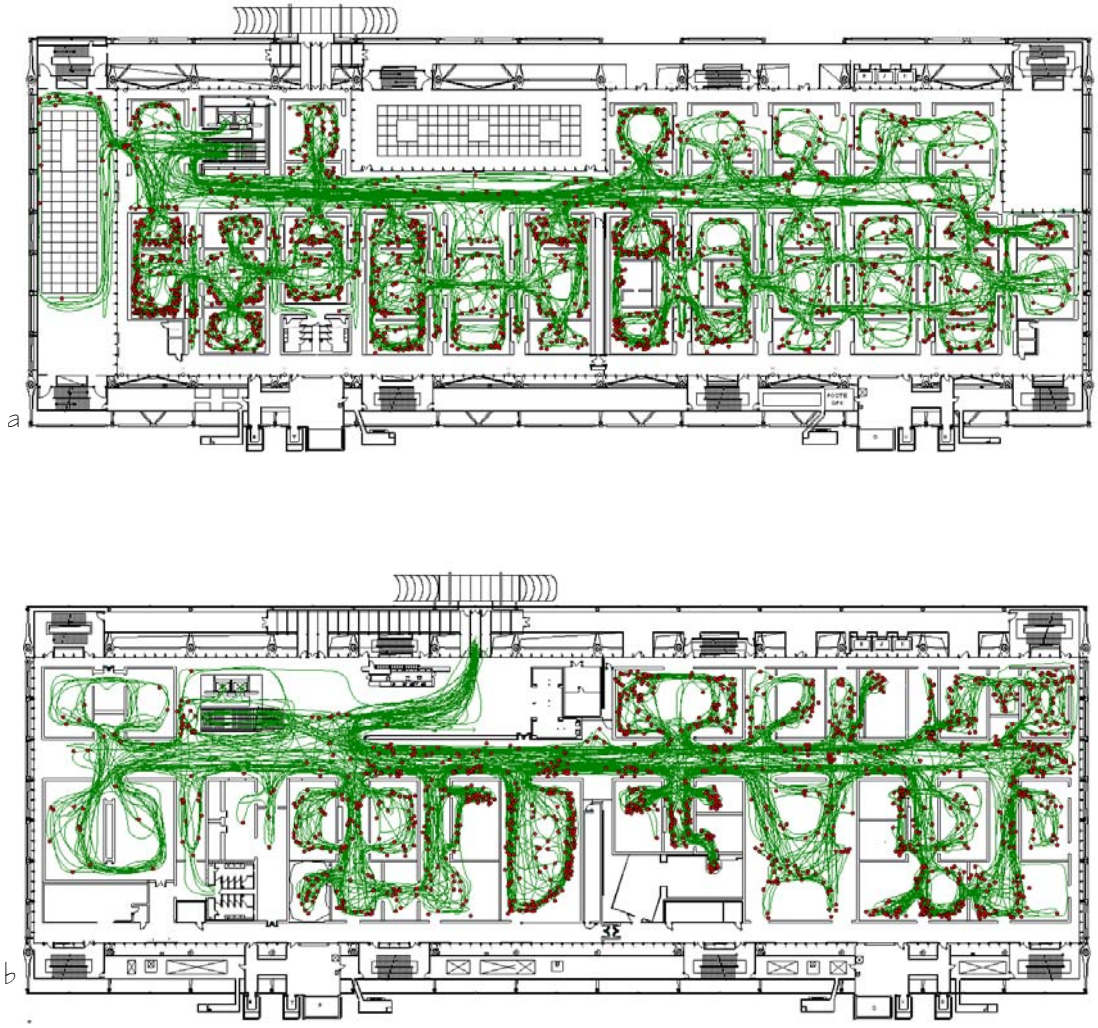
Because the galleries of modern art are our prime focus of concern, we will begin by considering the fifth floor tracking data. It is surprising to find that the visitors tracked have each followed a different path, taking advantage of the dense network of connections and exploring the variety of possible combinations. However, behind the heterogeneity of visitors' itineraries, a clear pattern can be identified. [**Figure 6.32a** and **6.33a**] Upon arriving,[43] 74.4% start their exploration from the room 2, opposite the entrance. [**Figure 6.34a**] They get to the first complex of spaces (rooms 4-14) and when they find themselves at the end of the interior path (room 15 in **Figure 6.34a**), they return to the axis, and either visit (50%) the gallery on the opposite side (room 12) or re-enter the right complex through room 16 (37.5%). Some continue down the axis and when they reach at the level of room 40, they get to the right side. The majority (76.9%) leave the left complex, through room 47, and find their way out through the main axis. Half of the visitors observed omit the right complex and just browse around the galleries, as they make the way back to the starting point.

On the whole, half of people tracked skip half of the galleries.[44] Of the omitted galleries, one-fourth is located in the first (south) part of the itinerary and the rest, in the second (north) part. Furthermore, the tracking data brought also to light the key role of the corridor-like spaces in structuring the pattern of movement. Especially in the second part of the itinerary, almost one-quarter of visitors seem to prefer to enter the central galleries through the small corridors, rather than the external galleries open on to the axis.

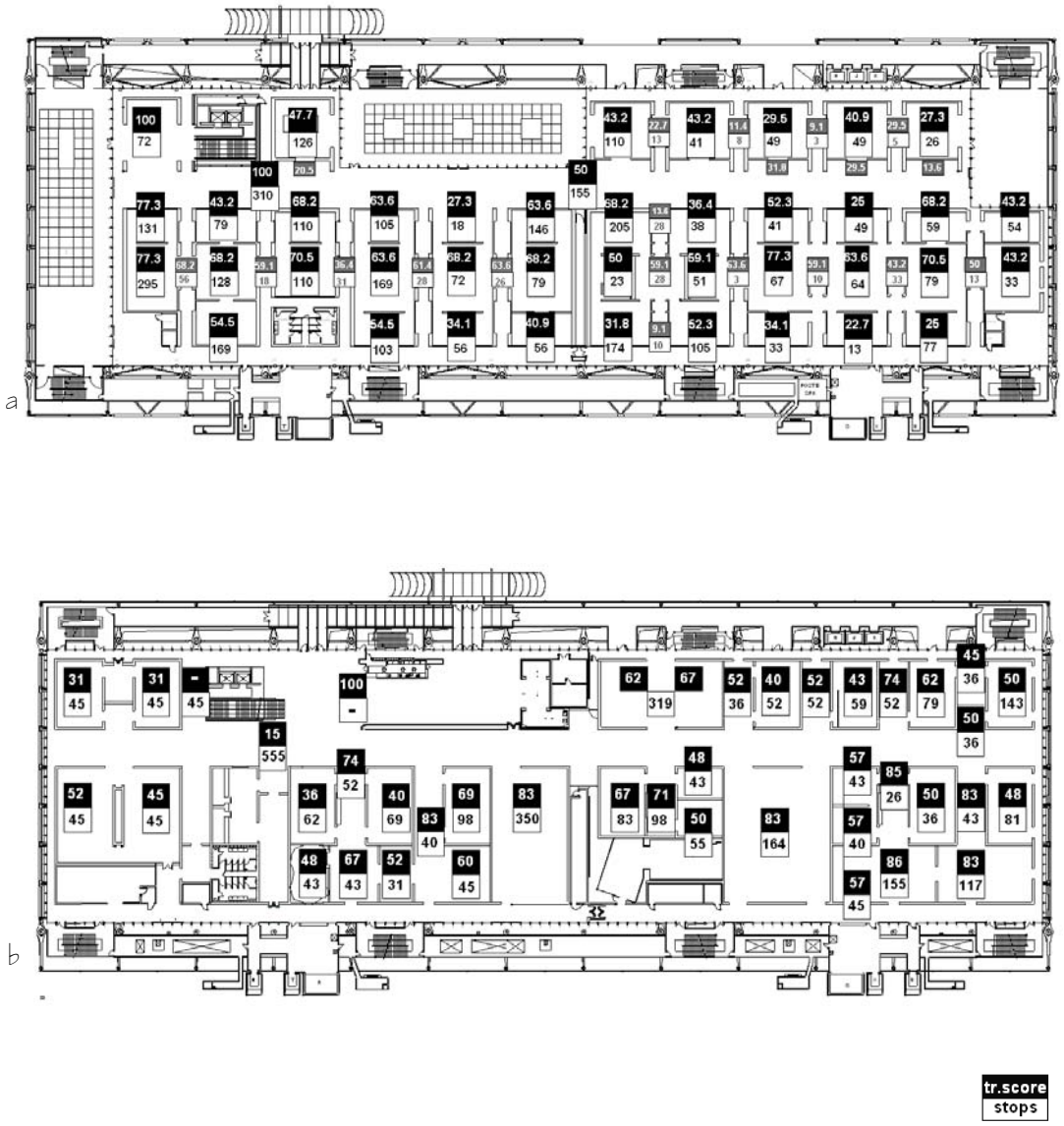
The more detailed movement study comes to confirm these observations. It seems normal to find that the central axis (space 3), where all the diverging paths necessarily converge, and the first space (room 2) attract the highest movement.



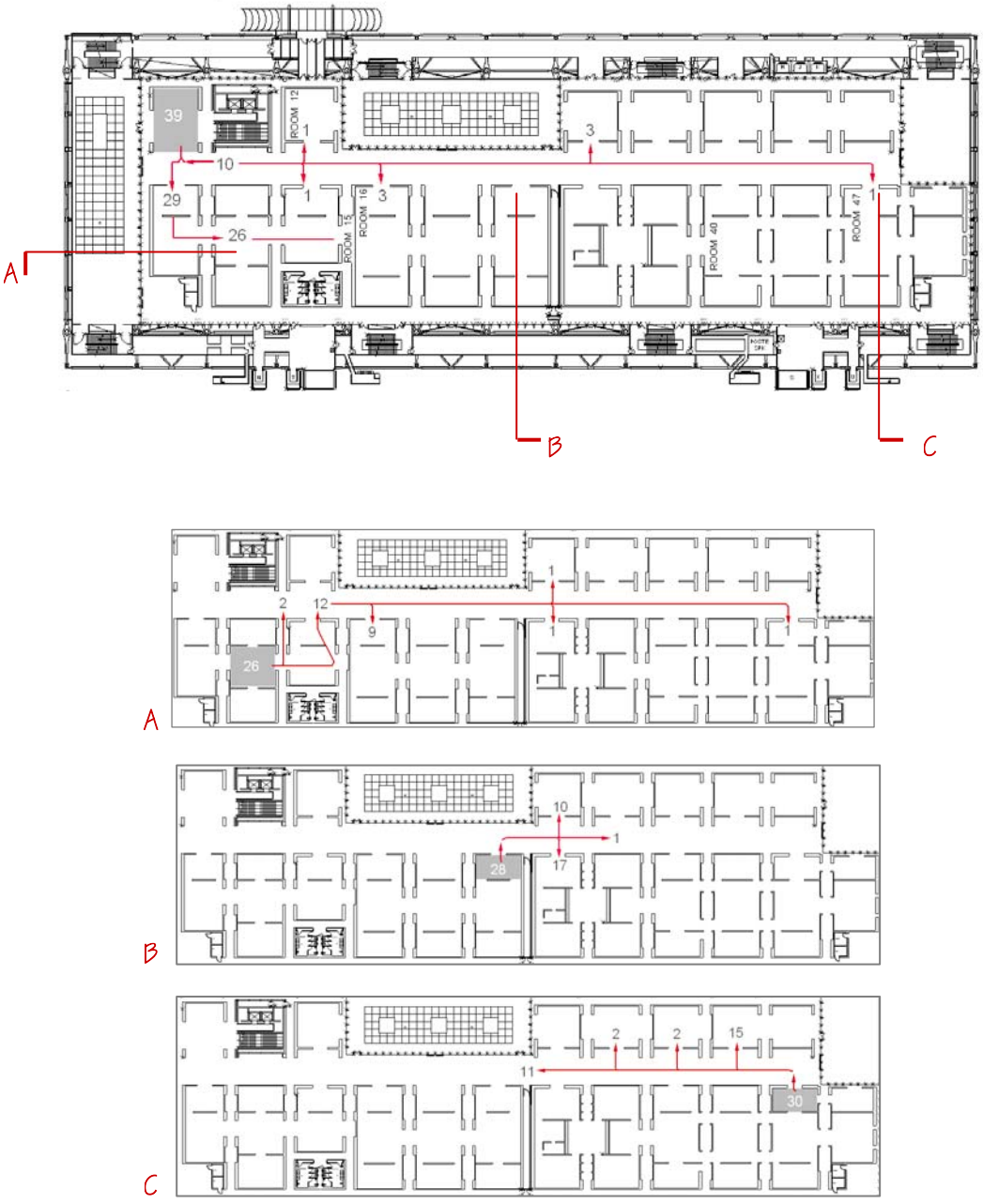
^ **FIGURE 6.31** Diagrams showing the time spent by visitors observed at Pompidou (a) and Tate Modern (b)



^ **FIGURE 6.32** The routes and stopping points of visitors observed at Pompidou5 (a) and Pompidou4 (b)



^ **FIGURE 6.33** The mean tracking score and the average number of stops made at Pompidou5(a) and Pompidou4 (b)



a

^ **FIGURE 6.34** The directional splits of where visitors observed are moving to during their visit to Pompidou5 (a) and Pompidou4 (b)

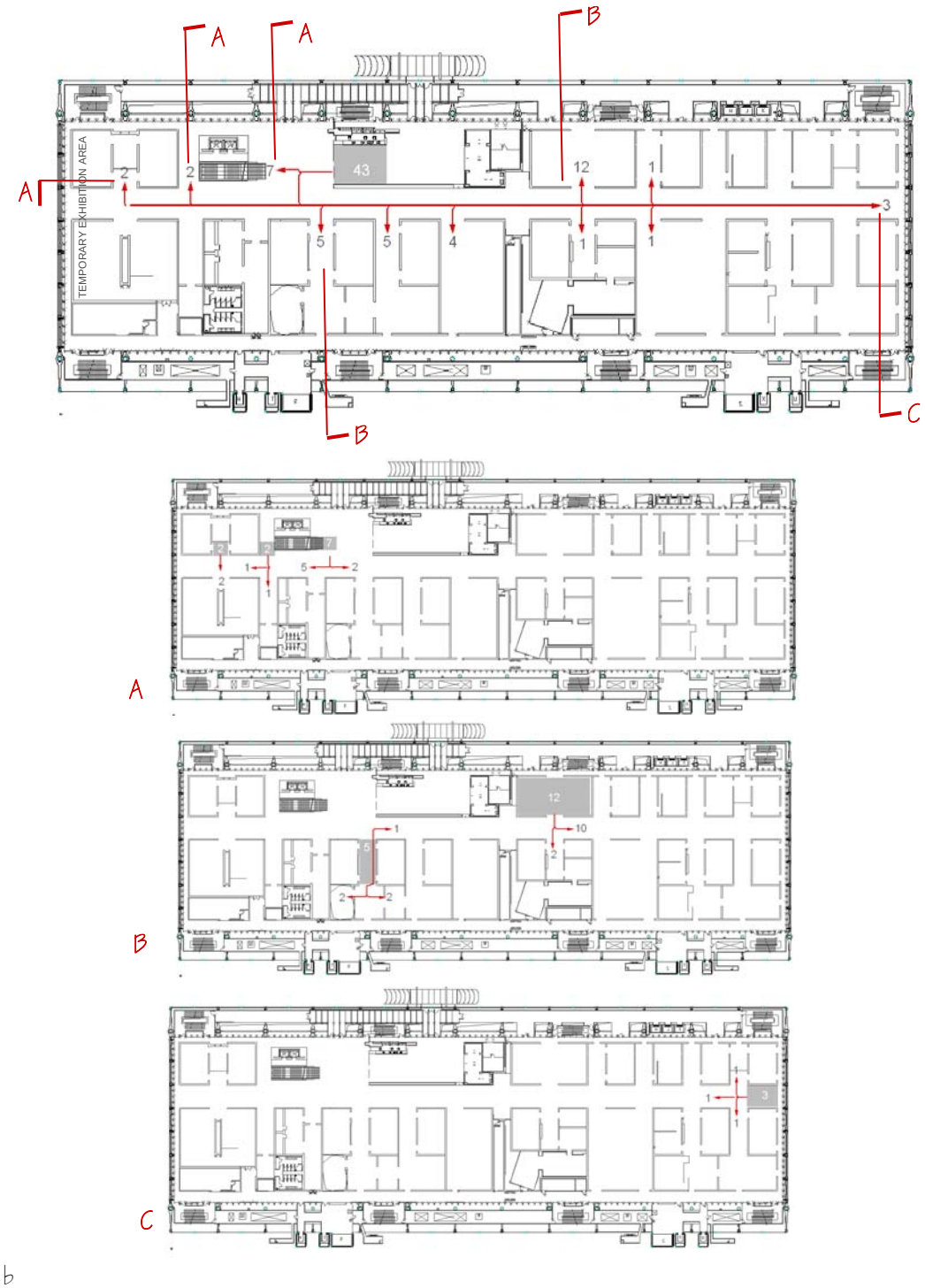


FIGURE 6.34 continued

Looking at the rates in **Figure 6.35a**, it is obvious that the higher rates are found in the right complex, while the left has consistently rates lower than the average (3.4 per minute). Among the most densely used left side galleries are the central spaces which structure the first and the last part of the internal circulation path, that is, rooms 8, 14, 17, 21 and 48. In between movement rates fall off. It seems that the arrangement of space that hinders a continuous path critically affects the pattern of movement.

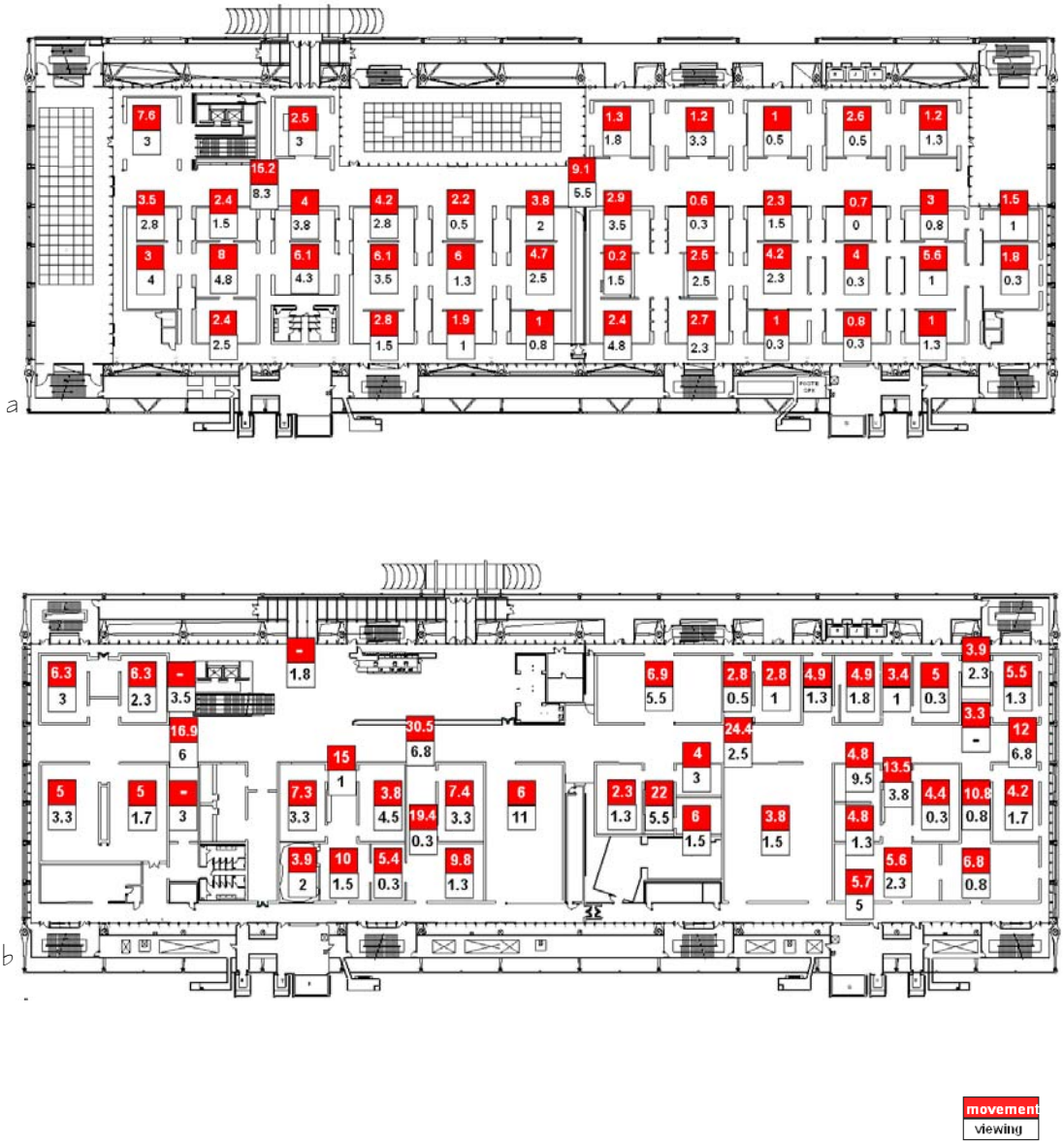
A second key observation follows from this. The spaces with low movement are consistently located at the end of the sequence or in the deepest spaces of the gallery that are visually segregated and not directly accessible from the main axis (rooms 30, 35, 41, 43 and 45). This points to an association between the movement pattern and the structure of the museum grid itself. In effect, a positive relation is found when we correlate movement both against *global integration* (R^2=351, p= <.0001),[45] and against the *reciprocal of depth multiplied by convaxial connectivity* (R^2=.368, p= <.0001), which shows that movement densities fall off with depth into the gallery (the higher the depth the lower its reciprocal) but rise with convaxial connectivity. [See **Table 6.1**and **Figure 6.36**]

	global integration	convaxial connectivity-depth(entrance)	local integration	convaxial connectivity
Pompidou4	.383*	.493*	.455*	.365*
Pompidou5	.351*	.368*	.338*	.327*

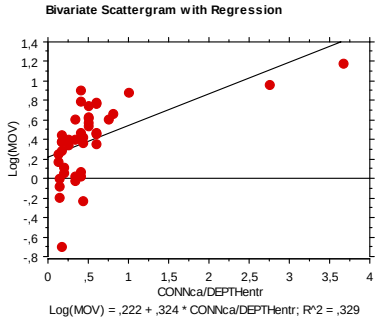
* *probability of error less than 1%*

^ **TABLE 6.1** Correlations between Log(movement) and spatial variables at Pompidou

Coming to the viewing pattern, [**Figure 6.38a** and **6.36a**] it is of particular interest to note that the main axis has not only the highest movement but also the highest viewing rates: visitors moving down the axis tend to stand to view the paintings hung on the walls and the sculptures placed along the route. There are two factors which may help explain the observed pattern. First, as it has already been noted, the display along the axis is an integral part of the whole; second, the ample cross visibility between axis and external galleries affords views into the adjacent rooms. Aside from the axis, the highest levels of viewing exhibits are found in the

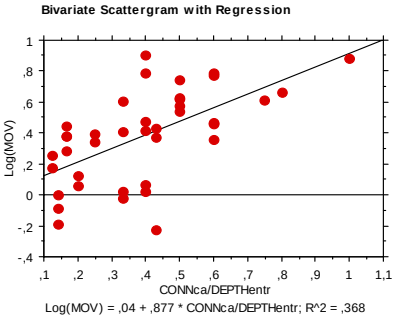


^ **FIGURE 6.35** The per minute movement rates and per snapshot viewing rates at Pompidou5 (a) and Pompidou4 (b)

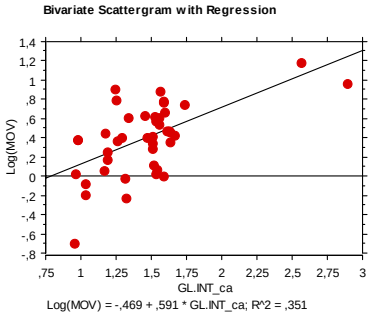


a

p = <.0001 [all spaces included]

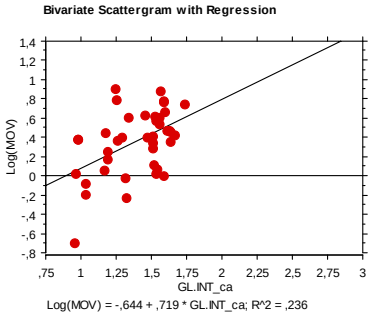


p = <.0001 [excl. the axis and R.30]



b

p=<.0001 [all spaces included]



p = <.0015 [excl. the axis]

^ **FIGURE 6.36** Scattergrams plotting movement rates at Pompidou5 against:
(a) the reciprocal of depth multiplied by convaxial connectivity and (b) global integration

right complex, and more specifically, in the first three central spaces (rooms 5, 8 and 14), dedicated to key artistic movements (*Cubism*, *Russian Constructivism*, and *Bauhaus*) as well as in the '*Breton room*' (space 31). The latter, being characterized by a discrepancy between viewing and movement, merits particular attention. Though a dead-end space, this dark gallery with spot-lit works seems to attract visitors' attention by offering a different spatial experience, and by featuring highlights of the collection.[46] Once again the complex of spaces on the left side of the main axis is much less well occupied. It is of interest to note, however, that in this side the higher rates are found in room 12, showing works by *Duchamp* and *Man Ray*, and in room 62, dedicated to *Matisse*, a finding that may suggest that architecture and design do not seem to constitute special attractors for those who visit the fifth floor galleries.[47] As for the lowest viewing rates, they are found in rooms 35, 41, and 45, all segregated, dead-end rooms, dedicated to the work of less well-known artists.

The first critical conclusion to be drawn from these results is that the spatial structure seems to affect not only the movement but also the viewing pattern. This is confirmed by the powerful relation between viewing and the *reciprocal of depth multiplied by connectivity* (R^2= .517, p= <.0001). It is evident that there is a statistically significant relation between movement and viewing (R^2= .559, p= <.0001). On the other hand, it is clear that the spaces with high viewing are those with the key attractors, an observation supported by the number of stops per space, which tell the same story (the correlation between viewing rates and stops is .634, p= <.0001, see **Table 4.6**). These two effects that occur in parallel seem to reflect most clearly the key curatorial strategy, to place the highlights of the collection in striking positions, in the most accessible spaces of the layout, which tend to have more movement than others. It seems that we have to do here with the *multiplier effect* (Hillier 1996, p. 169) which comes from the exhibits on space: taking advantage of the through movement, curators place the key works in these galleries, which means attracting in turn more viewers, and rendering these spaces the most intensively used galleries of the layout.

It could therefore be argued that two are the critical features of the Pompidou5 visiting pattern: first, that it operates in accordance with the curatorial intent, and

second, that it seems to be a function of the spatial layout. This brings us back to our initial observation in respect to visitors' pattern of exploration: that despite the heterogeneity of their itineraries, there is a strong tendency for visitors to get to the 'pre-determined' key spaces that structure the main route, and at the same time show the centrepieces of the collection. On the contrary, it was shown that they tend to omit the more segregated spaces and by pass galleries showing less-well known artists, which suggests a kind of *correspondence* model between space and exhibits -an argument further developed in the final chapter.

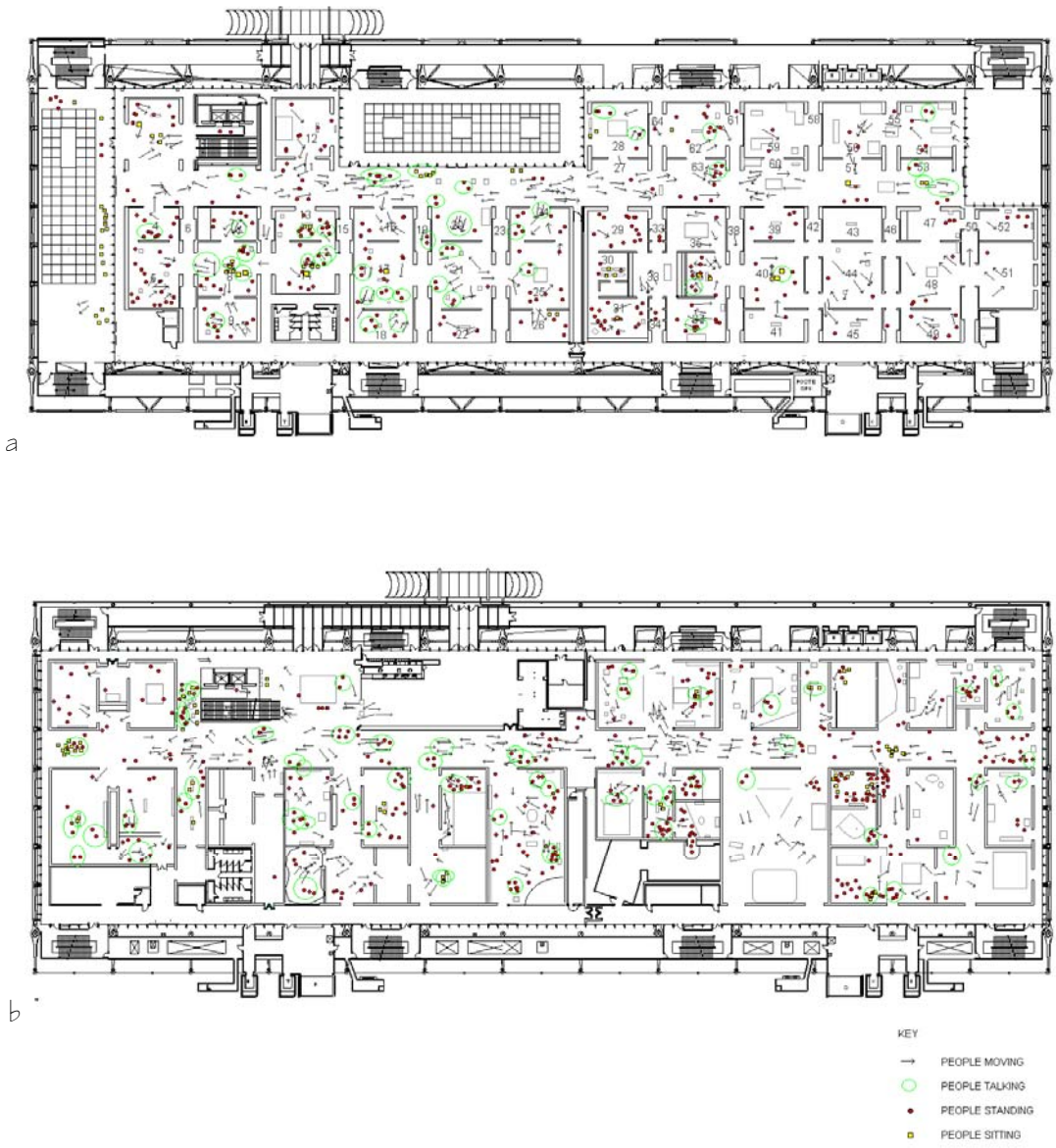
A final point can be made in reference to the encounter rates (that is, the number of people recorded on the plan as being either moving or static, obtained by taking '*mental snapshots*' of spaces[48]). It is to be expected that the main space for interaction is the central circulation space, which creates an '*interface*' (Hillier 1996, p.158) between those moving 'outside', along the axis, and those inside the galleries: the mean encounter rate is about five times as high as that of the galleries. Although the layout -a mix of *c*- and *d-spaces* (**Table 4.3**)- provides scope for exploration and enhances the opportunities for local encounters between visitors, much less is happening in the galleries and, as indicated earlier, the movement pattern falls off as one moves deeper into the building. This polarity is illustrated in **Figure 6.37a** and tabulated in **Table 6.2**.

	avg. mov./ TOTAL	avg.mov / AXIS	avg. movement/ GALLERIES	avg. viewing/ TOTAL	avg. viewing/ AXIS	avg. viewing/ GALLERIES	avg. encounter density/ TOTAL	avg. encounter density/AXIS	avg. encounter density/GALL.
Pompidou4	7.8	20.9	2.5	2.8	5.5	6.6	4.6	14.1	3.7
Pompidou5	3.4	12.1	2.9	2.2	6.9	2.0	4.4	17.5	3.7

^ **TABLE 6.2** Space use variables at Pompidou

The pattern of movement and space use in the fourth floor galleries

Let us now turn our attention to the fourth floor tracking data, which in comparison to the fifth floor, are marked by a tendency for greater homogeneity.



^ **FIGURE 6.37** The pattern of space use and interaction at Pompidou5 (a) and Pompidou4 (b)

[**Figure 6.32b** and **6.33b**] This is not to say of course that there is no diversity in the viewing order of the individual galleries, as shown in **Figure 6.34b**. But unlike the fifth floor visitors, those of the fourth floor tend to explore the gallery in its entirety and not to omit the deepest or the northernmost rooms at the end of the sequence. One reason for this maybe that the right complex is shallow (in respect to the main axis), the general direction of movement more pronounced, and the whole route, much simpler.

Among the most interesting observations made in respect to the observed paths, we could note that, upon entering, most visitors (89%) turn right,[49] and only 11% turn to the temporary exhibition area (rooms 5-8 and 9-11); the majority either omit this part or go to these rooms at the end of the itinerary. it is worth noting that 8.3% of visitors get first to the end of the axis, and then continue with the exploration of the west complex; once back to the starting point, they proceed to the east side.

As already indicated by the tracking data, at Pompidou4 we find no great differences in respect to movement between the spaces located at the beginning and the end of the axis, or between the east and the west complex. [**Figure 6.35b**] One reason for this might be the fact that many visitors do not seem to explore the deeper or the right side galleries at the end of their itinerary, as it was observed at Pompidou5. For example, spaces 50-52 constitute the starting point of their exploration for one-quarter (33.3%) of visitors tracked. But the main reason for this pattern lies in the comparatively much strongly sequenced layout of Pompidou4 (cf. *c-sequenceTotal* and *c-sequenceMean* in **Table 4.3**). The spaces that get the higher movement are the corridor-like galleries 23, 16 and 26 - equivalent to the central galleries at Pompidou5 in that they allow a more or less continuous path. But the most fundamental similarity between the two floors is the effects of space on movement. Interestingly, at Pompidou4 the degree to which spaces are used for movement is to a large extent a function of their configurational position, as shown by the correlation between movement rates and spatial variables (see **Table 6.1**), as for instance, *global integration* (R^2=.383), and the *reciprocal of depth multiplied by convaxial connectivity* (R^2=.493) -in both cases, the probability of error is less than 1%.

A critical contrast can be drawn between the two floors in terms of viewing. [**Figure 6.35**] At Pompidou4 neither the correlation between viewing and spatial variables (see **Table 4.8**) nor between viewing and movement (see **Table 4.6**) are statistically significant. With the exception of the central axis, which has the highest numbers in general, spaces with high viewing can have low movement, as for instance the 'video lounge' (room 33) and spaces with low viewing (spaces 23 and 16) can be found in the high movement areas. Among the most viewed spaces, we should note the lofty and densely arranged rooms 25 and 51, dedicated to the *Fluxus* movement and to the *French architecture of the period 1965-1975* respectively. This does not mean that the size of spaces determines viewing numbers, as shown by their poor correlation (R^2=.114, p=.0250). It seems, however, that displays dedicated to the collections of architecture (as, for instance, space 51) constitute one of the attractors of the contemporary galleries, as opposed to the modern art galleries (see above).

Looking comparatively at the two floors, three final comments are in order. First, as it has been widely established by visitors' studies in museums,[50] the average movement at the lower level tends to be higher than in the upper level; here the difference between the two floors is by 57% (see **Table 4.5**). Second, in both cases the dominant type of visitor is the '*object-driven*' visitor (74.4% at Pompidou4, 62.2% at Pompidou5). And third, on both floors the axis monopolizes movement and encounter density. [**Figure 6.35** and **6.37**] As shown in the **Table 6.2**, the main axis at Pompidou4 is the most intensively occupied space of the whole museum. This may be explained by the fact that on the fifth floor, movement is not controlled only by the main axis, but splits between main and internal axis. This finding seems also to explain the decision of the Museum to give prominence to the contemporary collection by moving it to the fourth floor. These observations become even more instructive, when contrasted to the Tate Modern space use pattern, to which will now turn.

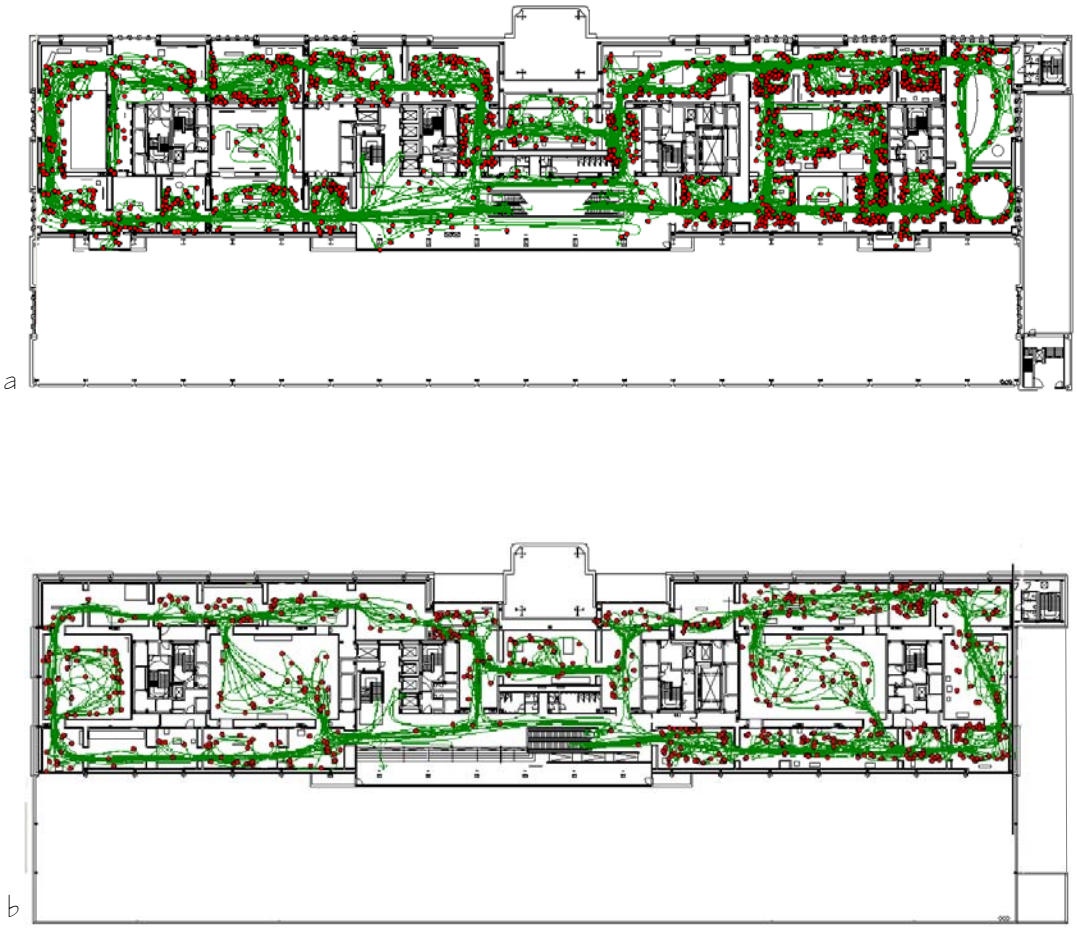
TATE MODERN [51]

The empirical investigation at Tate Modern will progressively reveal a completely different picture. Let us begin by considering the data from tracking 50 people on

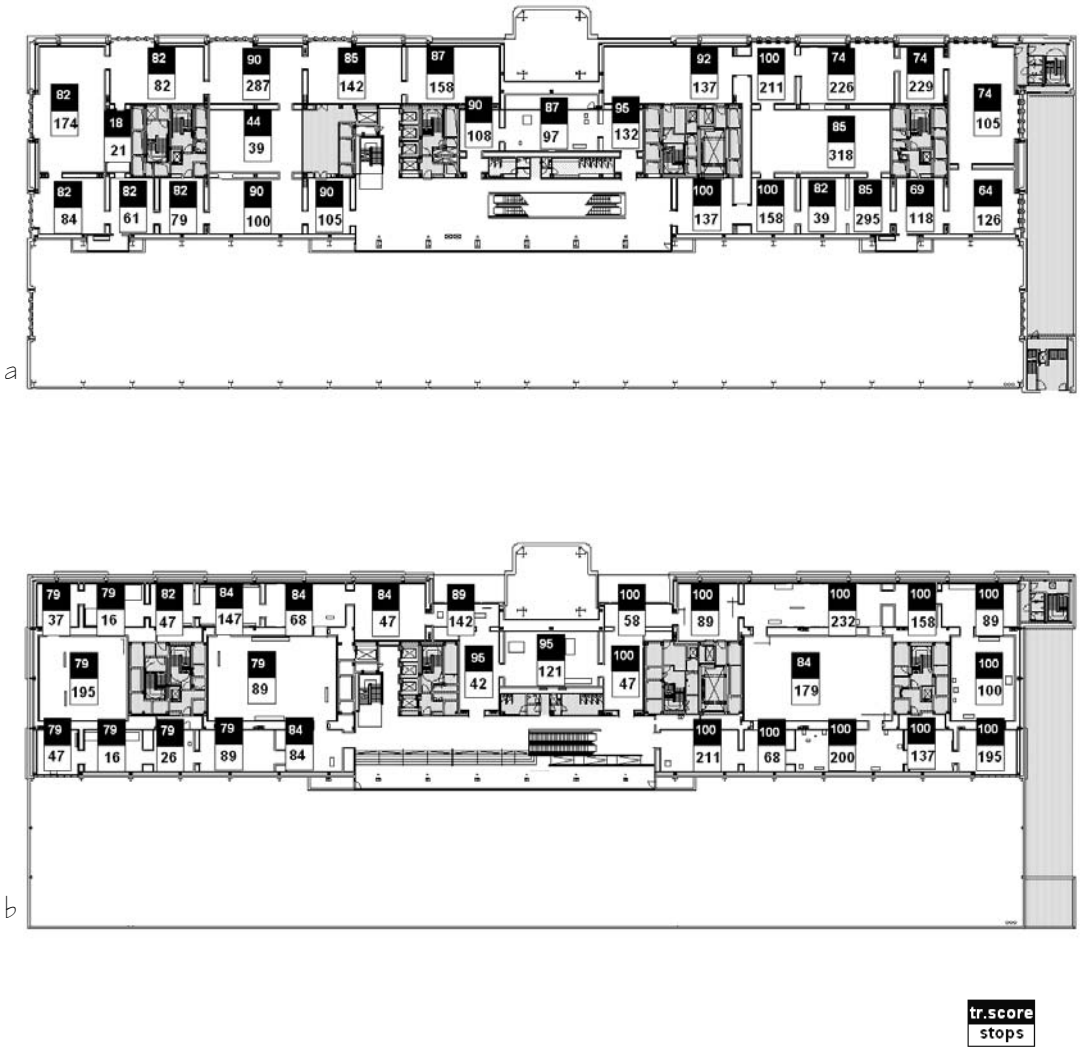
the two separate floors.[52] [**Figure 6.38** and **6.39**] A considerable proportion of people tracked (30%) visits only the third floor,[53] while a small majority (54%) gets to both floors. However, this figure may be somewhat misleading, because a notable percentage (16%) pause at the café on the fourth floor, and as a consequence, it could not be with certainty classified in one of the above groupings.

Interestingly, the amount of time spent on each floor begins to suggest that uniformity is a quality central to the pattern of space use. Visitors observed spent about 27 minutes in average on each floor (27.7 at Tate3 and 27.4 at Tate5), though 36.7 % at Tate3 and 40% at Tate5 stay longer than this (about 75 minutes maximum). [**Figure 6.31b** and **Table 4.7**]

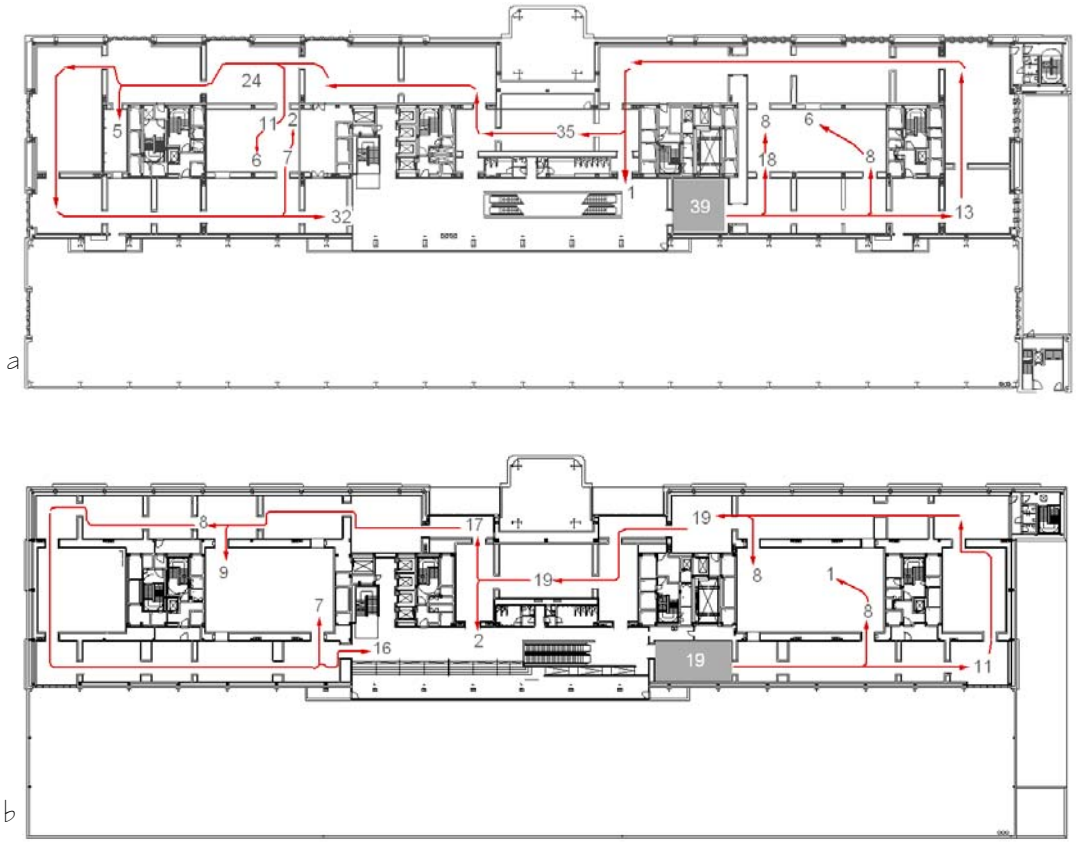
Looking closely at the directional splits at Tate3 allows some interesting observations. [**Figure 6.40a**] First it should be noted that half of visitors observed follow exactly the same route: entering by the east suite,[54] 33.3% follow the long line of sight that traverses the length of the building, and continue down to the end of the axis to room 7, while the majority (66.7%) turn to the middle space 3, either through room 2 or room 5. Two reasons can be accounted for this. The first reason why a considerable number of visitors pass through this space is that, they can thus short-circuit the exhibition, and get immediately to the other side of the gallery, to room 11. The second reason might be related to the specific characteristics of the display: the diagonal vista into the middle space allowed glimpses of exhibits with powerful physical and visual presence (as for example, the natural-size car by J.Opie, **Figure 6.20b**), and invited exploration, while, on the contrary, the view into the room 7 was partly blocked; one could hardly see through to this dark gallery at the end of the axis, in which, in addition, movement flow was regulated by a museum assistant. Beyond room 11 -traversed by all the visitors observed-, most people continue to the west suite and then find their way out though room 27. The west suite includes two of the least visited of spaces at Tate: the narrow dead-end room 21 –devoted to the drawing collection- omitted by 85.7% of visitors tracked; and the Rothko room (19), omitted by 53.8% of visitors, which is the equivalent to middle space (room 3) of the east suite, one of the most intensively used spaces, as discussed above.



^ **FIGURE 6.38** The routes and stopping points of visitors observed at Tate3 (a) and Tate5 (b)



^ **FIGURE 6.39** The mean tracking score and the average number of stops made at Tate3 (a) and Tate5 (b)



^ **FIGURE 6.40** The directional splits of where visitors observed are moving to during their visit to Tate3 (a) and Tate5 (b)

Little could be said about the directional splits of visitors tracked at Tate5: 89.4% follow exactly the same route. [55] [**Figure 6.40b**] This high degree of uniformity is to be expected as a by-product effect of the sequencing of the layout. Since the route is virtually a natural progression from the entrance to the end of the sequence, it is unlikely that visitors will miss any room (with the exception of one dead-end space on Level 3). However, within this general and clear tendency for homogeneity, the spatial layout seems to have an effect, by fine-tuning the movement pattern. [**Figure 6.41b**] The higher movement rates are found in spaces that have strategic positions, that is, rooms 11 and 26 on Level3, and rooms 3 and 29 on Level5. These are all *d-spaces* that control access to neighbouring rooms and are used by those entering, or leaving, the suite, as well as by those who shortcut the main sequence through the central space. One is forced, for instance, to cross room 11 (Level 3 East) to move to the west suite, or to pass through rooms 26 and 29 -the penultimate and ultimate space on Levels 3 and 5 respectively. This effect of space is clearly shown by the positive relation between movement and the *convex control value*. [**Table 6.3**] As expected from the high degree of sequencing, global variables, on the contrary, do not seem to affect the pattern of movement since all spatial values are equal and so the differences between spaces will be just random variation.

The layout of Tate Modern, shallow and sequenced, creates a well-balanced visiting pattern, so that we find deeper spaces getting similar or sometimes higher movement than more shallow ones (as for instance in the case of rooms 11 and 20, compared to room 2, on Level 3).

	Local integration	Convex connectivity	Convex control
Tate3	-	.237* (1)	.397*
Tate5	.511* (2)	.57* (2)	.369*(2)

** probability of error less than 1%*
(1) exc. R.21 with the lowest movement, (2) exc. R.4 with the lowest movement

^ **TABLE 6.3** Correlations between Log (movement) and spatial variables at Tate Modern

What seems even more interesting in the visiting pattern at Tate is that uniformity is not restricted in the galleries of a single floor but extends to both floors. This can be seen on a number of levels: first, the entrances of the four suites are evenly used (as shown in **Figure 6.42**);[56] second, the movement rates in the deeper spaces are, more or less similar;[57] thirdly, the last space of each sequence (room 27 and 29 on level 3 and 5 respectively) has in comparison to the first, higher movement by 25% -which seems natural since, as seen, the last galleries bring together those entering and leaving the suite; fourth, the central spaces of the four suites have in pairs almost identical movement rates;[58] finally, and most importantly, the two floors have almost identical average movement rate: 6.0 per minute, the Tate3, and 6.1, the Tate5 (see **Table 4.5** and **6.4**).

	Total mean movement (*per min*.)	East suite*	West suite*
Tate3	6.0	6.1	5.9
Tate5	6.1	6.7	5.8

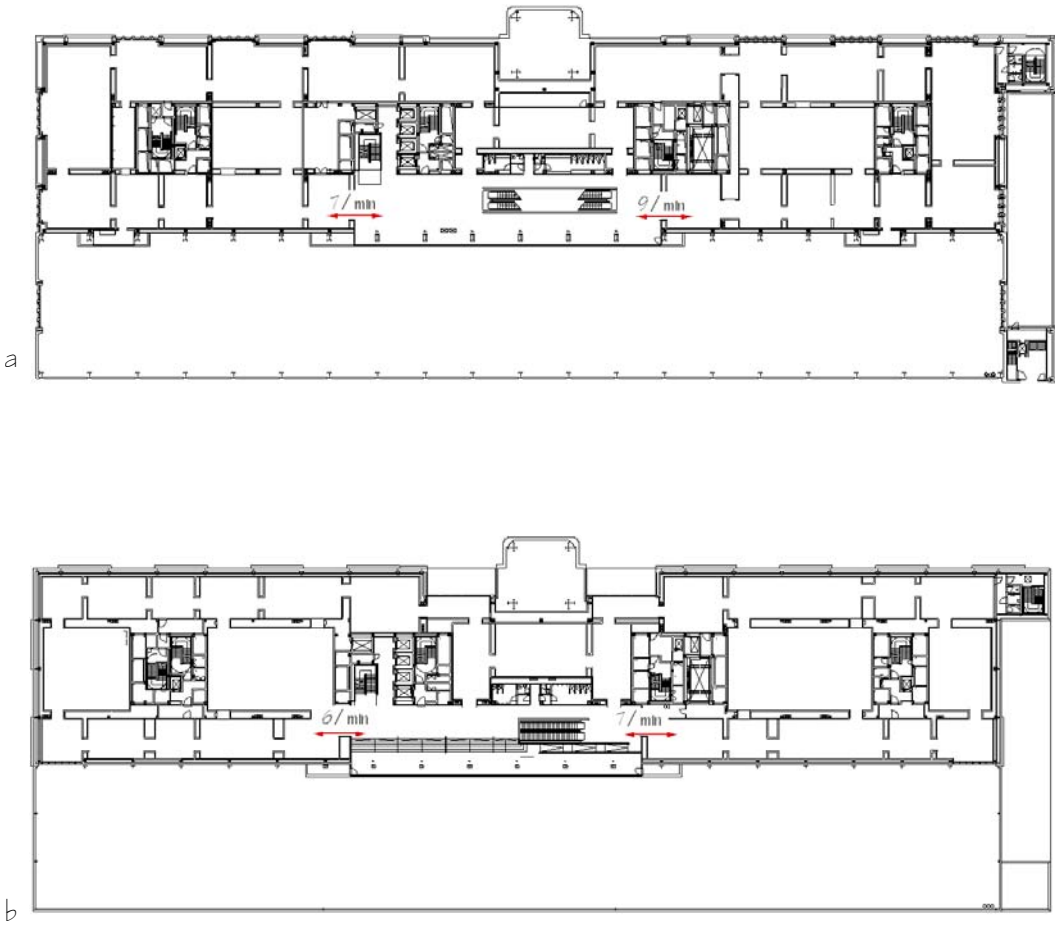
**excluding the middle space 14*

^ **TABLE 6.4** Space use variables at Tate Modern

Turning to viewing rates, we find a similar more or less uniform pattern, with the mean rate at Tate3 being 5.9 per snapshot and at Tate5, 5.4. [**Figure 6.41** and **Table 4.6**] Differences between the two floors begin to emerge when we look at the ratio between the two space use variables. While at Tate3, mean viewing is almost identical to mean movement (6.0 per minute), at Tate5, viewing is by 13% lower that movement. What it is worth noting is that in general, and in contrast to Pompidou5, Tate is not characterized by a strong association between movement and viewing, since the layout is so coercive and, as we have seen, evens out the effects of space on movement. So spaces with high viewing are not necessarily those that get high movement.

On Level3, the rooms with the higher viewing rates -and the higher number of stops made by visitors during their itinerary- are those dedicated to the Surrealists artists (room 18), and two displays which invite the active involvement of the

^ **FIGURE 6.41** The per minute movement rates and per snapshot viewing rates at Tate3 (a) and Tate5 (b)



^ **FIGURE 6.42** The use of entrances at Tate3 (a) and Tate5 (b)

viewer -Mark Dion's installation '*Tate Thames Dig'* (a mahogany chest inviting inspection in room 11), and Kinetic/Optical art (works creating optical effects and illusions in room 5). Respectively, on Level 5, the galleries that attract visitors' attention are: room 24, dedicated to the works of politically engaged artists (it has by far the higher viewing rate and the higher number of stops), and room 4 –a monographic display, presenting video installations of B.Viola. There is therefore strong indication that viewing tends to be more closely related to the special attraction of exhibits and much less affected by spatial properties. Further to this, it must be noted that, as it was directly observed, visitors tend to read the wall labels -both those that set out the underlying concept of the gallery and the shorter texts that accompany specific works on display.

The thematic arrangement of the collection at Tate, that a priori is built on links between works within a single gallery, raised the intriguing question (as already noted in the chapter 4) whether this curatorial strategy influences the way in which objects are explored by visitors. Looking closely at the morphology of their paths and indexing the locations where they paused, it was found that, in contrast to what might be expected, only a small percentage of visitors at Tate3 (7%) appear to look at group compositions and configurations of objects in space; the majority (62%) seem to be attracted by individual works and be '*object*' rather than '*space-driven*'. On the other hand, there also those (31%) who tend to visit selectively, meaning that they make many stops at certain spaces and few at others -the type of visitors we have come to call '*eclectic*'(see chapter 4). Two interpretative hypotheses might be proposed in respect to the observed visitor pattern, that is, the high proportion of '*object-driven*' visitors: the first is related to the display content, while the second, to the spatial structure. As argued above, objects can be visually dissimilar, since their association depends most often on conceptual rather than visual links. As a consequence, their relations are not always readily visible so as to direct attention towards the arrangements of objects and the overall visual experience. In addition, the lack of expansive views and the absence of cross-visibility between individual works located in single or different galleries do not encourage a comparative and space-oriented viewing. However, these hypotheses seem, upon first sight, challenged by the high proportion of

'*space-driven*' visitors (29.4%) at Tate5. But a closer look at the location where they stopped (in conjunction with the fact that they stay for shorter amount of time) seems to suggest that they tend to move in the middle of spaces looking around, browsing quickly the works on display -an argument taken up in the final discussion (chapter 8).

In concluding, it may be argued that the Tate Gallery works evenly, equalizing movement and viewing numbers, in contrast to Pompidou, and especially Pompidou5, that is characterized by heterogeneity in density of space use. In the first instance, we have to do with a layout that structures the search pattern, in an almost mechanical way, based on its most simple local properties, while in the latter, the availability of movement choices allows the differentiation of visitors' paths, and global spatial variables significantly affect the use of space.

6.5 Quality of the experience

In the last section the effort is directed towards synthesizing the different dimensions that make up the experience and have been separately interpreted. What are the implications to be drawn from the particular ways of organizing space and objects for the visiting culture of each museum?

Pompidou

One of the determining features of Pompidou5 is the synergy between space and display. Over and above the content of the objects, the articulation of space and the hierarchy of subdivision convey meaning and serve a display that aims at emphasizing the turning points of the history of modern art. In other words, the hierarchy of access corresponds to the hierarchy of the works displayed. Space is systematically used as a narrative device and mediates additional relationships between exhibits. Moreover, the order and the repetitiveness that mark the design of space -since it is made up of similar parts in similar relations-, are coupled with the uniformity and redundancy that characterize the arrangement of objects -in the sense that it is based on a well established conceptual scheme, familiar to most

visitors. It can therefore be argued that the layout of space and objects point in the same direction in order to support each other, to express a specific message –an idea pursued further in the synthetic chapter.

The empirical investigation has also showed that there is a synergy between conceptual structure and functioning. The spatial layout and the exhibition set up work together to channel visitors' paths to predetermined key spaces and make some parts of the galleries more occupied than others. This suggests that the intention is didactic; yet it is coupled with a measure of personal exploration and self-discovery. The information is structured, but proposed as a profusion of ideas and cumulative impressions. The arrangement invites visitors to take different paths, as reflected in the surprising heterogeneity of their recorded routes. The maze-like character of the spatial structure and the profusion of oblique views and changing vistas engage visitors both physically and intellectually. On the whole, the installation of the collection as well as the design of space is addressed to a peripatetic observer who is continuously pulled to something else, to the next point of aim, and emphasizes a dynamic sense of space.

Reference to movement brings us to another key aspect of the experience, also a function of space. It may be argued that the layout of Pompidou exploits movement to create dense encounter zones. As it has been suggested earlier, the main place for interaction is the central axis, designed to operate like a street, maintaining something of the original conception of the museum as a place to stroll, to look at works of art in a relaxed way. This is coupled with the internal structure of the galleries which favours the diffusion of movement and opportunities of interaction. But a critical distinction should be made: the axis synchronizes contacts between groups of visitors, encourages encounter density, makes interaction visible and maximizes people's awareness; but on the other hand, since the exploration of the galleries is not possible independently from the axis, its use seems enforced. By contrast, off the axis, visitors are less aware of each other and the encounters that occur are mainly between individuals rather than groups, but the pattern is characterized by a higher degree of randomness and occurs in a more informal and unforced way.

This opposition between the museum visit as a shared experience and the more private exploration of the galleries is one of the contrasts that define, we believe, the visiting culture at Pompidou. It seems that on the whole, the effort is directed towards resolving spatial tensions -between the open central space and the enclosed galleries, the integrated and the segregated rooms, the localised movement in the galleries and globalised along the axis, the need to guide visitors' paths and the intention to engage them to exploration, the didacticism and the personal learning experience- as much as display tensions -between the central displays showing groups of artists and the monographic ones presenting individual artists. This richness of contrasting elements and experiential dimensions can be seen as a means to counter the lack of spatial variety and unexpectedness that characterize the repetitive pattern of progression.

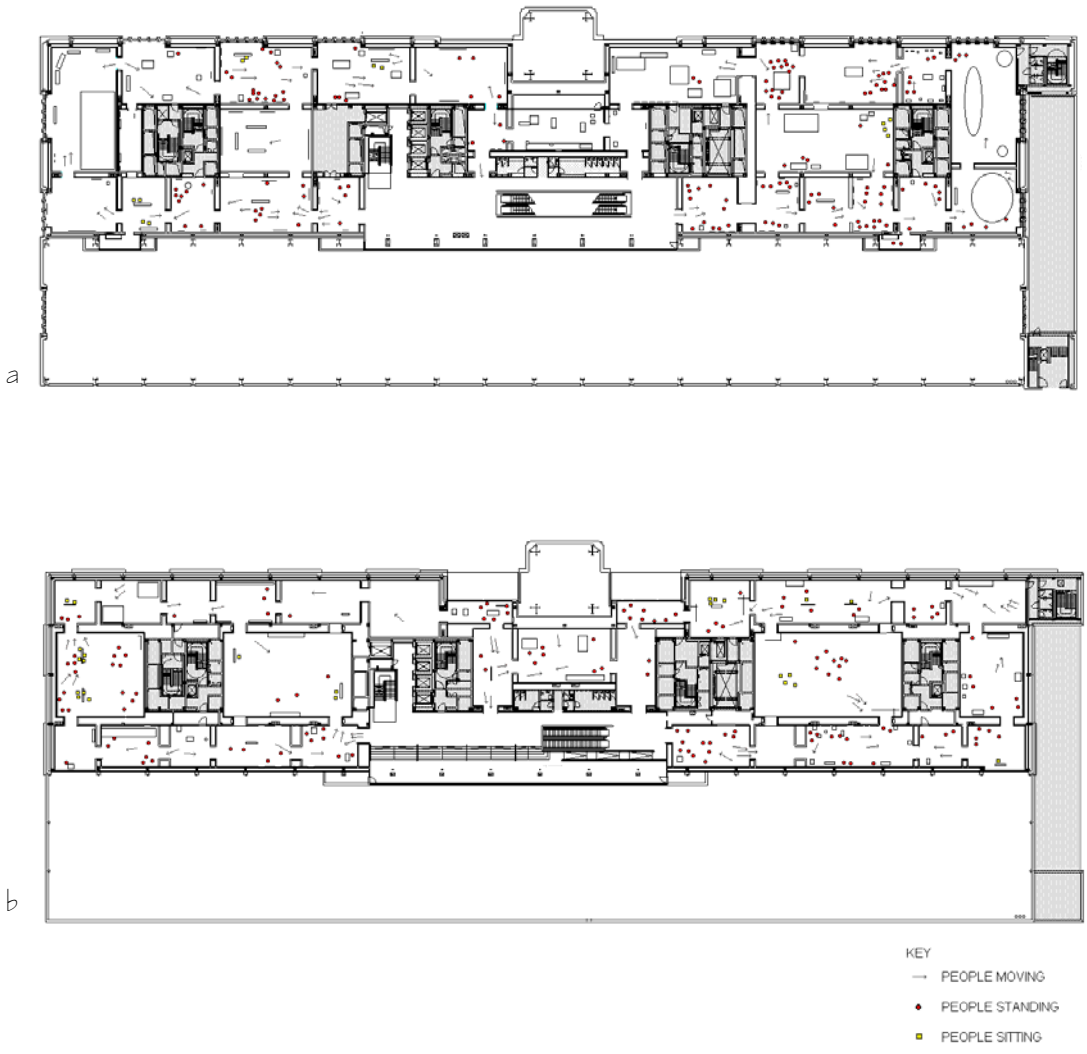
Tate Modern

The critical differentiating feature of Tate Modern is the high degree of autonomy that governs the relation between space and display. Not only there are no strong interdependencies between space and display decisions, but also key spatial principles, which have an instrumental role in terms of organization of space, appear inert in respect to the exhibition set up. However, there is one linking point between the two layers of organization, and that is the high originality of the display message, which seems to be supported by the restrictive function of space. The self-contained displays, the controlled visual fields, the lack of visual continuities across spaces encourage concentration, as reflected in the attention of visitors to the exhibits.

Furthermore, the fact that the whole display lacks the coherence of a total viewing sequence both on the local scale of individual galleries and the global, of a suite or an entire level, points to a deeper opposition between the two museums. In contrast to the peripatetic experience favoured by Pompidou, the spatial structure and the installation design of Tate privilege a rather static approach and encourage a locally driven exploration. On the whole, the organization of circulation at Tate exemplifies the exact opposite of Hulten's concept of the museum route, described as follows: '*One has just to traverse it. He is here. He*

arrives there. There is nothing else to do'.[59] The plan is clear and revealed at once, the itinerary constrained. This, on the one hand, suggests that much less input is required from the visitor, in comparison to the complicated and elaborated spatial design of Pompidou. By minimizing the effort and the energy needed for exploring galleries, Tate places the emphasis on the intellectual content of the display. Visitors wander through the galleries without thinking of choices; they have to follow the succession of rooms and focus their attention on what they see. Moreover, the links between works are already set up, which also suggests less intellectual effort required by the viewer and a high degree of control given over to the curator. This points to a didactic intention, not immediately discerned behind the atypical arrangement of the collection that rejects established narratives and hierarchies of value, subverts chronological and narrative principles.

A contrasting approach can also be seen in the emphasis that Tate places on evening out differences. Instead of directing attention, to resolving tensions and contrasts like Pompidou, it aims at equalizing the accessibility of galleries, the significance accorded to the works displayed, and most importantly, the densities of space use. It could therefore be argued that Tate works as planned, '*as a machine for showing works'* (Serota cited Tate Gallery Archive 1995a, p.32), However, there are some critical, unintended implications of the above design choices. The overly sequenced galleries do not allow for any variation in visitors' pattern of encounter [**Figure 6.43**]: since people are using space more or less in the same way (as crystallized in the homogeneity of the recorded paths and the uniformity of the movement pattern), they are also equally likely to be co-present. In other words, the interface between localised and non-localized movement is broken and patterns of changing natural co-presence in space are not achieved; as a consequence, we have no emergent social function as in Tate Britain. Additionally, the escalator space, the only kind of social gatherer on the level of galleries, is extremely constrained to movement function. Besides, the design suggests a dichotomy between viewing and social interaction, by completely disengaging the spaces where each experience occurs –since the gathering space is essentially the turbine hall. The latter seems to bring into the fore both the social



^ **FIGURE 6.43** The pattern of space use and interaction at Tate3 (a) and Tate5 (b)

and the spatial experience, which, in the galleries, recede to the background. In this respect, it is of particular interest that the attendance falls considerably when the turbine hall is closed for display changes. Perhaps it could be argued that Tate seems to transpose the sense of discovery from space to the reading of works, and renders the exploration intellectual rather than spatial or visual; the sense of surprise emerges from the atypical groupings of works and their challenging readings, which counter the predictability of the spatial experience.

Conclusion

These conclusions reinforce the thought with which we began: that the two museums remarkably resemble each other in respects that are not evident at the outset. They share in common fundamental morphological properties, such as the configurational regularity, the axiality, the controlled visibility, the grid structure, the core in the sequence. They are also guided by similar spatial ideas -the attention given to the global structure, the emphasis on spatial orientation, the preoccupation with the organization of manageable sequences-, and the final result is, in both cases, a more or less didactic arrangement, and a predictable spatial experience, marked by *redundancy* and a sense of *order*.

To our analysis, two things account for their strategic variation. First, looking at the whole layout of the two museums, it is clear that common elements are embedded in quite different configurations, so that in the case of Pompidou, the layout strongly influences an elaborate pattern of movement and exploration, and sustains a pattern of encounter between visitors; in the case of the Tate, by contrast, the layout operates like a restrictive rule that dictates a particular pattern of exploration and experience of both objects and other people.

The second fundamental difference between the two museums arises from the way their spatial qualities are handled in relation to display decisions. Though in both cases space does not constitute an integral part of the display, Tate differs from Pompidou in that the spatial properties are seen as functional ends in themselves, while at Pompidou, they are thought of as spatial means to express the intended message and contribute to the perceptual organization of the gallery

(as illustrated by the ‘photogenic’ quality of the galleries). Thus, by being closely interlinked with the exhibition set up, the central qualities of the spatial design of Pompidou -sequences, core, axes and views- acquire an enhanced importance and become part of the visual aesthetic and the whole experience.

Notes

[1] For a discussion of these recent tendencies in the display of art see chapter 2.

[2] It is also argued that the Louisiana Museum of Modern art and the Kröller-Müller Museum, which are analyzed in chapter 7, epitomize the rural model of the museum of modern art in the twentieth century.

[3] This brief historic overview is based on a number of papers: Roux 1978; Colquhoun 1981; Bozo 1985; Croset and Milesi 1985; Ellis 1985; *L'architecture d' aujourd'hui* 1985; Musee d'Art Moderne 1985; *Richard Rogers* 1985, p.90-104; Bozo and Lawless 1986; Montaner and Oliveras 1986; *Beaux-Arts* 1987; Du plateau Beaubourg au Centre Pompidou 1987; Le journal des expositions du 10e anniversaire 1987; Aulenti 1992; Buchanan 1996; Burdett 1996; Lauxerois 1996; Petranzan 1997, p.128; Newhouse 1998, p.193-198; *Beaux Arts* 1999; *Connaissance des Arts* 2000; Dufrêne 2000; Poderos 2002.

[4] It integrates three departments: a. the National Museum of Modern Art (MNAM) and the Centre of Industrial Design (CCI)[4] , b. the Public Information Library (BPI), and c. the Centre for Music and Acoustic Research (IRCAM).

[5] Piano and Rogers won the 1971 international architectural competition.

[6] The itinerary started with the works of the period 1905-1918 in the south part of the 3rd level and continued with the period 1918-1940 in the south part of the 4th level; the north part of this level was dedicated to the contemporary section of the collection (1940-1977).

[7] The current fifth floor was then read as fourth and respectively the fourth as third, because originally the ground floor was not included in the numbering.

[8] Quotation translated by the researcher.

[9] Also, the central terrace was designed by G.Aulenti and the south, by R Piano.

[10] The brief introduction is based on the following papers: Tate Library and Archive 1995a; 1995b; 1995c; 1995d; 1995d; 1995e; 1996a; 1996b; 1996c; Burdett 1998; Belli 2000; Birnbaum 2000; Federle 2000, p.26-33; Moore and Ryan 2000; *Tate* 2000; Wilson 2000; Steiner 2000; *Architectural Review* 2000; Searing 2004; Zeiger 2005, p.84-89.

[11] The original building was created in two phases, between 1948 and 1963.

[12] As in the case of Pompidou, an international competition was launched for the design of Tate in 1994. The short list included T. Ando, D. Chipperfield, R. Koolhaas, R.Moneo, and R. Piano. See the Tate Gallery Archive 1995a.

[13] P. Wilson, Director of Projects and Estates, in conversation.

[14] It was argued that '*each* (suite) *suited to a visit lasting one or two hour*' (Tate Gallery 1994, p.3)

[15] Paradoxically the tripartite structure is to be found on a number of levels: each unit consists of three spaces, and in turn, each cluster of the north side complex is structured by three units; vistas penetrate up to three spaces in both directions, horizontally and vertically; the interior axis is interrupted on both sides at three points.

[16] In 1985 the traverse galleries were covered by light diffusing ceilings, which were removed after the 2000 refurbishment.

[17] A difference between the two layouts is to be observed here, since at Tate5 the spaces of the south enfilade do not lie on the same axis, as at Tate3.

[18] The distinction between *synchrony* and *description* is due to J.Peponis.

[19] See chapter 5, note 16.

[20] Perhaps it is no accident that the Orsay Museum, also designed by Aulenti, has a similar layout.

[21] The linking staircase is located opposite the entrance, so that one can get to the fifth floor without having to pass through the fourth floor galleries.

[22] It is of interest to note that originally the idea was that the starting point of the visit on each level would be the point at which the escalator arrives. But it was observed that a number of people choose to start their visit from the opposite direction. So it was decided to differentiate - with the coloured walls and the signs-, the entrances of the two suites on each level. This change in the design recalls the idea of the '*revision of the script*' advanced by Noordegraaf (see chapter 2)

[23] The section discusses the arrangement of the permanent collection at Tate as recoded in June-July 2003, and that at Pompidou, in August-September 2003.

[24] Until the 2003 re-hang the starting point of the whole collection was the year 1905; but as a consequence of the acquisitions of two early works (1900) of Matisse, the chronology moved earlier. These works are shown in the beginning of the itinerary, on the fifth floor, hung on the front wall of the first unit.

[25] Though this decision dates from January 2000, the Pompidou has been building up its architecture and design collections over the last eleven years, with the belief that '*twentieth-century art cannot be presented only through drawing, painting and sculpture; it must also encompass photography, architecture, design, film and video'* (see Spies 1999).

[26] This approach, first introduced by MoMA in 1929, has been often seen as perpetuating the traditional diversification of media and emphasizing a formal view of art.

[27] The key themes adopted since 2001 are: Minimal/Conceptual art (2001-02), Figurative art (2002-03), Abstract art (2003-04). It should also be noted that the more contemporary works are not inscribed in the thematic structure of the display.

[28] Similarly, rooms 10, 14, 19, 21, 21 and 24 are devoted to a single work by *Agam*, *Kabakov*, *Scurti*, *Grand*, *Sechas* and *Francois* respectively.

[29] The '*Breton wall*', a recent acquisition (2003), groups objects ranging from surrealists' paintings to masks and objects from Oceania and North America

[30] Room 38 focuses on the '*use of wood in the 30', 40's and 50's*', [**26** in **Figure 6.15b**] and room 40, on the '*Rationalism'* in Europe, between the wars; [**28**] also, a monographic display is dedicated to *Le Corbusier*'s housing units and the Modulator (room 39). [**27**]

[31] As originally planned, the thematic structure remained for five years (from the opening of the museum in 2000 until 2005), with an annual cycle of display changes.

[32] According to many art historians (i.e. Meijers), this display strategy goes back to the genres of art established by the French Academy in the 17th century. Others have seen this curatorial choice as being driven by a practical problem, acknowledged in the Competition Brief: that the Collection '*has its …weaknesses, and is not sufficiently comprehensive to give a full history. Focal points must therefore be created which will depend on core groups of work in the Collection, rather than on key moments in art history'*. In other words, offering a '*rounded experience'* did not require articulating a comprehensive history of modern art.

[33] The concept is summarized by the first director of Tate Modern L. Nittve as follows: '*We can't have a situation of audiences bowing in front of masterpieces*' (Interview, Nordic Art Review, no 1/99).

[34] According to Godfrey (2004, p.58), the term '*black box***'** has been used '*in homage to the idea of the "white cube", to describe the most typical situation for the display of multimedia and video installation in Biennales and Documentas*'.

[35] As Rubin (Artforum 1974, p. 51) described the spatial arrangement at MoMA.

[36] In conversation, the Curator of the Modern Art Collection *Brigitte Leal*, pointed out that a number of hanging difficulties arise from the spatial design, as for instance, in terms of choice of paintings to be shown on the front walls or those flanking the door openings of each unit: on the one hand, they are given prominence but on the other hand, they are isolated by their contemporary works and seldom contemplated frontally. Similarly, the plethora of door openings breaks up space, and considerably restricts the available wall surface. It was also noted that hanging on spur walls does not allow leaving broad margins of space around the works and is not suited to the display of the modern art collection.

[37] Matisse's *Autoportrait* and *Mont St. Michel* in room 4, or *Intérieur, bocal de poissons rouges,* and *Le Peintre et son modèle* in room 13; Kandisky's *Mit dem schwarzen Bogen* and *Impression V*, in room 16; Mondrian's *Composition en rouge, bleu et blanc II*, and *New York City I*, in room 20; Picasso's *La Liseuse* and *L'Arlequin* in room 24; Magritte's *Le double secret* and *Le modele rouge* in room 29; and Pollock's , *Number 26 A " Black and white "*, and *Peinture* in room 48.

[38] They are grouped under the theme '*Across history'* in room 29. The painting by Grosz expresses the moral corruption in Berlin during the First World War years; that of Picasso is an allegory for the suffering of the Spanish nation during the Civil War; and the work of Lichtenstein is a criticism to the Vietnam War.

[39] The collection was organized in eight chapters and these were divided into forty themes, based on the key idea that the subversion of the past is the driving force of creation in the twentieth-century art. Also, in the current arrangement, the different media (architecture, design, photography, film), shown until then in separate galleries, were brought together.

For instance, the first chapter, entitled '*Destruction'*, focused on the rejection of traditional artistic issues, like the questioning of the picture plane, the blurring of the perspective and the geometric fractioning of the surface; accordingly, the display grouped together the monochrome paintings of *Yves Klein* and the model of monochrome architecture of *La Villette*.

Another display juxtaposed the repetitiveness of *Judd'*s sculptures and *Kelly'* s or *Buren'* s paintings to the model of the *Galerie Goetz,* designed by *Herzog & de Meuron*, suggesting that there are affinities between this style of architecture and the abstract and minimal art.

[40] The observation study was carried out during the period 22 August-2 September 2003, over four time periods 12-2, 2-4, 4-6 and 6-8 (given that the Museum is open from 11pm to 9pm).

Out of the 5O visitors tracked, the traces of **42** were taken into account for the study of Pompidou4, and **39** for Pompidou5. The rest either did not get to the galleries (6 out of 50 at Pompidou4, and 7 out of 5O at Pompidou5) or interrupted their visit (2 out of 50 at Pompidou4, and 4 out of 5O at Pompidou5).

[41] It would be of some interest to juxtapose the results of the questionnaire of the Visitor Audit carried out by the National Museum of Modern Art in May-June 2002. It was found that 75% of people visit both floors and 61% start from the contemporary collection. This is explained by the fact that, as the questionnaire showed, people are aware, prior to their visit, that the museum collection is divided in two sections (61% of people asked), and shown in two different floors (94%).

(The above data from the '*Etude de connaissance des publics du Musée national d'art moderne'*, Synthèse quantitative de Junior ESSEC Conseil pour le Centre Pompidou, Août 2002, were kindly provided by A. Dablanc, Public Relations).

[42] Related to this are two results of the Visitor Audit: first, that the spatial experience of the fifth floor galleries is what visitors (16%) appreciated most in their visit; second, that there is a strong preference for the works displayed on the fifth floor galleries. More precisely, the display preferences were as follows: Matisse (12%), the exhibits of 5th floor as a whole (10%) and Kandisky (5%). On the contrary, the works displayed on the fourth floor were the most popular for 5% of visitors.

[43] It is of some interest to note that there was a considerable percentage of visitors observed that, prior to the exploration of the galleries, spent time in the north open air terrace (not always accessible to the public) located opposite the entrance.

[44] That is, 18 out of the total of 39 galleries (excluding the corridor-like galleries).

[45] The relation becomes weaker if we exclude the main axis (that is, spaces R3a and 3b): R^2=.236, p= <.0015).

[46] See the section 'Display narrative' above.

[47] The opposite is true for the contemporary collection (see below).

[48] See chapter 3, note 13.

[49] 16.6% begin the exploration from the first galleries opposite the entrance space (rooms 16-18), 14.3% from room 23 and 12% from room 25.

[50] See for example, Niehoff 1968, p.15; Falk and Dierking 2002, p.56.

[51] The observation study at Tate Modern was carried out between 2-23 June 2003, over three time periods (from 10am to 4pm). Two observations are also in order: firstly, that the starting point for the observation on both levels was the escalator, with the exception of (4) visitors tracked at Tate3 upon arriving from the staircase/lifts. It is self-evident that their point of arrival determined the starting point of their itinerary (the east or west suite).

Secondly, people who stop on the intermediary *Level Four* for longer than half an hour were not tracked on the top floor.

It should also be noted that during the observation study, display changes in individual rooms were taking place, obstructing the normal flow of visitors' movement. These conditions that evidently affected visitors' route choices have been taken into account, and are discussed at the end of this section.

[52] Out of the 5O visitors tracked, the traces of **39** were considered in the study of Tate3, and **19** for Tate5. The rest did not get to the galleries (1out of 50 at Tate3, and 15 out of 5O at Tate5) or paused at the café (8 out of 5O at Tate5); there is also a number of recorded itineraries that were not eventually included because a number of rooms were closed at the time of the observation study for display changes (10 at Tate3, and 8 at Tate5).

[53] According to the Tate Visitor Audit, Level 5 is slightly less used than Level 3 (P. Wilson, personal communication, 2003).

[54] As noted above, only 4 visitors entering by the west suite were tracked at Tate3.

[55] A result obtained by considering the paths of visitors who do both the east and west suite of Tate5.

[56] A focused study was carried out with this specific aim in mind.

[57] For example in the Tate3, the rooms 6 and 22 have movement rate is (6.1) and (6) respectively.

[58] Room 3 of EastL3 and Room 20 of WestL5 get (5.8) and (5.7) respectively; Room 3 of EastL5 and Room 19 of WestL3 get both (3.7)

[59] Hulten's (1974) comment on the Guggenheim Museum, New York

Chapter Seven
Kröller-Müller compared to Louisiana

Introduction

In contrast to the two preceding chapters, this chapter shifts the focus of attention from the urban to the rural museum, and explores it through the Kröller-Müller Museum in The Netherlands and Louisiana Museum of Modern Art in Denmark,[1] often seen as the model of the modest and humane view of museum architecture (Tate Gallery 1994, p.2; Brawne 1993, p.11). These two museums share in common intriguing similarities which set the background for exploring their meaningful divergences: both were founded by collectors, as the outcome of their vision and passion; besides defining the character of the collection, the founders were closely involved in the design of the buildings, which became the spatial expression of their different concept of the museum; both have evolved gradually with extensions and additions, and are set in an attractive natural setting, overlaying art with nature; finally, a distance away from an urban center, their visit constitutes a destination itself. Our argument suggests that the two case studies illustrate alternative, if not contrasting, explorations of identical themes, with the most obvious being the opposite way in which they resolve the tension between architecture, art and nature: where the Kröller-Müller severs the visitors from views outside, promoting an undistracted contemplation of art, Louisiana brings landscape views indoors, displaying them in juxtaposition to art. Exploring in stages their oppositions, in relation to the concepts and intentions of the founders, and in the light of their observed consequences on patterns of use, the analysis will seek to clarify how layout of space and objects are used to communicate the intended message and experience.

7.1 Description

The Kröller-Müller-Müller museum

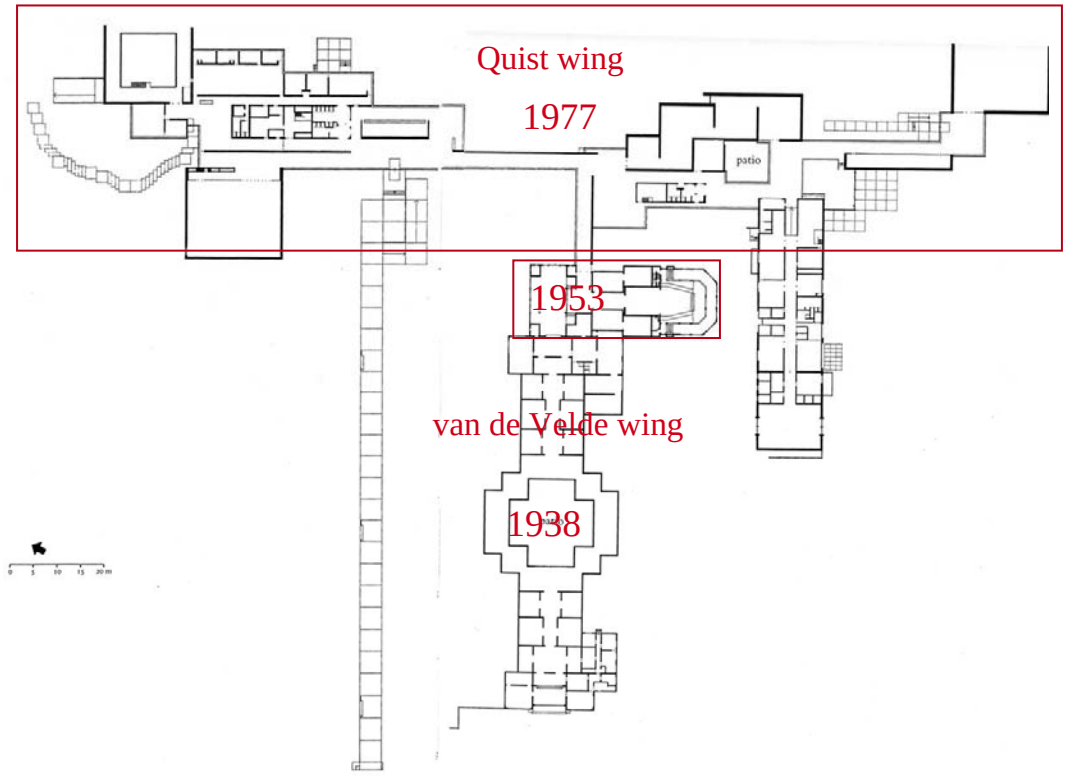
Let us begin by looking at the evolution of the two museums. The Kröller-Müller museum[2] is located in Holland's largest natural reserve, the Hoge Veluwe National Park, in Otterlo. It consists of two wings, the older one built by Henri van de Velde in 1938 and extended by the same architect in 1953, and the new one, designed by W.G. Quist in 1970-1977. [**Figure 7.1**] Our area of study will focus on the old wing, the main part of the complex.

Spatial separation and materiality emphasize each wing's different function -the former houses the permanent collection, while the latter accommodates the temporary exhibitions. Their relation appears like a continuous interplay between contrasting elements: the rigidity of the old building is in sharp contrast to the fluidity of the new, the hermetic character of the former to the openness of the latter. Moreover, the symmetry and the visual isolation of the old wing are making a counterpoint to the irregularity and the transparency of the extension.

The museum was founded by H. Kröller, the wife of A.G. Müller, owner of a shipping and trading company. Initiated in art history by the art critic H.P. Bremmer, she developed a particular theory of art, set out in her book '*Considerations on the problems related to the development of modern painting*'. She began collecting around 1908, '*for the benefit and pleasure of the community*', arguing that:

'*...in what I collect I am always thinking of the future… for I am collecting in order to give the future what seems best to me in life*' (Oxenaar et al. 1989, p.22).

H. Kröller determined not only the presentation but also the future development of her collection; in a memorandum that accompanied the donation of the collection to the state, she defined the general guidelines for future acquisitions. More importantly, she was strongly involved in the design of the museum building. It must be noted that the initial project was to design a house and art gallery on the Kröllers' estate in Wassenaar. Four design proposals were successively submitted, in 1911-1912, by: L.J. Falkenburg, P.Behrens, L.Mies van der Rohe[3]



^ **FIGURE 7.1** Overall plan of the Kröller-Müller museum

-Behrens's assistant at the time- and H.P. Berlage. Though Berlage's design proposal was not rejected (as were the previous ones), it was never built, because in the meantime the Kröllers acquired the Hoge Veluwe estate, and a new project was submitted by Berlage (1916). But soon the idea of a combined house and museum was given up, and in 1919 van de Velde was asked to design the Kröllers' family house in Wassenaar and a separate, monumental museum on the Hoge Veluwe. The economic recession of the 20s made it impossible to complete the construction of the museum, which eventually led to the present, smaller scale museum, intended to be 'temporary'. What is of particular interest is that looking at the previous designs, one can identify traces of the key ideas that characterize the existing layout, and which perhaps may suggest deliberate design decisions, as for instance, the windowless walls and the prominent presence of a lake in Mies' design, the entrance on the short side of the building in the designs of both Mies and Behrens, and more importantly, the cruciform shape of the building[4] in the preliminary designs of van de Velde.

The Louisiana Museum of Modern Art

The Louisiana Museum of Modern Art, located in Humlebaek, near Copenhagen, consists of a complex of interconnected pavilions, set gradually, between 1958 and 1994, in a free staggered arrangement at the perimeter of a park overlooking the sea, shaping an 'enclosed' circular path. [**Figure 7.2**] The first complex, as all the additions that followed, was designed by Jørgen Bo and Vilhem Wohlert.[5]
Louisiana was founded by a young businessman, Knud Jensen, who bought the estate with an old villa –that dates back to the middle of the nineteenth century-, by its owner Alexander Brun.[6] Director of Louisiana from its opening until 2000, Jensen was deeply concerned with the creation of a museum which, devoid of a formal, institutional character, would be integrated into people's everyday life. An art amateur himself, who enjoyed life and traveling, he aspired to communicate his love of life and art to his museum visitors. He explained:

'*We have tried to avoid a rigid atmosphere, that emphasis on architectural prestige which is so often associated with the concept of the museum. Visitors can*

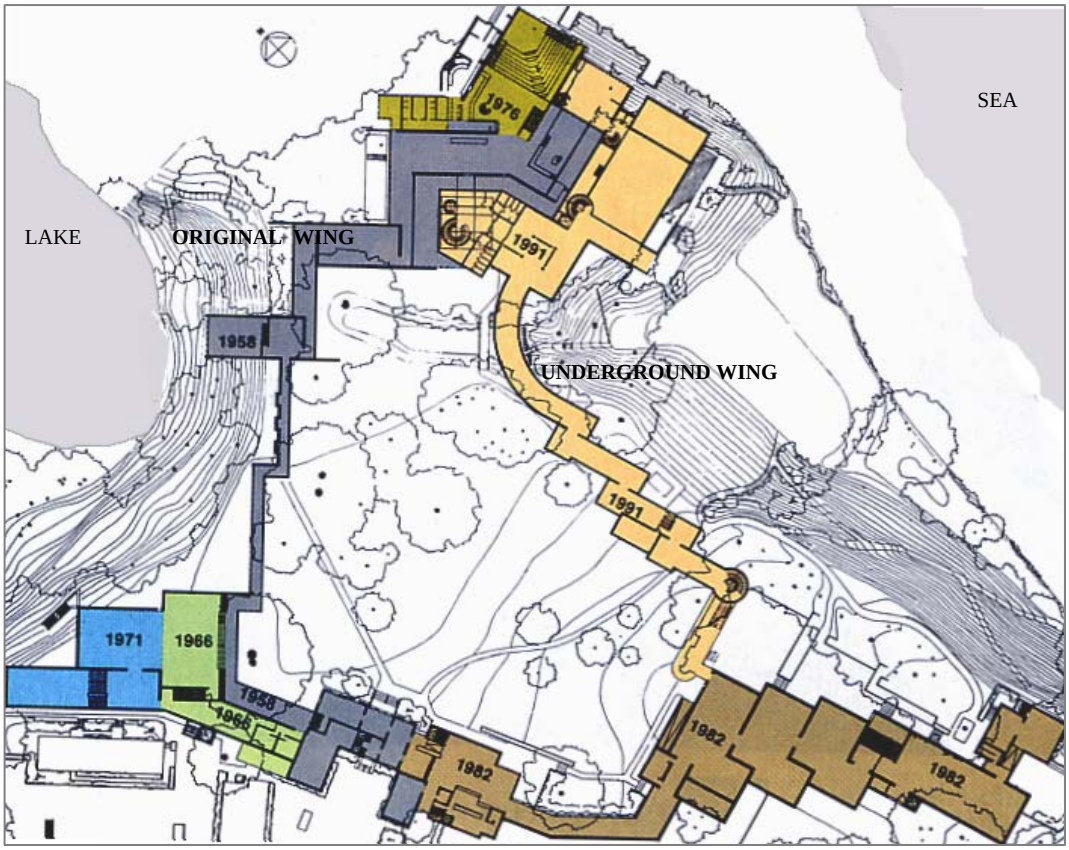
stroll about inside and out, and need not feel as though they are about to be tested in art appreciation' (Jensen 1984, pp.268-269).

Elsewhere he goes further:

'*people who have difficulty in coming to terms with the works of art, can experience the architecture and the park; …their curiosity may be stimulated, and maybe the next week they come to look again…By reducing the dislike felt by many when confronted with the new art forms, visitors are encouraged to come again and gradually become accustomed to them*'.

Each complex of galleries was designed with a specific part of the collection in mind: the original small and low north galleries (1958), on the left side of the park, were specifically created for the display of the modest scale works of the fifties; the lofty galleries of the south wing (1982) -the right arm of the park- suited the development of art from the 1960 onwards; and the recently added underground east wing (1991), which completed the ring, was intended to show the collection of prints and drawings.[7] Interestingly, the junction between the wings is marked by a space open to the landscape: the north complex leads to a wintergarden, accommodating the museum café; the south wing ends with a pavilion overlooking the sea, while the east wing begins with a greenhouse and ends with a glazed bay. Special attention was given to the park and sculpture garden, designed in 1963-64. Works are asymmetrically arranged to be seen in the open landscape, or placed close to the buildings to be experienced from inside, and most often appear unexpectedly as one walks along the glass corridors or the external paths. Jensen's argument seems suggestive in respect to the overall design rational:

'A walk round the museum and the park should be somewhat like a voyage of discovery. A sense of expectation is continuously stimulated and maintained. The attention is held because the rooms are never alike; each one is different from the next –narrow, wide, low, or high, with different lighting' (Jensen 1984, pp.267-268).
And he added: *'I am fascinated by the sense of around-the-bend –the expectation, the anticipation of a voyage. That has always been a key element in our planning at Louisiana –lots of around-the-bend'* (Welscher 1998).



^ **FIGURE 7.2** The gradual extensions of the Louisiana museum [*Kipphoff* 1992,p.101]

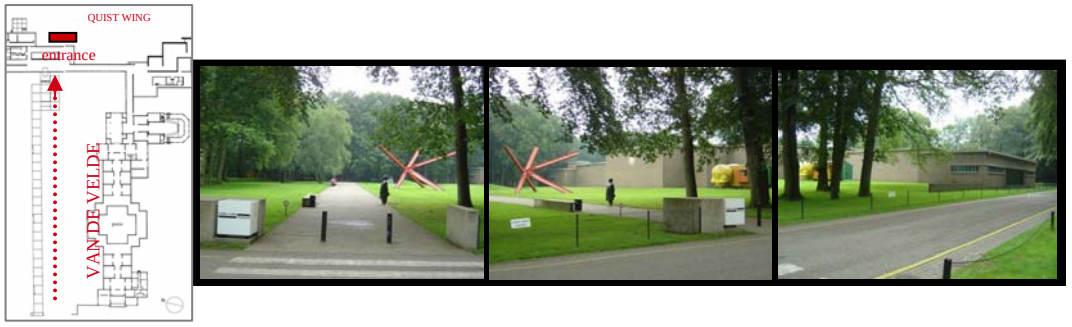
7.2 Morphology of space

The architecture

The first thing to be seen as one approaches the rather isolated location of the Kröller-Müller is the solid blank wall elevation and the play of volumes of the hermetic and austere van de Velde building. [**Figure 7.3a**] At a right angle to this, and at its short east end, the new addition, the Quist wing, appears discreetly as a long and low screen of glass, largely hidden behind the trees. A paved linear path, parallel to the main axis of the old wing, leads to the entrance. There, behind the glazed windows, another domain is revealed, a sculpture garden.[8]

A diametrically different impression is created to the visitor approaching Louisiana: he is first confronted with old villa, in harmony with the modest scale of the neighborhood, which constitutes the entrance to the museum.[9] [**Figure 7.3b**] The museum does not have a facade in the traditional sense, a deliberate architectural choice explained by Jensen's programmatic intentions, outlined above. The old villa, plays in effect the role of a passage, which establishes the character of the museum: its crossing means being impregnated with a sense of intimacy found with consistency in the additions of the museum: the contours of the buildings follow the slopes of the site, and their masses are dissolved in the landscape, so that they are hardly visible to people walking in the park. And when some fragments of their brick walls appear towards the main lawn, it is '*as if they were to accentuate the vegetation*' (Fisker cited Brawne 1993, p.9).

So in both cases, the buildings, horizontally organized, are situated in such a way as to create a visual discourse that relates the architecture to the landscape; in the case of Kröller-Müller, the van de Velde building appears as a compact volume, directing the view from the landscape to itself; on the contrary, in the case of Louisiana, the pavilions are self-effaced, giving visual priority to the landscape. Moreover, their entrances enhance the approachability of the museum, though at the same time an element of something hidden and unseen stimulates a sense of curiosity and acts as an invitation to exploration.



a

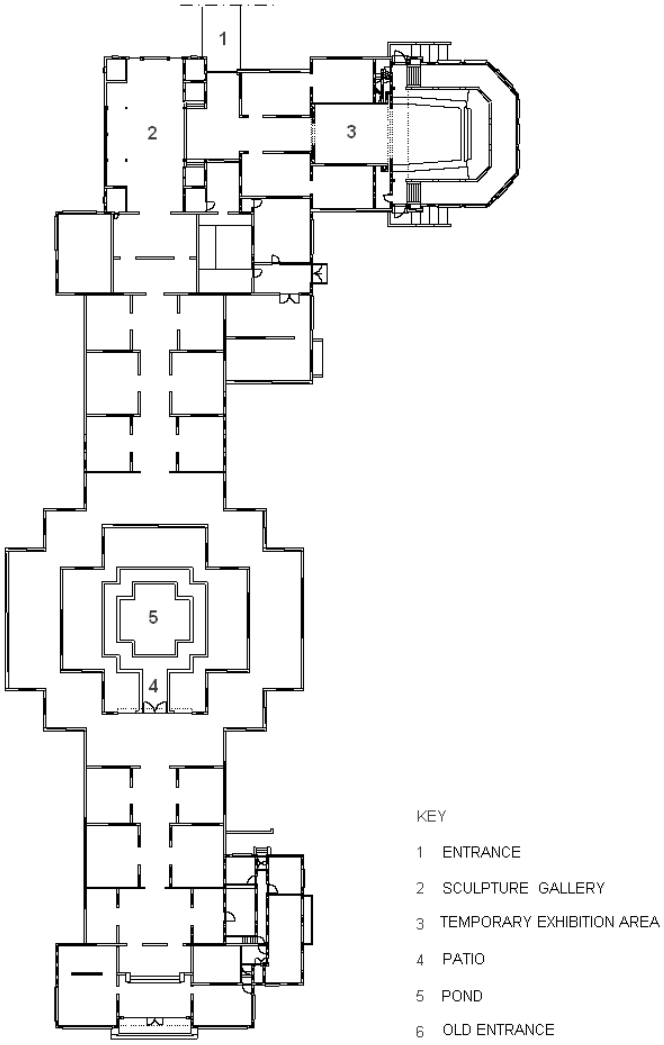
b

^ **FIGURE 7.3** Approaching the museum entrance of Kröller-Müller (a) and Louisiana (b)

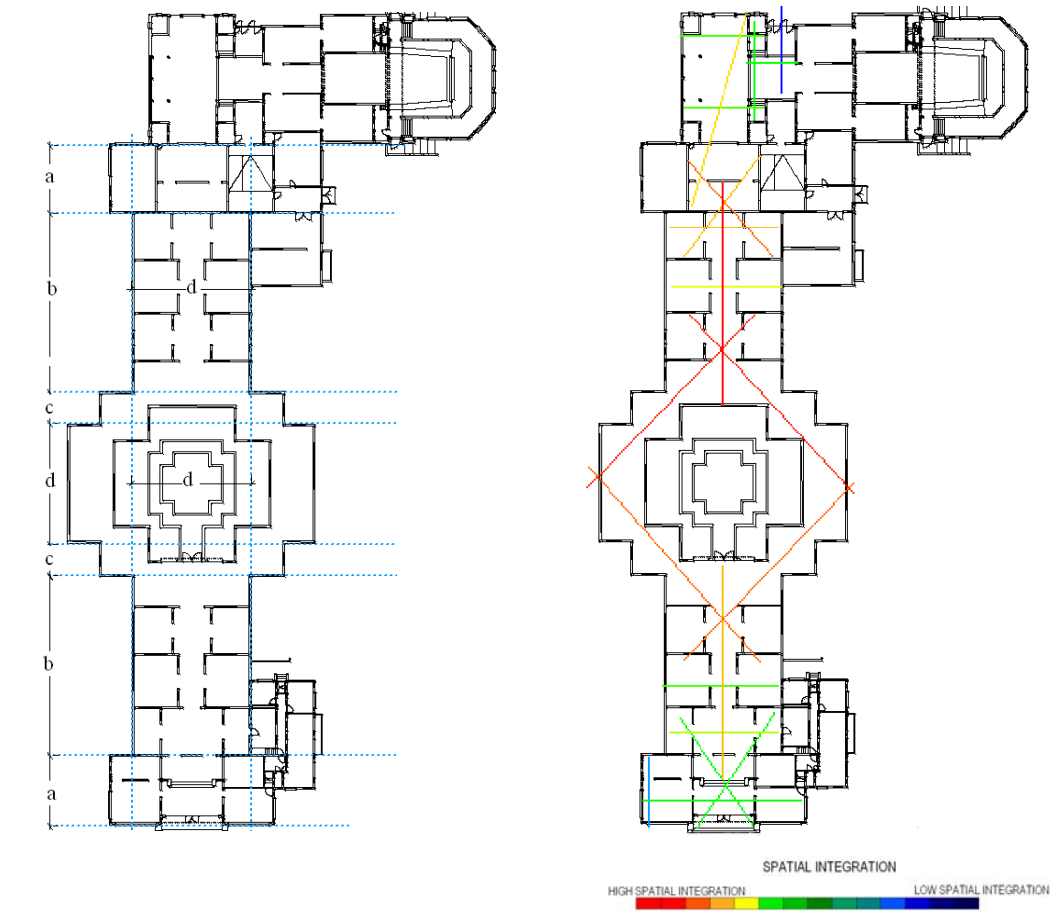
Linear vs diagonal axiality

Just as the whole complex of Kröller-Müller, with the two wings set at right angle, is characterized by axial organization, so is the layout of the van de Velde building marked by an axial structure, a clear syntax and a regular geometry. [**Figure 7.4**] If we look more closely at the original plan (that is, excluding the sculpture gallery), we find that it consists of five parts, similar in shape and size, which alternate rhythmically. [**Figure 7.5a**] The constituent spaces are arranged in simple and geometric relations that reinforce the modular rhythm of the plan and make the overall spatial pattern easy to read and learn. It is of interest that the architect placed the entrance not in the middle of the composition, but on the narrow western side of the building, so its orientation is based on a single axis, rather than two intersecting ones. This major axial line is regularly intersected in right angles by the shorter lines of the side galleries, shaping an orthogonal pattern, and creating a balance between strong and weak axes of visibility and access. [**Figure 7.5b**] However, the unifying quality of the major axis is subordinated to the predominance of the central space which interrupts it, bisecting it. This space is wrapped around an inner courtyard and assumes a cruciform shape; intriguingly, it accommodates a pond in the middle of a similar, cruciform layout. Here the linear organization of space is replaced by the diagonal, and circulation is looped around the courtyard.

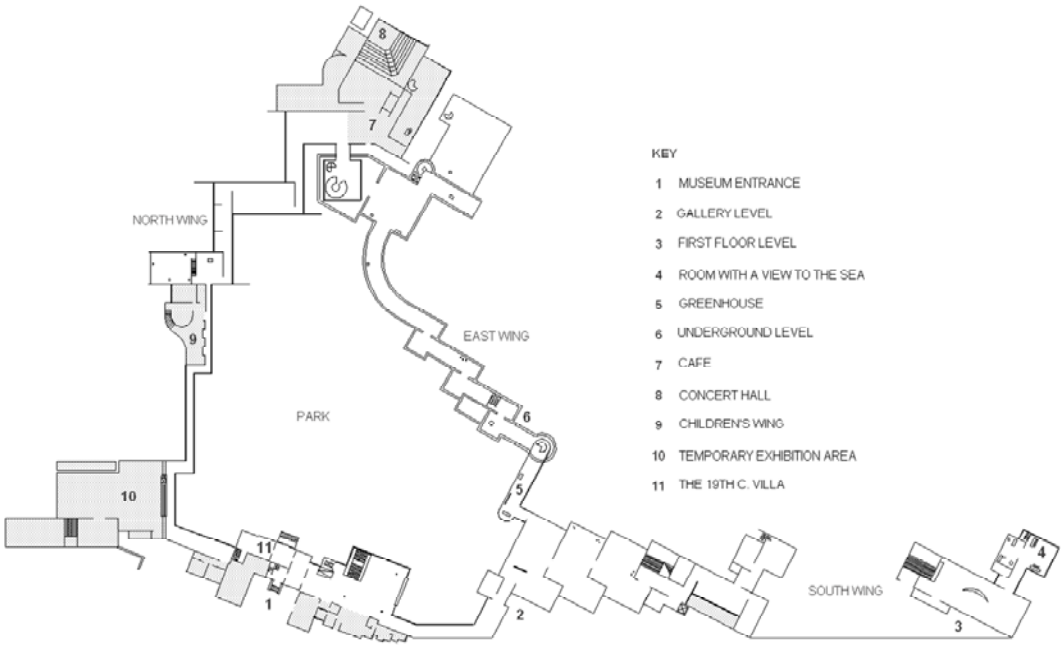
Louisiana moves in the opposite direction: the architects dispensed with the Beaux-Arts rules about axial planning and opted for a free asymmetrical plan, a zigzag architecture. [**Figure 7.6**] The museum is synthesized by individual units, laid out in a staggered alignment, a diagonal pattern which appears to be irregular, almost disordered. The overall plan is characterized by the complete absence of a major, strong axis or an integrator line. [**Figure 7.7**] The sense of spatial continuity seems here rejected; galleries rarely lie on the same axis, maximizing distancing effects, and the transitions from one space to the next become consecutive shifts in the direction of movement. The diagonal axiality and the indirect relations between spaces are further accentuated by the constant changes of levels -one has to move from the ground to the upper floor of the



^ **FIGURE 7.4** Plan of the van de Velde building



^ **FIGURE 7.5** The modular structure (a) and axial structure (b) of the plan of the van de Velde building



^ **FIGURE 7.6** Overall plan of the Louisiana museum

^ **FIGURE 7.7** Axial organization of the Louisiana museum

south wing and then from the underground east wing to the ground floor of the north complex. The global spatial structure is definitely not providing intelligibility or *order*.[10] It is clear that the museum is intended to be experienced not as a pattern grasped at once, but as an articulated structure that one discovers as he moves in it, and understands after having explored the whole, piece by piece.

Unity vs spatial variation

At Kröller-Müller axiality is coupled with the principles of symmetry and hierarchy. The plan is bi-laterally symmetrical both on the horizontal and the vertical axis, which enhances the sense of balance and makes the overall statement of the building one of harmony and unity. Moreover, the fact that the van de Velde building consists of almost identical spaces, equivalent in relation to the axis and connected longitudinally -and not laterally- eliminates any hierarchical order between them, while at the same time, gives a strong controlling effect to the main axis. This uniformity of the galleries strengthens the differentiation of the central space that becomes the focus of the building, both morphologically and semantically. The properties of symmetry and repetitiveness shape a spatial rhythm, which is also reflected in the external structure of the building and the organization of its volumes.

Louisiana is at the opposite extreme: repetition can not be identified in its spatial elements or in their relations. On the contrary, its distinguishing feature is spatial variation -perhaps partly as by-product of the organic evolution of the museum and partly an architectural intention. Spaces differ both in terms of morphology -from the simple rectangular room to the narrow curved gallery- and configuration. Even spaces which at first sight might appear identical are differentiated by a characteristic architectural detail, as, for instance, the progressively increasing ceiling height of the main south wing galleries (S5-7, see **Figure A.1f**). But carefully planned correspondences between complexes act as references and unifying elements;[11] for example, the one-sided glazed corridor of the original building corresponds with the curved, and glazed at one side, corridor

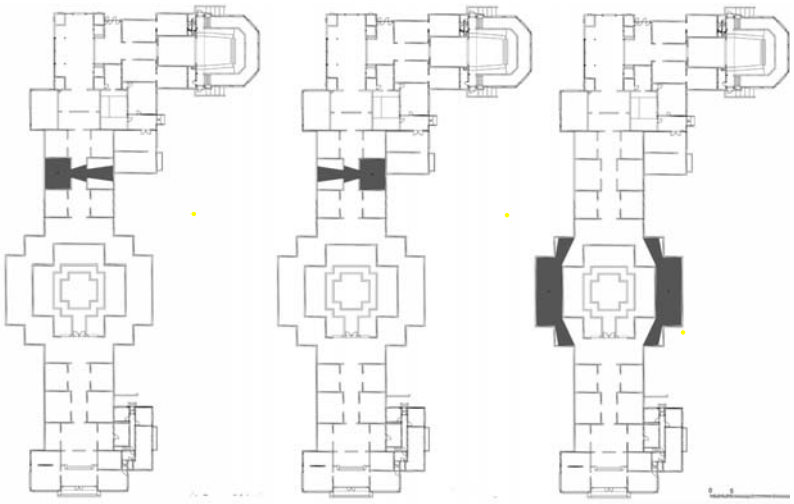
of the 1982 south extension; this, in turn, reappears in the underground curved corridor of the 1991 east addition.[12]

The 'free' arrangement of the complexes of spaces seems to eliminate the sense of hierarchy. As in the case of Kröller-Müller, there is a central element, the park, which unifies the entire complex of buildings and operates like the *integration core* of the museum, but is devoid of any controlling function. On the contrary, as we shall see, the park emphasises the autonomy of the galleries, by making the link between them without being a compulsory space.

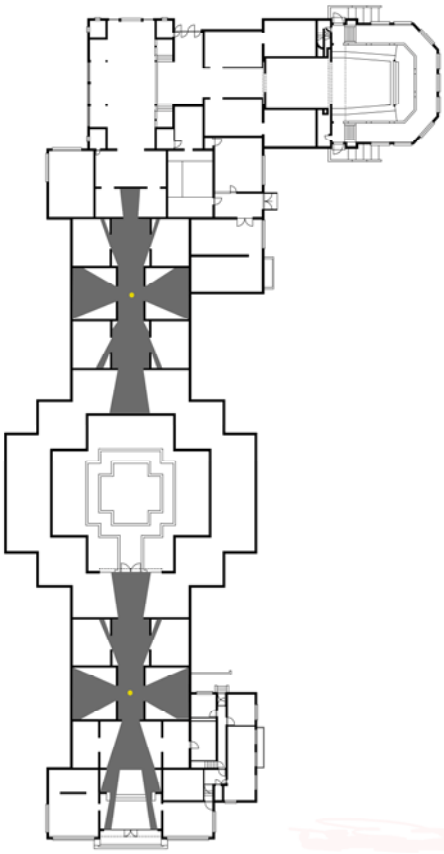
The tension between open visibility and visual insulation

This brings us to the spatial quality that illustrates more vividly the difference between the two museums, that is, the visual relations between galleries and between inside and outside. It is evident that the ordered pattern of symmetry and repetition, that characterizes the space organization of Kröller-Müller, marks also the structure of visual information. If we look at the visual fields generated form the centre of the side galleries, the main axis and the rooms around the patio, we note that they consistently produce a set of symmetrical shapes. [**Figure 7.8**] Though in average up to four spaces can be seen from a space in the layout, there are strategic locations -like the central points of the main axis-, which generate distant views and cover spaces in many directions, allowing the visitor to retrieve an overall picture of the linear sequence. Similarly, the bi-lateral structure of the axis and the wide door openings synchronizes galleries on both sides for the viewer moving along the axis. [**Figure 7.9**] Homogeneous and expansive views seem to be the general principle, which, to a large extent, eliminates the sense of surprise (cf. *Mean number of spaces visible from a space* and *Mean transparency value* in **Table 4.4**, among the highest in the sample).

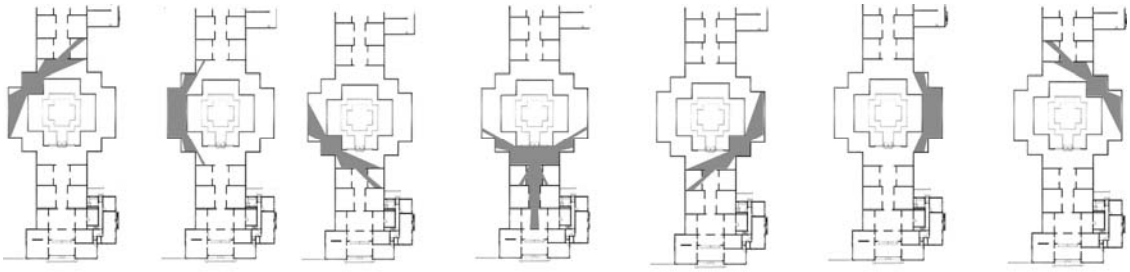
However, as the visitor approaches the central space, the view to the second half of the itinerary is obstructed. The central emphasis in plan, conceptually, becomes a dispersal of focus in the interior, perceptually: it is necessary to go around on all sides to sum up the composition in one view. The open corners of the rooms allow



^ **FIGURE 7.8** Symmetrical visual fields drawn from central points of the Kröller-Müller galleries



^ **FIGURE 7.9** Symmetrical visual fields generated from the central points of the main axis at Kröller-Müller



^ **FIGURE 7.10** Isovists drawn from the central point of the galleries around the patio of Kröller-Müller creating an impression of movement

space to join and expand, and provide diagonal perceptive vistas. If we look at the isovists drawn from the central point of these rooms as a series of successive images, we observe that they create an impression of movement, of a sequence of views constantly changing. [**Figure 7.10**]

This open visibility between galleries is opposed to the almost complete visual insulation from the outside -with the exception of the sculpture gallery and the patio. The windowless galleries create a placeless environment that underlines the distinction between art and nature, heightening the experience of both. One could perhaps detect the main idea behind the visual organization, that is, the gradual visual transition from the inside to the outside, by looking at the original sequence, which has been inverted as a result of the 1977 addition of the Quist wing and the consequent move of the old entrance to the back of the building. In the 1953 plan, the visitor upon entering was offered a distant view of the patio and from close by, a glimpse of the sky. [**Figure 7.11**] Once he had traversed the last sequence of spaces (the first, in the existing layout), and reached the sculpture gallery, he was allowed once again to come in visual contact with the landscape. This alteration of seclusion and openness structured a visual sequence that culminated in an almost completely transparent space, the sculpture gallery, and introduced an element of tension in the spatial experience, which is now reduced.

To take the second point first, at Louisiana the interplay between building and natural environment constitutes the distinguishing feature of the museum. Glazed corridors and landscape views have been part of the museum concept from the outset: more than the provision of framed views of nature, the original galleries interweave art with natural setting.[13] [**Figure 7.12**] Passages of dramatic confrontation with nature still occur, but they alternate with the viewing of art. They constitute in effect 'intervals' for relaxation that, situated at the end of each sequence, punctuate the narrative and become poetic transitions that tie the building to the landscape: here art is discretely present or completely absent, and it is nature that becomes the focus of attention. [**Figure 7.13**]

On the whole, the visibility structure is based on variation: long axial views precede short glimpses of spaces, and controlled vistas alternate with bird's eye

^ ENTRANCE ^ PATIO ^ SCULPTURE GALLERY

^ **FIGURE 7.11** (a) The original (1953) visual sequence at Kröller-Müller [*Sembach* 1989] as compared to the actual one (b)

^ **FIGURE 7.12** The interplay between building and natural environment at Louisiana

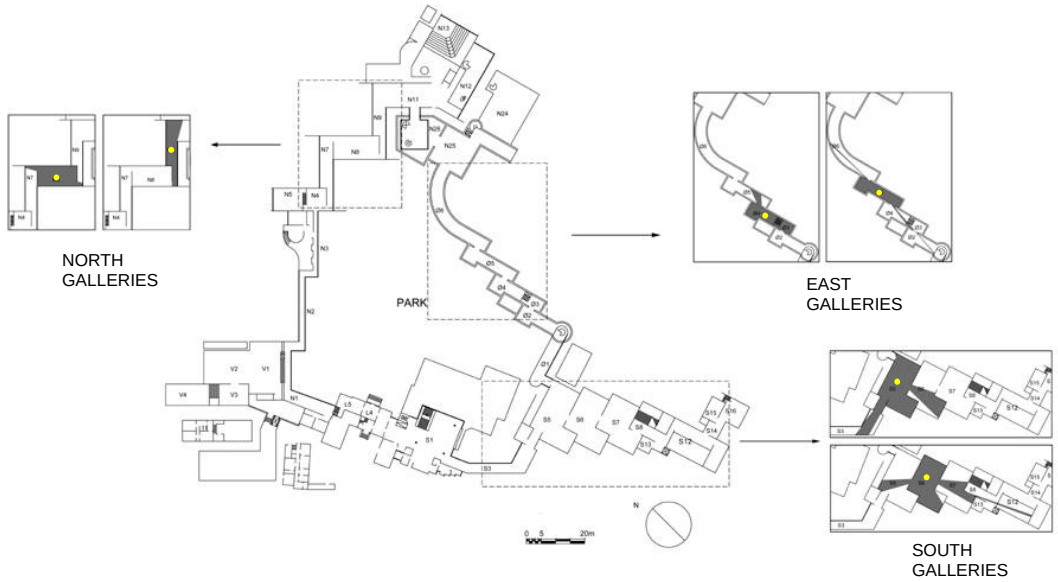
^ **FIGURE 7.13** Transition spaces open to the park punctuate the narrative at Louisiana

views from double-height rooms. For example, in the south wing, the diagonally aligned galleries provide information continuity through a succession of vistas, a visual pattern which comes in complete contrast to that created in the east and the north wings: here we have to do either with remarkably narrow vistas though spaces or with views systematically restricted to the local scale of a single space. [**Figure 7.14**] Instead of the homogeneous and repetitive visual fields of Kröller-Müller, isovists at Louisiana are of a heterogeneous set of shapes and more importantly, display constantly changing information, images that have nothing in common with the ones already seen or those that follow. But heterogeneity is coupled with visual concealment, short lines of sight that intersect orthogonally. On the whole, visibility is not more extensive that accessibility, and so it cannot substitute for movement. In other words, one has to move in space in order to have access to the gradually revealed information, to images and spaces that unfold progressively. In addition, the fact that the moving observer approaches galleries at an angle and comes across them rather unexpectedly enhances the sense of expectation and self-discovery (cf. *Mean number of spaces visible from a space* and *Mean transparency value* in **Table 4.4**, among the lowest in the sample).

It could therefore be argued that the tension between open visibility and visual insulation constitutes another point of difference between the two museums: at Louisiana the former quality governs the relationship to the outside, and the latter, characterizes the visual organization of the interior space; at Kröller-Müller, the reverse is true. However, a notable affinity should be pointed out: neither of the two museums seems concerned with providing visitors with a total impression of the layout from any central location, or with creating a tension between the local and the remote.

Construction of the route

To pursue the spatial analysis of the two museums a step further, we suggest moving to the organization of circulation and focusing attention on the properties



^ **FIGURE 7.14** A sample of visual fields drawn from central points in galleries at Louisiana

of their constituent spaces, which can show most clearly their experiential differences.

The layout of Kröller-Müller is essentially a single sequence which takes two forms: the visitor starts with a linear sequence -with the main axis branching off on both sides-, which is interrupted by a looping route, and then continues through a linear sequence, which is in effect the repetition of the first one, and leads to the beginning of the chronology and the end of the itinerary. It consists mainly of two types of spaces: about half are dead-end spaces and half, *c-spaces*. [**Figure A.3e**] The fact that the side galleries are individualized and not organized in a sequence allows a measure of choice: the viewer is not forced to pass though one space to get to another; he can also move through the main axis without having to cross the side galleries. This potential for choice is opposed to the obligatory passage through the loop around the patio, which is in effect an extension of the axis, part of the circulation spine of the gallery. This means that visitors are offered some degree of flexibility on the local scale, by being able to skip parts of the gallery, but are forced to follow the single direction of movement in terms of global scale. In addition, they have to return the way they came in, as a result of the addition of the new wing. It is therefore no surprise that Kröller-Müller has the highest values in the sample in terms of length of sequence, that is, *c-sequenceTotal* and *c-sequenceMean,* see **Table 4.3**).

Like Kröller-Müller, Louisiana is a highly sequenced experience, since each pavilion forms a single large ring of spaces and, in turn, the localized sequences of the pavilions form a continuous circuit of movement. But it is the pervasive presence of the park that enriches its pattern of circulation. If we look at the typology of the spaces and include their links to the outside, we find that ten spaces, that is, one-fourth of the total, is *d-type* spaces (see **Table 4.3**); remarkably, all *d-spaces* are identified with transition spaces that are directly open to the park. [**Figure A.3f**] The rigid circulation system on the local scale becomes flexible on the global one. In other words, one can omit an entire complex but not a gallery, since once inside the pavilion, every visitor has to go through the same sequence. The park becomes the key element of the layout: it offers exploration opportunities and provides scope for differentiation of visitors' paths; and,

through this, it counters the separation enforced by the spatial sequencing, reinforces the relations between visitors and maximizes the probability of informal encounter.

Concluding the above discussion on the spatial structure, it could be argued that at Kröller-Müller possibilities of local choice are available within the pre-determined global direction, which, coupled with visual continuity, guides the viewer who is in visual isolation from the outside. In contrast, at Louisiana local choices are restricted, but the global route is open and fluid, providing the viewer with a sense of unexpectedness as he explores his way and experiences the interplay between art and nature.

7.3 Morphology of display

It follows that Kröller-Müller tends to secure the dominance of order and harmony, while Louisiana transfers attention to exploration and dynamism. The question that arises then is: how do these qualities relate to the presentation of their collections and the display layout?

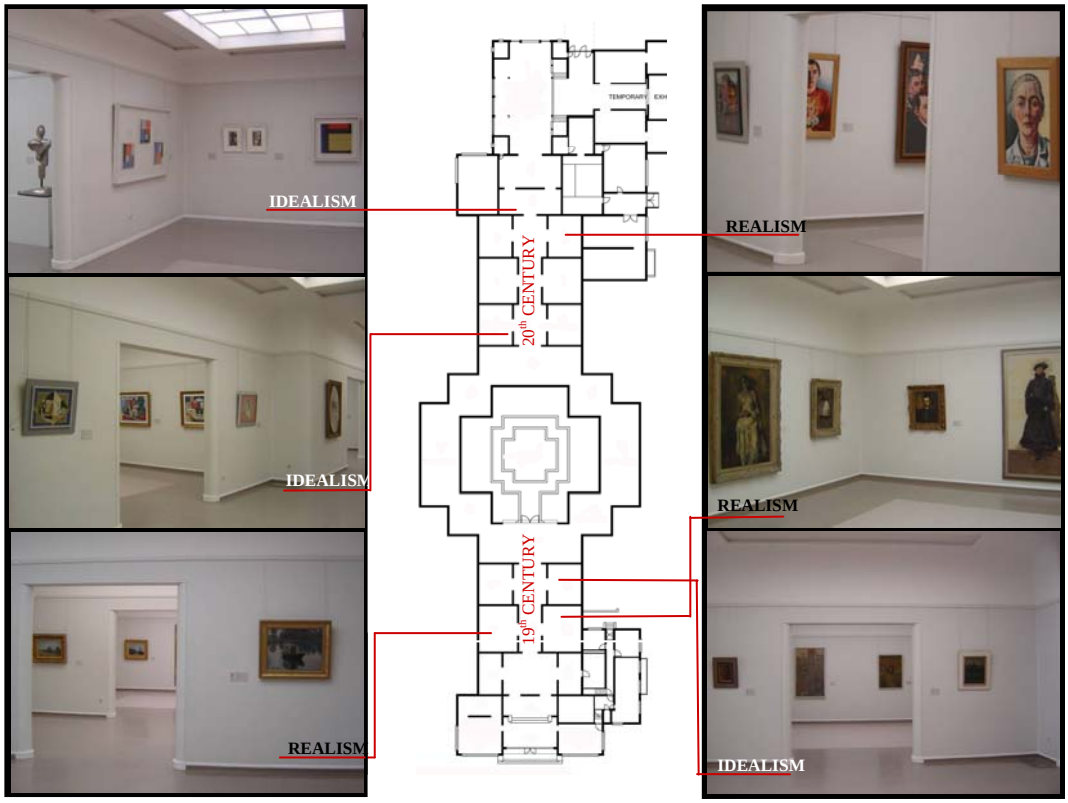
The spatialization of H. Kröller's art theory

The collection of the Kröller-Müller, obviously representing a personal choice, focuses on the second half of the nineteenth and the beginning of twentieth century,[14] and includes mainly French, Belgian and Dutch art. Rather than arriving at a historical completeness, H.Kröller's intention was to illustrate her specific theory of the development of art. The gaps are therefore intentional and meaningful. On the whole, and with the exception of the highlight of the collection, the 273 works of *van Gogh*, the emphasis is not placed on well known artists and masterworks.[15] What seemed of critical importance for H. Kröller was that, rather than imitating nature, the works included in the collection, translated thoughts and emotions into visual forms, expressed a mental and spiritual attitude. Accordingly, the art of the period 1500-1900 is not represented, since it is '*mostly realistic*'; similarly, key movements of the early twentieth century (such as

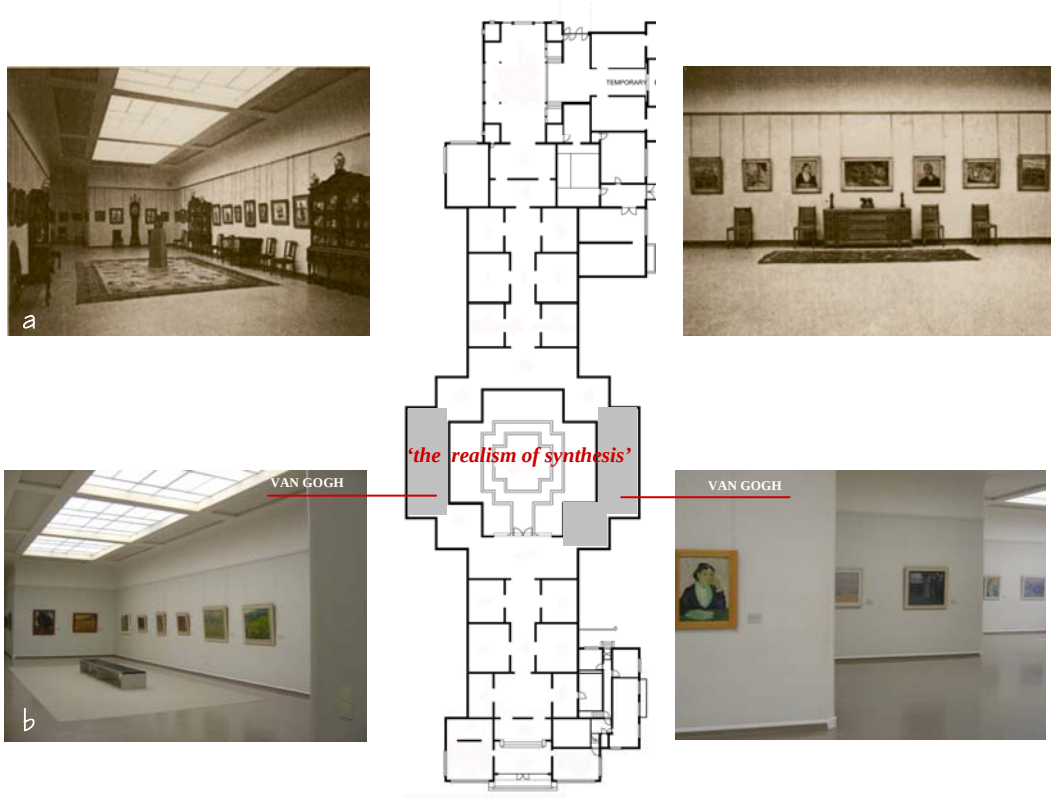
expressionism and surrealism), are rejected because of their impassioned expressiveness. On the contrary, paintings of old masters, dating from the sixteenth and seventieth centuries, as well as sculpture and ceramic from different cultures (i.e. Egypt, China) are part of the collection in order to lend support to H. Kröller's argument that the spiritual in art is timeless.

The articulation of space supports the narrative structure which is based on H. Kröller's twofold argument: first, that there are two movements in every period of art, what she called '*realism*' and '*idealism*'[16] (Oxenaar et al. 1989, p.73); and secondly, that abstract art had always existed and is not a phenomenon of the beginning of the twentieth century (Oxenaar et al. 1989, p.62). Let us explore the first point further. The two linear sequences of the layout serve her broad chronological division of art: the first component is devoted to the twentieth-century 'idealistic' art, and the second, to the nineteenth-century, naturalistic art. [**Figure 7.15**] The bilateral symmetry, the repetitive uniformity of the spatial design and the autonomy of the galleries echo H.Kröller's intention to show that the two movements co-exist in every period of art, and avoid '*taking sides*' (Oxenaar et al. 1989 p.73, 95). The arrangement of space encourages comparative looking, as for example, in the case of the paintings of *Herbin* and *Metzinger*, cubist works in terms of technique, but realistic in terms of representation, which are displayed in room 9, opposite to room 10, devoted to the abstract works of two key figures of Cubism, *Braque* and *Gris*. [**4-5** in **Figure 7.18**] Similarly the figurative paintings of *Beekman* influenced by the De Stijl aesthetic, in room 7, are juxtaposed to the abstract works of *Mondrian*, founder of the De Stijl movement in room 8.[17] [**2-3** in **Figure 7.18**]

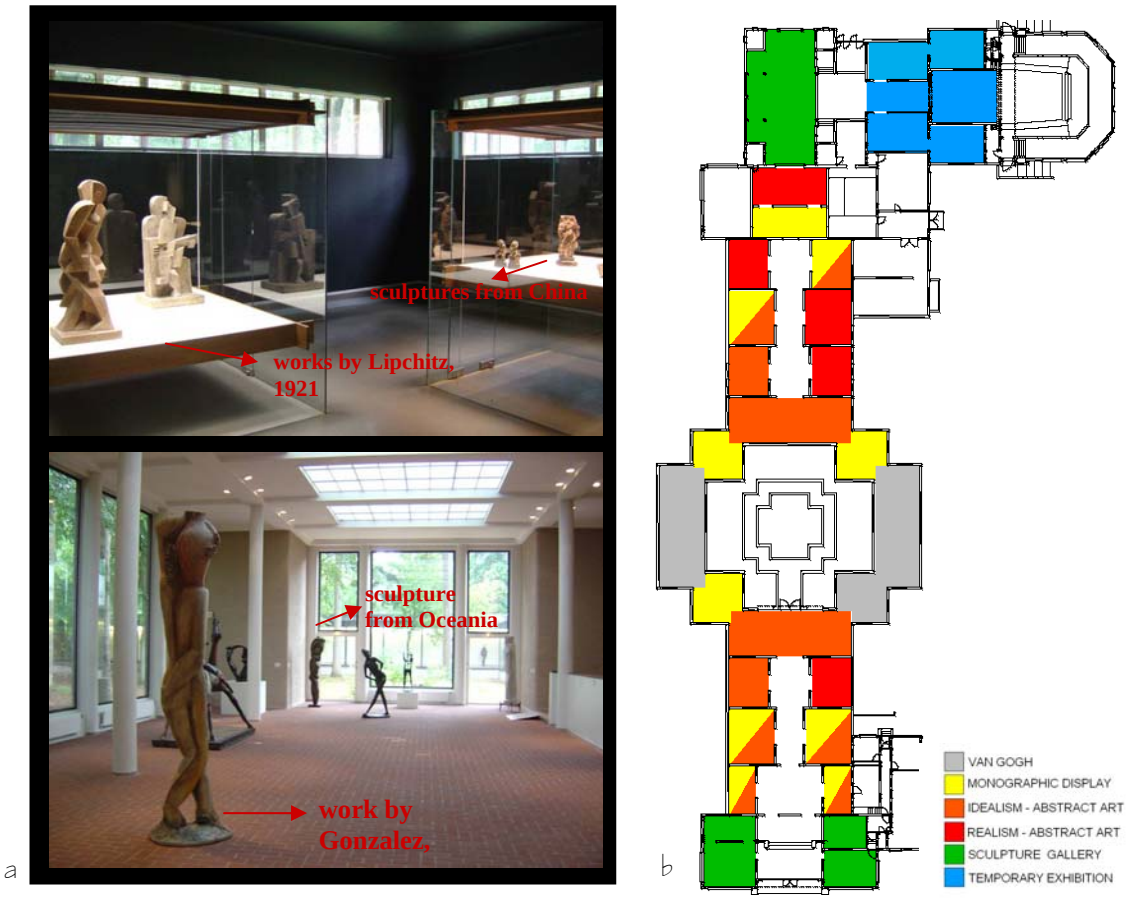
At the end of the first sequence, the linear narrative is disrupted, and a wall characteristically obstructs the axial discovery. Views are gradually channelled towards the perimeter of the patio, time seems lengthened. Unconventionally, the key rooms in terms of contents, dedicated to the oeuvre of *van Gogh*, are situated halfway the itinerary. [**9** in **Figure 7.18** and **Figure 7.16**] The transition in space, the morphological differentiation of the central element, emphasizes the shift in art. According to H. Kröller, the oeuvre of van Gogh cannot be classified in one of above movements, realism and idealism, but represents the culmination of both,



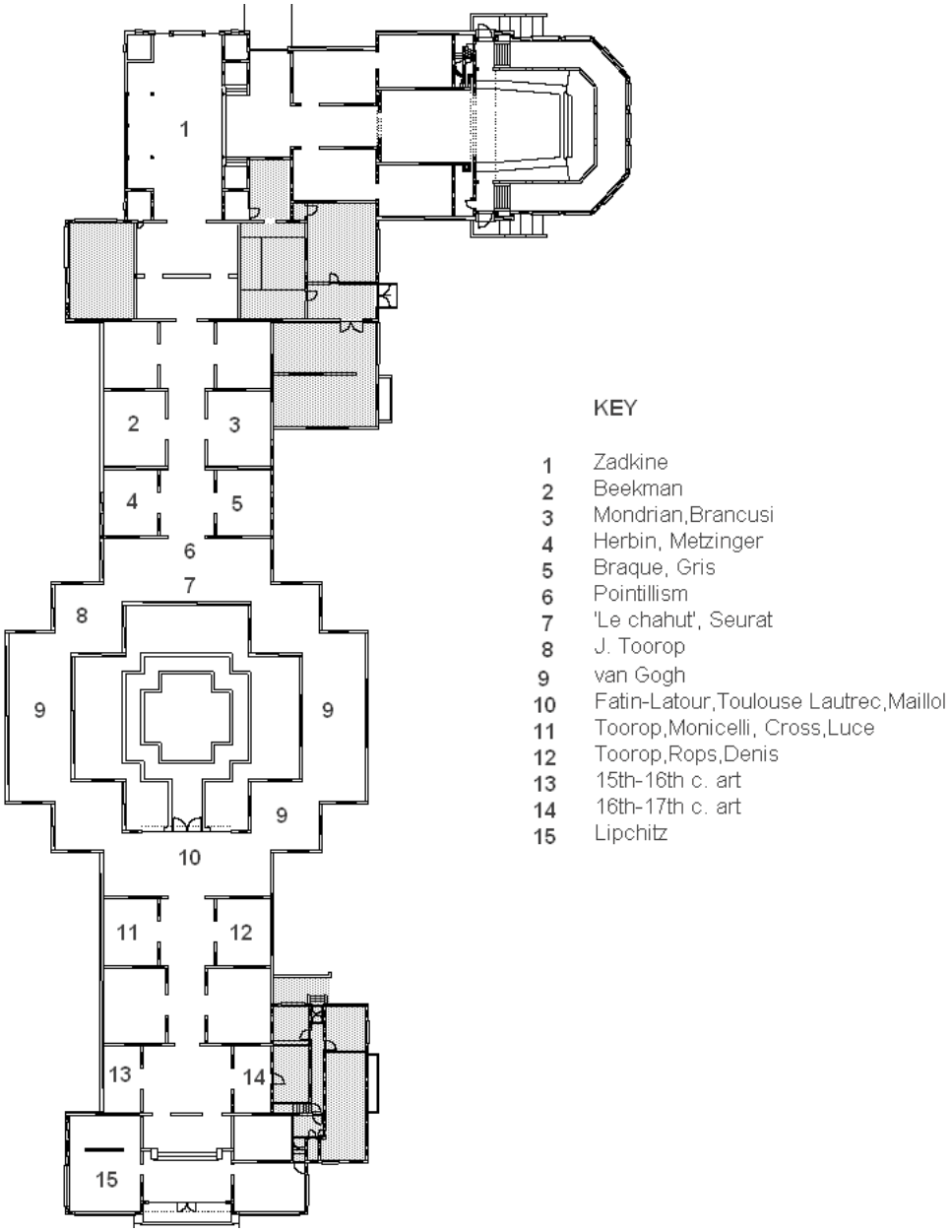
^ **FIGURE 7.15** The juxtaposition of *realism* and *idealism* at Kröller-Müller



^ **FIGURE 7.16** The display of van Gogh at Kröller-Müller: (a) in 1938 [*Oxenaar et al*, 1989, p.102] and (b) in 2004



^ **FIGURE 7.17** Views of the sculptures galleries (a) and display layout (b) at Kröller-Müller



^ **FIGURE 7.18** Plan of the van de Velde building showing the locations of key displays

the '*realism of synthesis*'.[18] The central space constitutes an obligatory passage and the connecting point of the narrative; the heart of the building accommodates the fulcrum of the collection.

The second key concept of H.Kröller, that abstraction is not related to a certain period or a particular culture, is powerfully reflected in the sculpture galleries, which located at the beginning and the end of the itinerary, create a circular structure. [**Figure 7.17**] They show together ancient non-western art and western avant-garde art of the early twentieth century. At first sight the viewer can hardly distinguish the figures of *Lipchitz* from the Chinese sculptures (room 27), [**15** in **Figure 7.18** or the sculptural works of *Zadkine* from a statue from Oceania (room 1). [**1** in **Figure 7.18**]

These basic guiding principles apart, the display is, at the time of the study, a watered-down version of H. Kröller's original installation. [**Figure 7.17b**] For example, as we have seen, the abstract compositions of *Mondrian* are shown in room 8; but his early works as naturalistic painter are hung along the main axis framing the opening of the room -a hanging methodology quite different from the typical repetitive juxtaposition of *realism* and *idealism* in opposite galleries. Similarly, the oeuvre of an artist can be shown in a monographic display[19] and at the same time, individual works by the same artist can be included in displays that offer historic overviews. The distribution of the paintings of *J. Toorop* is a case in point: apart from the monographic display in room 12, [**8** in **Figure 7.18**] two additional galleries (rooms 19 and 20) show his works. [**11-12**]

The display of *van Gogh* is no less inconsistent: organized around the phases that marked his oeuvre,[20] it occupies the long sides of the central space (rooms 13 and 16) as well as the west corner room (room 16a), [**9**] which means that it is regularly interrupted; between the works of *van Gogh* intervene three monographic galleries (rooms 12, 14, 17) devoted to his contemporaries,[21] and two comprehensive displays (rooms 11 and 18) [**6,10** in **Figure 7.18**] that make the link –both physically and conceptually - between the central ring and the linear sequences.[22] To these difficulties that arise from the heterogeneity of installation principles and the lack of a rigorous adoption of the original ideas of H.Kröller, one could add the fact that the narrative begins with the most

contemporaneous works and goes back in time, since the move of the museum entrance was not accompanied by the reversal of the chronological sequence.

It can therefore be argued that this absence of a single display imperative and the fact that objects are not in strict relationships between them, seem to be in disagreement with the logical information and the abstract message intended to be communicated. In other words, the fact that the narrative structure relies on intellectual links, rather than visual juxtapositions, and is based on a very specific view of art, imply that the viewer needs a key, and a certain degree of structure, to read the display, which otherwise is recognizable only to those with some prior knowledge of H.Kröller's theory of art, able to mentally reconstruct the individual episodes into a coherent whole.

This need for order is also reflected in the distribution of objects in space,[23] which seems consistently aimed at creating symmetric compositions and balanced groups. Big scale paintings are centred on the wall, opposite the door openings, framed by symmetrically arranged works of diminishing size. On the whole, the display is homogeneous, with no tensions or focal points, but the few exceptions that occur are meaningful: as, for example, the installation of H. Kröller's favourite painting[24] at the end of the main axis that freeze-frames the view and enhances the impact of the work; [**7** in **Figure 7.18** and **Figure 7.19a**] or, the vista through the central galleries featuring the works of *van Gogh* that accentuates visual depth and allows synchronic perception of the paintings hung on both sides and on varying visual planes, creating a completely different visual experience from the repetitive frontal views of the linear sequences. [**Figure 7.19b**]

The visual arrangement of the collection at Louisiana

The collection of Louisiana initially included exclusively modern Danish art but soon became international, taking its starting point in the years just after the Second World War, and focusing on major movements of European and American art. Like H.Kröller, K.Jensen did not aspire to create a comprehensive collection but aimed '*to exhibit the work of relatively few artists and preferably more than one piece by each*' (Jensen 1984, p.261). But unlike her, he did not

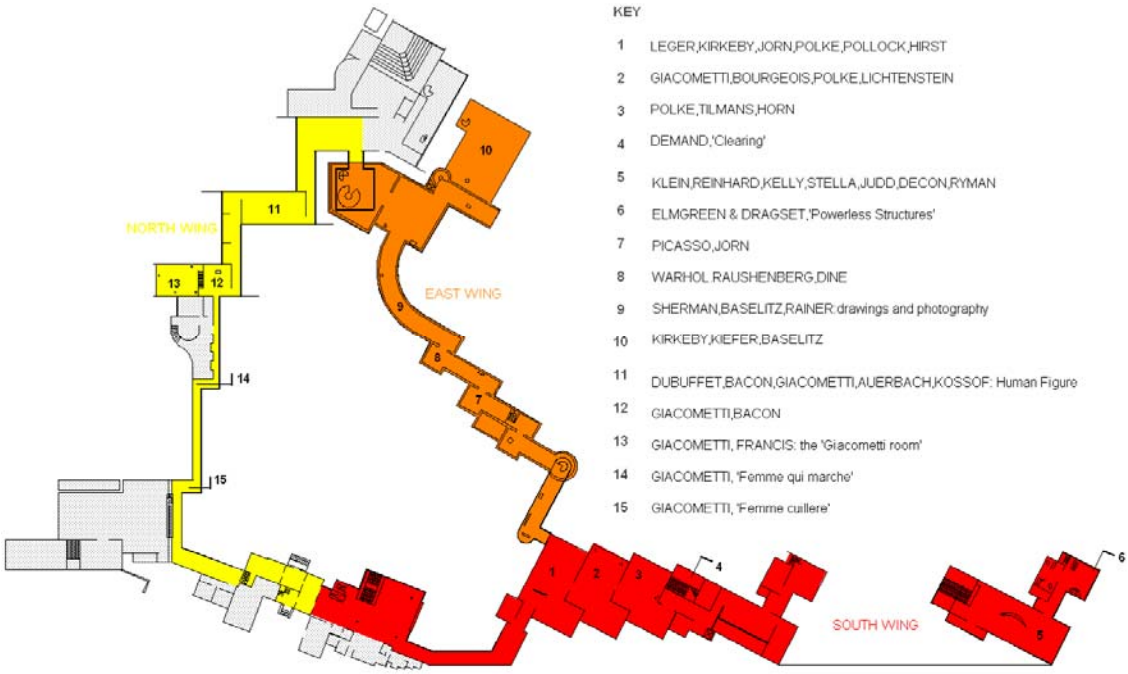
intend to '*lure the visitor into believing in a development leading to something better and richer*' (Louisiana 1959, p.5). The key factor for the acquisitions was that the works possessed '*a visual power of expression*'.

Accordingly, the display of the collection is not school or theme-based nor is concerned with the creation of a continuous narrative thread throughout the museum. Each complex accommodates a self-contained display and, characterized by formal and conceptual unity, works independently from the preceding or the following one. [**Figure 7.20**] Precisely, the south wing is dedicated to the recent acquisitions of the museum (2001-2004), and focuses on the oeuvre of artists already represented in the collection. The east wing explores major artistic movements, arranged in a broad chronological sequence, while the display in the north wing is organized around the theme of the human figure, a constant preoccupation in the art of '50s until the late'90s.[25] [**Figure 7.21a**] The main idea behind the arrangement of the collection is the 'principle of climate', '*to create a meaningful totality in each room*' (Nittve 1997).

'*We attempt to arrange the collection*' argued Jensen (1984, p.265), '*so that the works are experienced in the best imaginable circumstances, even by visitors who are not familiar with modern art; we believe the works will speak for themselves*'.

In other words, Louisiana adopts a visual arrangement of objects. Rather than promoting the uniqueness of the works, the emphasis is placed on relationships (and not necessarily similarities). Artists, apparently different in respect to aesthetic goals or artistic movements are grouped together so that their interaction brings out traits in common, reveals correspondences, and creates a unity of atmosphere. [**Figure 7.21a-d**] The expressionistic power of the paintings of *Jorn*, a member of COBRA group, creates visual continuity with late *Picassos* (room Ø 4), as they share in common the wildness of the brushwork, the spontaneity, and blending of reality and dream. [**Figure 7.21b**] The dark atmosphere and the compelling 'pathos' is the common themes that put in dialogue two German expressionist artists, *Kiefer* and *Baselitz*, with the abstract expressionist Dane

^ **FIGURE 7.19** View down the main axis (a) and through the central galleries (b) at Kröller-Müller



^ **FIGURE 7.20** The display layout at Louisiana

artist *Kirkerby* (room 24). [**Figure 7.21c**] It could also be argued that the common language of the works on display opens up for wider level of communication. For instance, in the upper floor of the east wing, room 9 assembles the monochrome paintings of *Klein* (member of the 'New Realism'), and works of abstract expressionists (*Reinhard, Kelly* and *Stella*) and minimal artists (*Judd, Decon* and *Ryman)*: they all explore the idea of the canvas as a two-dimensional colour field and the emphasis on the autonomous, purely visual, reality of colour.

More importantly, by negating the intellectual approach and favouring aesthetic readings, Louisiana involves the viewer in making the links between works; as for instance in the case of the poetic juxtaposition of works of two abstract expressionist artists, *Giacometti* and *Sam Francis* (room N5): it is an aesthetic play between the rough surface of the works of the former and the forms created by the use of colours in the paintings of the latter.[26] [**Figure 7.22a**]

Accentuating visual links between works and making associative connections has a twofold effect: on one hand, it creates unexpected juxtapositions and assigns new meanings to well known works, intriguing for the specialized viewer; on the other hand, it suggests eloquent dialogues, and creates a 'plot' which is easily read and appreciated by all visitors. This relates to another atypical feature of Louisiana, the regular re-arrangement of the collection, seeking to adapt to the multiplicity of audiences (Nittve 1997). Rotating the collection bi-annually is an established contemporary practice, but what is innovative in the case of Louisiana is the concept behind the display changes: in summer, when the audience includes a considerable number of tourists, the display focuses on key works of the collection and is chronologically organized, contributing to the '*learning process*'. On the contrary, in winter, when the number of first time visitors falls off, there is more scope for unexpected pairings of works which encourage visitors to see them in a different light; in other words, the display emphasizes the '*disrupting side*', focuses on the '*unlearning process*' (Nittve 1997).

However, what seems interesting is that, within these display changes, there is a constant: to permanently display key works in specific and specially designed locations.

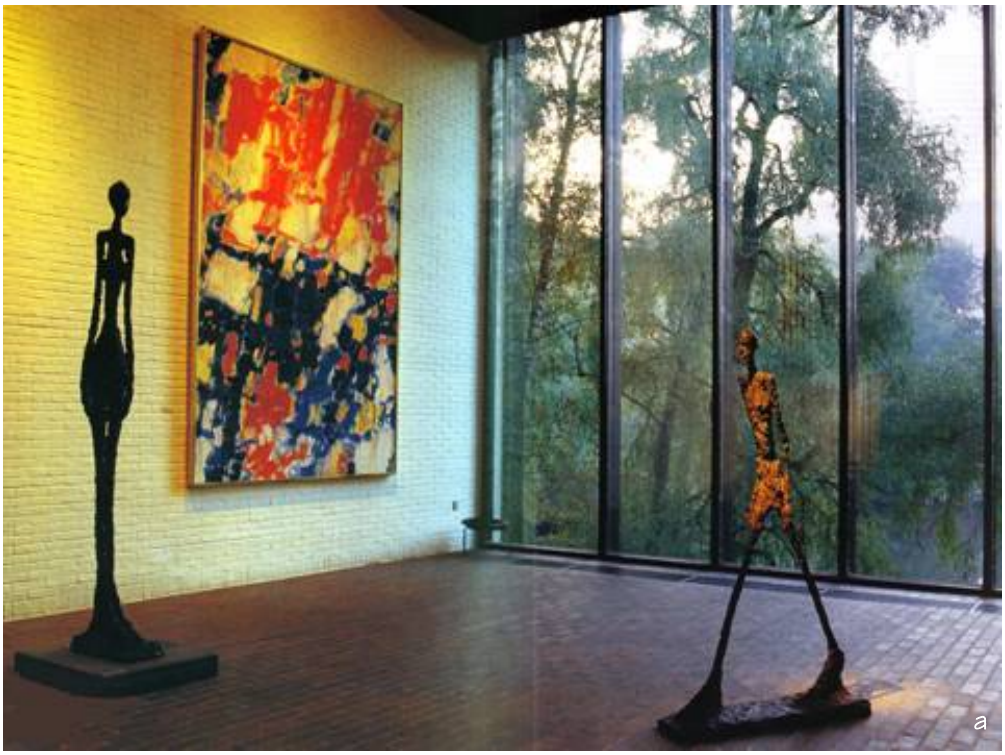
^ **FIGURE 7.21** Installation views of the collection at Louisiana

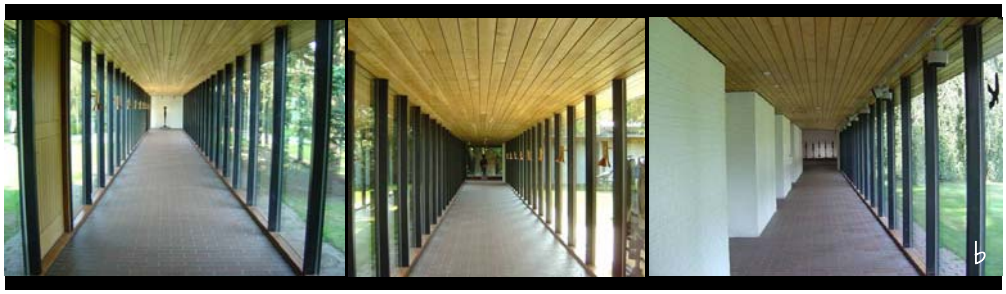
'*When coming to the museum it is important to encounter certain artworks in the same place, thus meeting something familiar*'. Finding '*a particular painting or sculpture in its expected place provides a fixed point through all the changes which typify a museum of modern art with so many exhibitions and different events*', argued Jensen (1984, p. 267-268).

So at Louisiana, the focal point of the collection, the 24 works of *Giacometti*, are permanently arranged, so that people can return and always find them in the same place (Skjøth 1989); these rooms act as '*islands of memory*' (Elderfield 1998, p.231) and establish a sense of familiarity. It is no accident that special attention was given to the design of these galleries as well as to the sequence leading to them. One of the initial requirements formulated by Jensen was to design a gallery overlooking the lake (Welscher 1998, p.82). This room is where the *Giacomettis* are permanently displayed. Though on the whole spatial qualities are not systematically employed to enhance the impact of objects, the sequence preceding the '*Giacometti room*' is carefully planned: at the end of the long vistas though the narrow glazed corridors, which lead from the entrance to the '*Giacometti room*', are placed the early works of the artist, which are influenced by the African and Egyptian art;[27] thus visitors are gradually led to the contemplation of his later and characteristic elongated figures[28] in the core galleries, and their anticipation is enhanced. [**Figure 7.22b**]

The same tendency, to relate objects with space -with the natural setting in particular- and create a '*topology*' of works can be found throughout the museum. The placement of *Th. Demand*'s photographic work '*Clearing*' in juxtaposition to the view to the park through the door opening [**Figure 7.23a**] suggests a play between the natural and the artificial, between inside and outside. Similarly, a kind of visual illusion is created by the installation of '*Powerless Structures*' by *M. Elmgreen* and *I. Dragset* - a diving board that cuts through the glass window overlooking the sea. [**Figure 7.23b**]

In conclusion, it is suggested that, in terms of display strategy the two museums share a key feature in common, the permanent arrangement of the highlights of their collections, the *van Goghs* at the Kröller-Müller and the *Giacomettis* at Louisiana. But they differ emphatically as far as the organization of the collection and the character of the narrative are concerned; to the





^ **FIGURE 7.22** View of the '*Giacometti room*' at Louisiana (a) and the sequence leading to it (b)

^ **FIGURE 7.23** Relating objects with the natural setting at Louisiana

intellectual curiosity of Kröller-Müller, Louisiana opposes the visual curiosity, and to the didactic character of the former, Louisiana juxtaposes an enjoyable contemplative experience.

7.4 Morphology of movement and exploration

Having identified key differences between the two museums in terms of laying out space and objects, we now come to the critical question: are these differences reflected in the ways visitors move around in space and explore the displays?

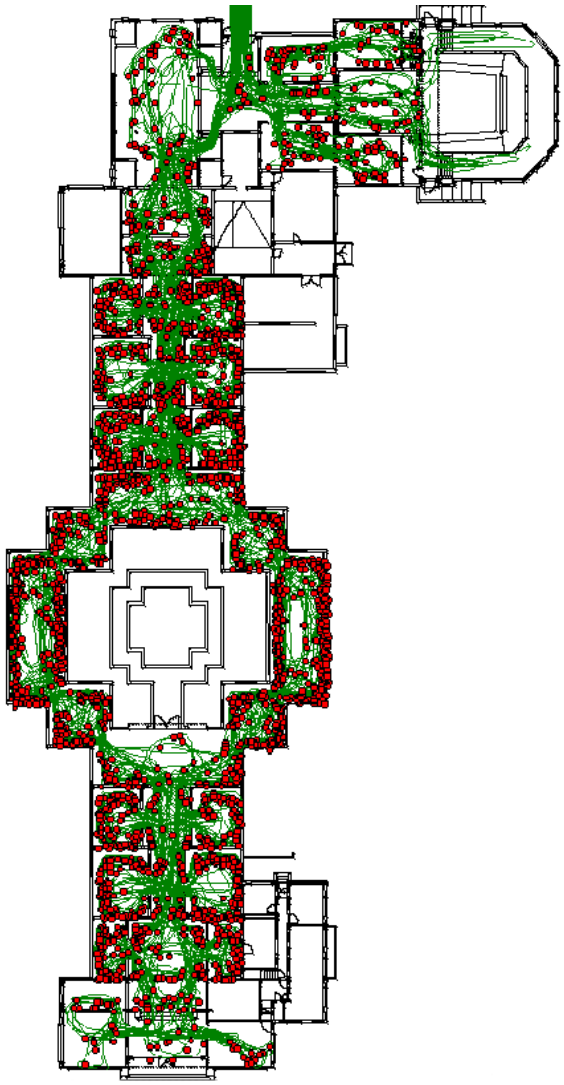
Space use patterns at the Kröller-Müller

Let us begin by looking at the pattern of movement and exploration at Kröller-Müller[29] as reflected in the itineraries of 31 visitors tracked throughout their visit. [**Figure 7.24**] To note first that the initial flow of movement is equally split between the van de Velde building and the new wing, [30] while few are those who start the exploration from the sculpture garden. As argued earlier, the highly sequenced layout allows only localised choice, that is, choice of galleries; the major flow of circulation is predetermined and therefore predictable : the vast majority of visitors gets to the whole wing and omits few spaces; [31] also, it tends to browse the first spaces while moving along the axis, and focus attention on the *van Goghs*.

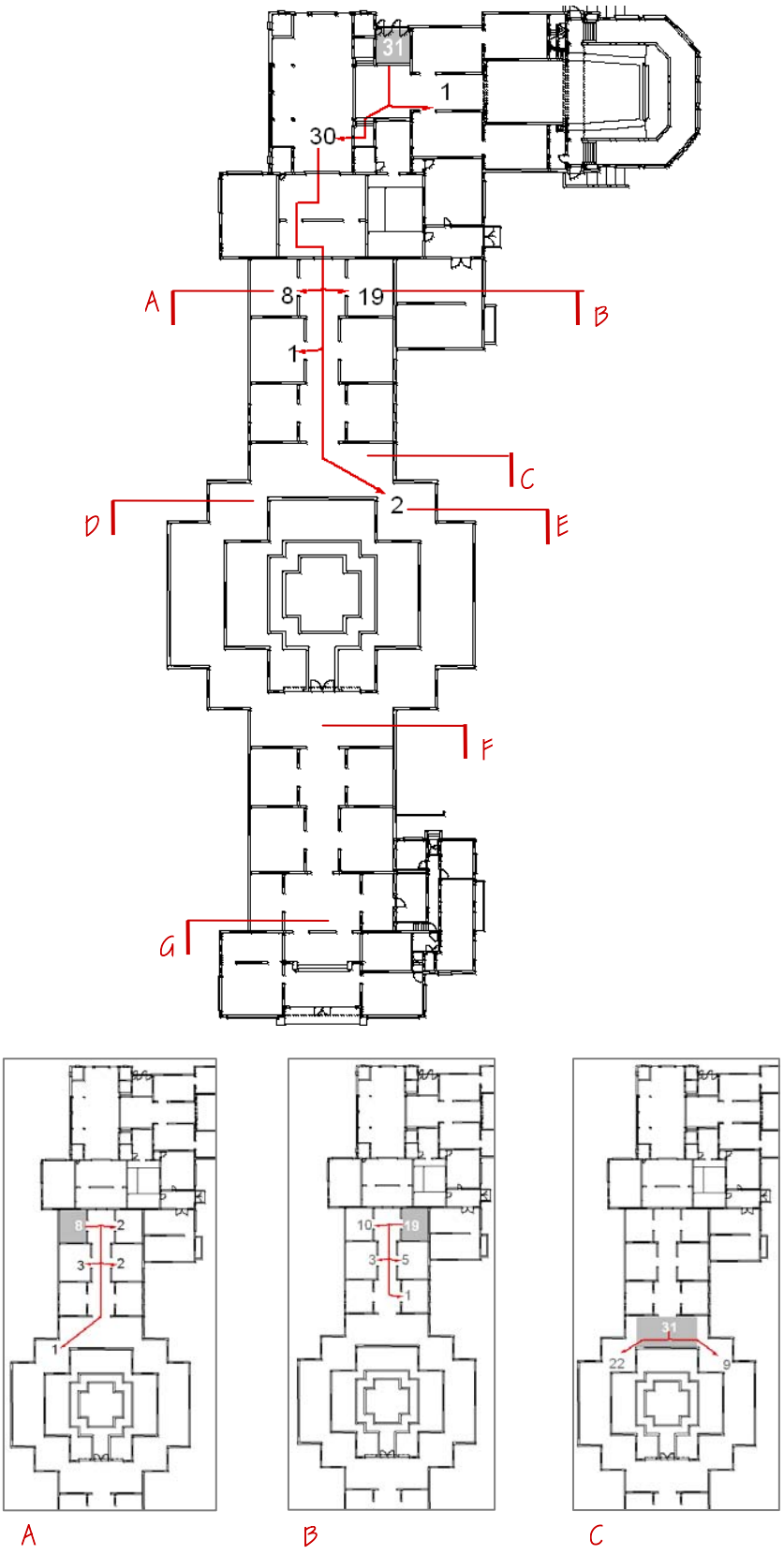
But looking closer at the pattern of use in the van de Velde wing, there are some interesting points to be made. The starting point of the exploration is for almost all visitors (97%) the permanent collection (and not the small temporary exhibition shown in the left complex); [**Figure 7.25**] once they find themselves in the beginning of the main axis, their attention (63.3%) is attracted by the first left side gallery. But beyond that point, their paths show less consistency: a significant number (42%) explores the galleries of the first sequence alternately, a small percentage looks each side separately, and less than half of visitors (48%) move in a non systematic way. A slightly different pattern is found in the second complex of spaces. Here the numbers are split between those who opt for a parallel

exploration of the side galleries, and those who visit one side in the way in and the opposite in the return route. This difference in the observed exploration pattern between two identical sequences might be explained by the following argument: the distant view from the central space down to the end of the building gives visitors a picture of what remains to be seen, allowing them to plan their route and the way back. However, the percentage of visitors who, branching off from the main axis, tend to access the side galleries selectively and with no specific order is still significant. This observed exploration pattern is not in accordance with the design intentions in that on the whole, only about one-third of visitors tracked explore the display in the way it was intended to be read, as a juxtaposition of artistic movements accommodated in the opposite, symmetrically arranged galleries. Though the synthetic chapter that follows will allow us to expand on this point and pose the question of the relation between arrangement of space and presentation of the collection in a new light, let us note here that one possible reason for this lack of synergy between functioning and conceptual structure might be the absence identified earlier, of a consistent and intelligible display strategy that, supported by the spatial design, would facilitate the reading of the exhibition.

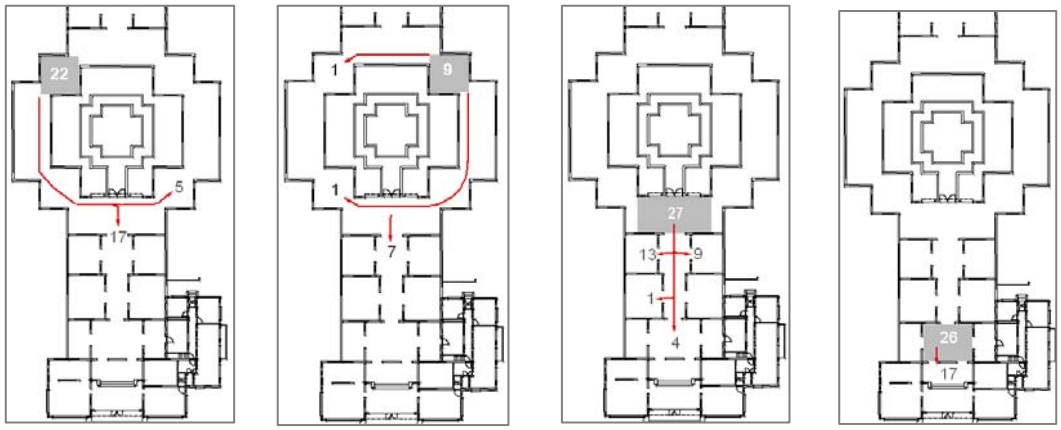
The second observation is related to the pattern of use of the central space. It was found that at the end of the first sequence, most visitors (71%) move anticlockwise and walk half round the courtyard, where the early works of *van Gogh* are displayed, then proceeds to the second linear sequence of spaces, and eventually explores the left side of the central space in the return route. But as suggested above, in order to get a complete picture of the oeuvre of the artist one has to come full circle, a path followed by only 16.1%. Further to this, it should be noted that, the fact that the spatial design (and the curatorial strategy) prioritises the central space is reflected in the observed movement pattern. Almost all visitors (97%) traverse the space encircling the courtyard on their way in or out. It is beyond that point, after looking at the van Goghs, that 13% tend to leave the gallery. A final point should to be made in respect to the return route. It is observed that for a large number of visitors (74%) retracing their steps is seen as



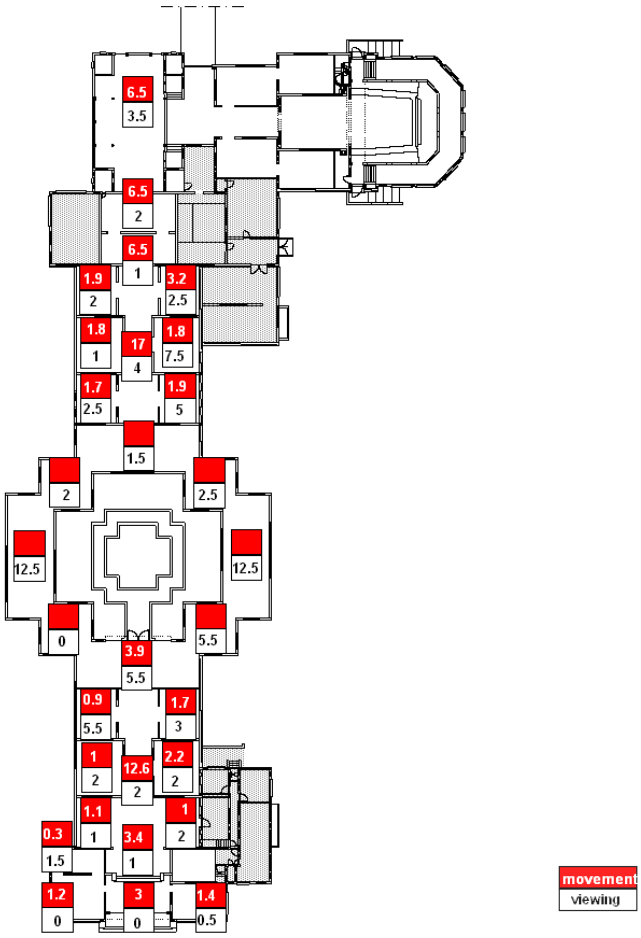
^ **FIGURE 7.24** The routes and stopping points of visitors observed during their visit to Kröller-Müller



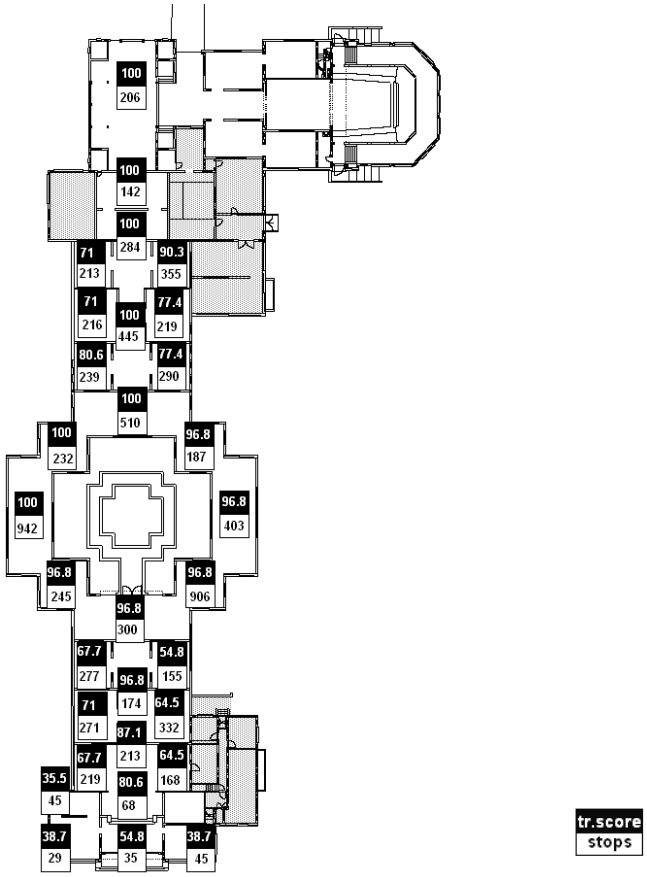
^ **FIGURE 7.25** The directional splits of where visitors observed are moving to during their visit to Kröller-Müller



^ **FIGURE 7.25 continued**



^ **FIGURE 7.26** The per minute movement rates and per snapshot viewing rates at Kröller-Müller



^ **FIGURE 7.27** The mean tracking score and the average number of stops made at Kröller-Müller

an opportunity to complement the exploration and get to the galleries previously omitted.

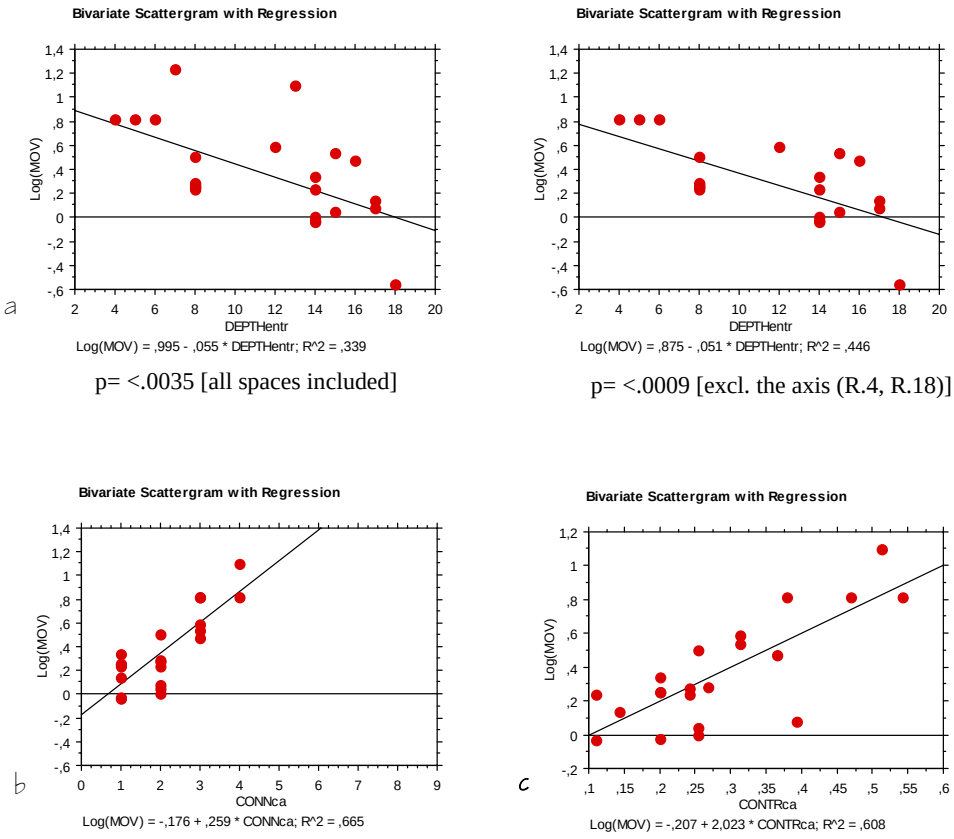
It is evident that, in terms of movement, the axis, as a connected location and a compulsory passage, benefits from the highest movement (14.8 per minute, almost four times as high as the average). [**Figure 7.26**] On the contrary, rates are much lower (less than half the average) in the last, deepest galleries of the building, an observation statistically checked by correlating the *depth from the entrance* with movement rates: the negative correlation between the two variables (R^2= -.339, p=.0035) indicates that the less depth from the entrance, the more movement; the more depth, the less (a more or less similar picture is given by the respective tracking scores, see **Figure 7.27**) However, the fact that local properties of space are with consistency related to movement suggests a locally driven exploration. [see **Table 7.1** and **Figure 7.28**]

convaxial Connectivity	convaxial Control	convex Connectivity	convaxial Connectivity - DepthEntrance
.665 * (1)	. 608 * (1)	.452 * (2)	.708 (2) *

* *probability of error less than 1%*
(1) *excl. the axis (R.4) with the highest movement and R.28 with by far the lowest rate*
(2) *excl. the axis (R.4 and 18) and R.28*

^ **TABLE 7.1** Correlations between movement and spatial variables

If we now turn to the pattern of viewing, it is self-evident that the high rates (12.5 per snapshot) are found in the ring of spaces around the patio -almost four times as high as the average. [**Figure 7.26**] This is obviously a function of the attraction of exhibits, the paintings of *van Gogh* (displayed in rooms 13, 16, 16a). It seems that the reputation for this part of the collection precedes the museum and affects the visitors' behaviour once inside. Similarly, the rooms devoted to key figures of modern art - *Mondrian* and *Brancusi* in room 8, *Braque* and *Gris* in room 10- are among the spaces with high viewing. But we also note that the last spaces of the sequence have once again the lower rates in the gallery. This might be due partly to the configurational position of the galleries and partly to the contents of the displays, which are not integrated, thematically or chronologically, to the main



p= <.0035 [all spaces included]

p= <.0009 [excl. the axis (R.4, R.18)]

p= <.0001 [excl. R.4 (with the highest movement rate)
and R.28 (with the lowest rate)]

^ **FIGURE 7.28** Correlations between Log (Movement) and spatial variables at Kröller-Müller: (a) DepthEntrance, (b) convaxial connectivity and (c) convaxial control

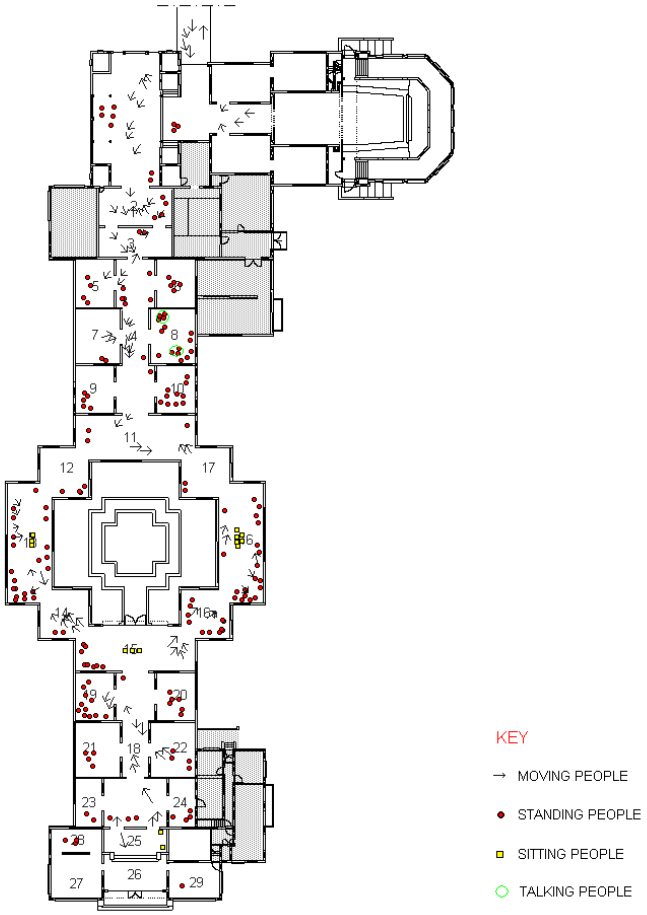
narrative, an interpretation supported by the fact that viewing is not related to configurational properties or movement.

Shifting attention to the encounter rates, an interesting distinction could be established between the way the main axis and the central space operate socially. [**Figure 7.29**] If we look at **Table 7.2** which gives the average rates per area, we note that, as in the case of viewing, the central space has the highest encounter rate (6.8 per snapshot) while it gets only the average movement (3.9 per minute). This suggests first, that viewers tend to linger in these rooms rather than move through (a tendency picked up by the two different sets of observations),[32] and so secondly, that the dense encounter pattern observed in the central galleries is strongly influenced by the distribution of works, the *van Goghs*, and less a by-product effect of the spatial layout. The opposite is true in the case of the circulation axis, where there is a bias towards movement and the encounter rates are lower that the total average. If we follow this line of thought, we could also argue that the physical and visual contact between visitors seems lengthened in the central spaces around the patio, as compared to the short encounters along the axis.

	movement *(per min.)*	viewing *(per snapshot)*	encounter *(per snapshot)*
1st SPATIAL SEQUENCE	4.9	3.3	4.9
CENTRAL GALLERIES (AROUND THE PATIO)	3.9	4.6	6.8
2nd SPATIAL SEQUENCE	2.5	2.9	3.7
TOT. AVG.	**3.8**	**3.6**	**5.1**

^ **TABLE 7.2** The average movement, viewing and encounter rates in different areas of the Kröller-Müller museum

In the end, if we were to define the key feature of the pattern of use at Kröller-Müller, we would argue that the viewing rates, the time spent and the morphology of paths all converge towards intensive viewing. It is no accident that the total average viewing (3.15 per snapshot) is close to the total average movement (3.85 per minute). Moreover, the mean time spent is 36 minutes (see **Table 4.7**), twice as high as that of Louisiana in terms of ratio between length of visit and floor area (though it should be noted that in the case of Louisiana, the recorded length of visit does not include the exploration of the park and the north wing). Finally, we



^ **FIGURE 7.29** The pattern of space use and interaction at Kröller-Müller

could argue that a closer examination of the morphology of visitors' paths within the galleries seem to offer some evidence of viewers' interaction and engagement with the exhibits. First, the majority of visitors (80%) appear to be '*object-driven*': their lines of movement are not kept to the central area of the rooms; on the contrary, the majority of viewers tends to move peripherally around the galleries and regularly stop[33] to engage with individual works. Second, the observed paths, especially in the van Gogh galleries, are characterized by frequent changes of direction and intersections, which may suggest that viewers tend to refer back to works already seen and make cross-comparisons -a pattern of exploration which remind us of that observed at Castelvecchio (see chapter 5) and will be further discussed in the final comparative review of the case studies.

Space use patterns at Louisiana

The observation study at Louisiana, which focuses on the south and east wings,[34] tells us a completely different story. First, mapping the paths of 29 visitors through the galleries [**Figure 7.30**] frequently interrupted by short pauses to the park,[35] immediately revealed the idiosyncratic character of the museum: 96.5% of visitors observed get out to the park at some point of their visit, to pause between the sequences and re-enter at a later stage. Interestingly, this does not generate an uneven spatial distribution of movement. On the contrary, there are no parts of the museum that perform poorly, although it is the south and the north wing, situated in strategic locations and linked directly to the entrance, that get the higher movement. [**Figure 7.31**] It should be noted however that upon entering, the majority of visitors move clockwise towards the north wing and the temporary exhibition (twice as many as those who move anticlockwise and go first to the permanent collection). Interestingly, an equally high number of visitors take the third alternative route that gives direct access to the park, allowing a path external to the building.

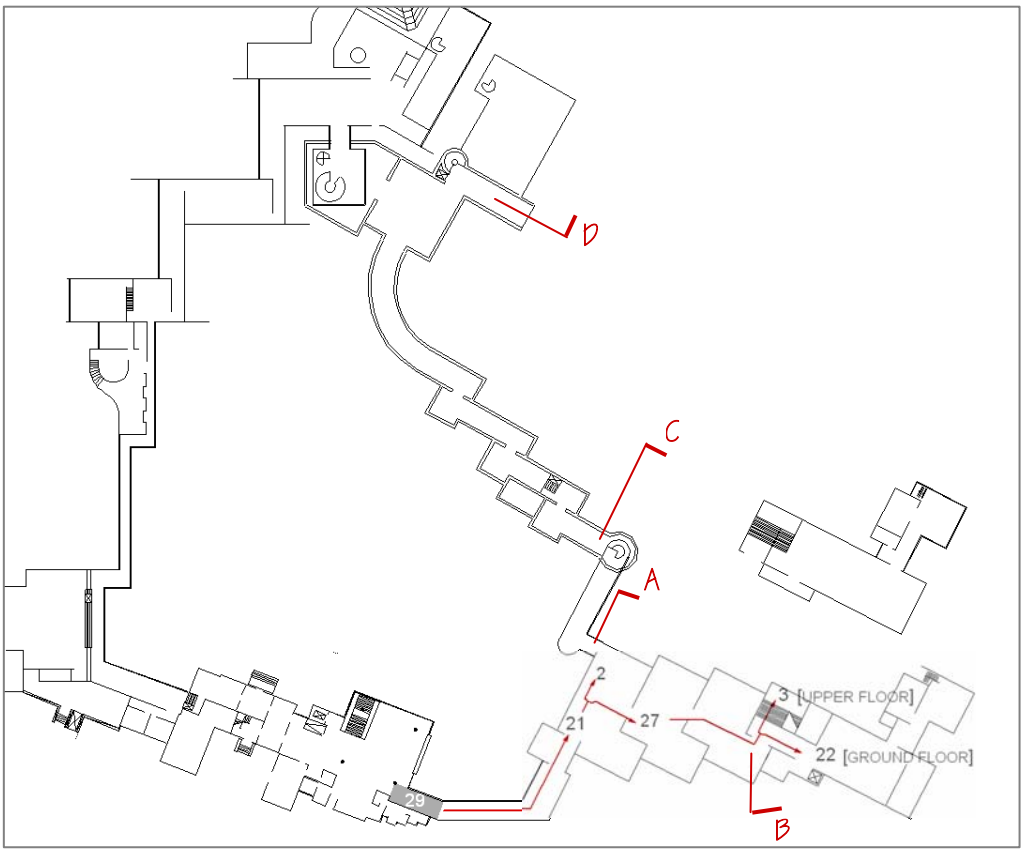
If we now move the focus of our analysis to the pattern of exploration in the south wing, [**Figure 7.32**] we find that the vast majority tends to explore it exhaustively, proceeding from the three, diagonally aligned, main galleries to the smaller

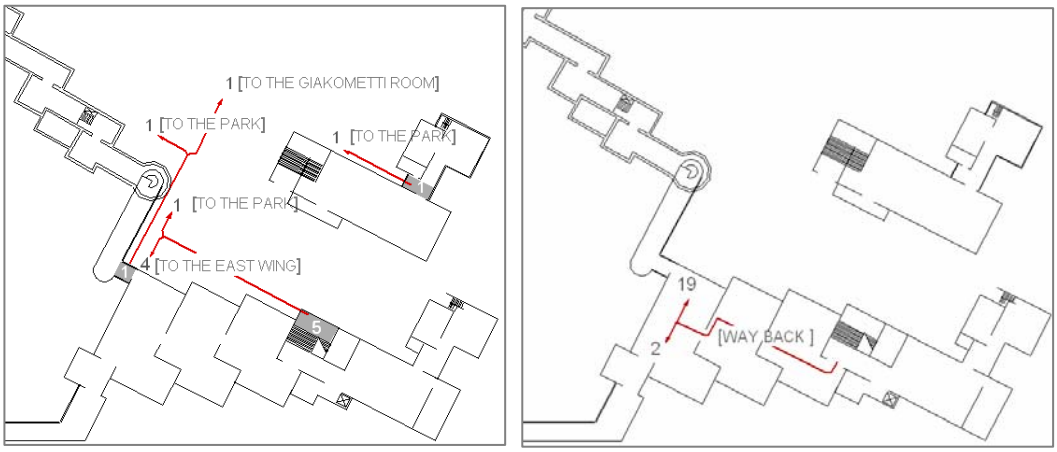
^ **FIGURE 7.30** The routes and stopping points of visitors observed during their visit to Louisiana

^ **FIGURE 7.31** The per minute movement rates and per snapshot viewing rates at Louisiana

galleries on the ground floor and then to upper floor; only 10% take the opposite direction. Few (6%) are those who omit the south wing to move directly to the east complex. On the way to the east wing, some prefer to get out to the park; others (31%) retrace the route and do not continue to the east complex. This may well be a deliberate choice; but it may also be related to the rather awkward junction between the two complexes. It has been observed during the field study that the absence of an immediately obvious connection space caused confusion to visitors, which eventually missed it. The pattern of movement in the single sequence of the underground east wing is -as expected- uniform;[36] since the layout is so coercive, it does not allow to produce differences between spaces and, by implication, space does not structure the flow of movement –an argument also made previously about Tate Modern (cf. Louisiana's low values in terms of *Movement Differentiation Index* and *Tracking Score Differentiation Index* in **Table 4.8**; see also **Figures 7.30** and **7.33**). At the end of the sequence, 39% visitors get to the park through the glazed space (N25a), while the majority (55.5%) continues, through the staircase, to the ground floor wintergarden (accommodating the museum café); and only one-third (30%) continues the itinerary to the north wing without pausing. Once again we have to do with a counter-intuitive route that requires visitors to pass through the café in order to continue the exploration of the galleries.[37] Perhaps the fact that spatial cues are not clear enough to guide visitors around, might be seen as part of the intended character of the visit: to motivate people to wander around and explore routes rather than facilitating orientation.

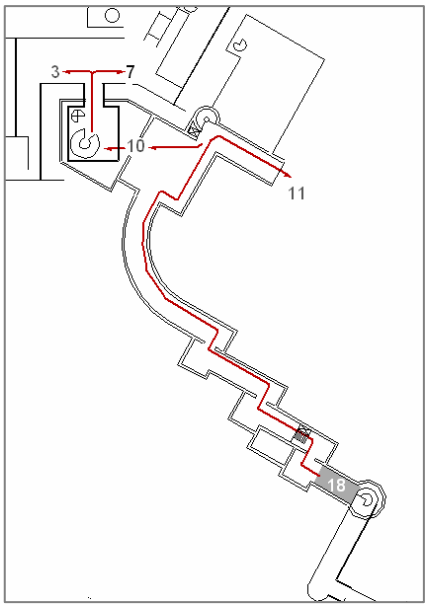
This particular intention might also explain the recurrent links to the park that mark the layout. As suggested above, looking at the directional splits of visitors, we find that all paths converge in the use of the park; more interestingly perhaps, we note that what differentiates their itineraries is the way they integrate the exploration of the park in the viewing sequence. So by being both a social space and an outdoor exhibition space, the park brings together visitors with different intentions -from those who shortcut the sequence to those who are venturing an alternative route- and from a variety of directions -since openings to the outside





A B

^ **FIGURE 7.32** The directional splits of where visitors observed are moving to during their visit to Louisiana



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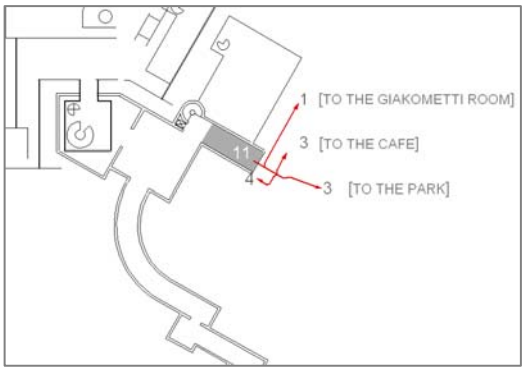

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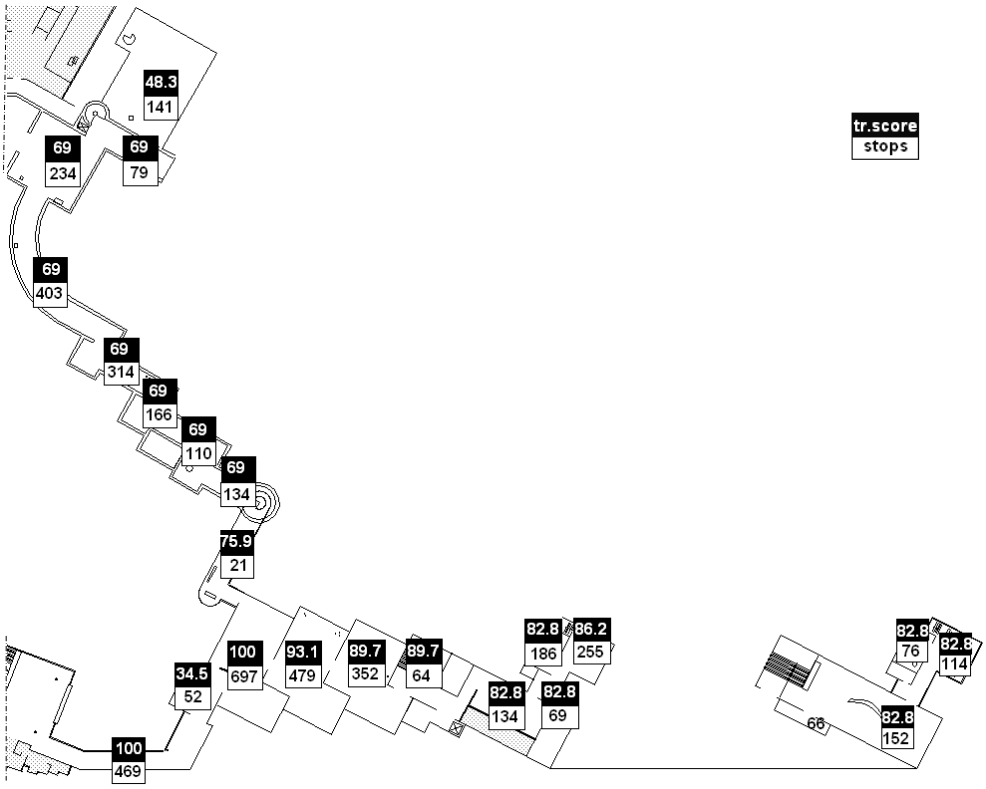
^ **FIGURE 7.32 continued**



^ **FIGURE 7.33** The mean tracking score and the average number of stops made at Louisiana

are dispersed everywhere and one discovers them rather unexpectedly along the route.

In what follows it is argued that a closer look at individual visitor paths can suggest a little more about the morphology of exploration. It has been observed that in the lofty south galleries visitors' lines of movement tend to deviate from the major axial line and diffuse in space -perhaps an effect of the morphology of space and the distribution of openings which enhance the freedom of circulation. Interestingly, 17.9% of visitors observed are characterized as '*space-driven*', while the same percentage of viewers seem to be '*eclectic*', in that they focus attention on specific exhibits and displays (as indicated by their stopping points). A different, rather atypical circulation pattern is recorded in the curved corridor-like gallery of the east wing. What seems characteristic here is that visitors' paths tend to switch left and right, as they tend to explore alternately works displayed on both sides. It could therefore be argued that a parallel could be drawn between circulation on the global scale and paths within spaces –the south and east galleries in particular: in both cases, the intention seems to be to minimize circulation control and reduce set paths.

If we now turn to the viewing pattern, [see **Figures 7.31**, **7.33 -7.34**] there is an important finding to be noted. The highest rates are not found in rooms which show works that could be seen as special attractors, as for instance, the *Giacometti* room (with viewing rate lower than the average) or the galleries featuring paintings of *Picasso* (room Ø4) and works of *Warhol* (room Ø5). On the contrary, it is the south wing, dedicated to the new acquisitions, which is the most well-occupied (the average viewing rate is 4.1 per snapshot, while in the east and north wings, viewing numbers are 1.4 and 0.7 respectively). [38] However, high viewing in the south wing is coupled with substantial differences in rates between the constituent spaces: the first lofty galleries get viewing almost four times as high as the upper floor galleries –a finding which can perhaps be explained by the attraction power of the works displayed (the recently acquired works of *Giacometti, Kirkeby, Bourgeois, Polke, Jorn, Leger, Pollock, Hirst).*[39] By contrast, the east wing has comparatively lower viewing numbers, but tends to be more uniform in its occupation.[40] A different pattern is found in the north wing,

^ **FIGURE 7.34** The pattern of space use and interaction at Louisiana

which is characterized by a strong bias towards movement; it seems that the glazed galleries, with the high number of people moving though, tend to be seen as corridor spaces, rather than spaces that encourage contemplation.

There is therefore evidence to suggest that, as far as the pattern of viewing is concerned, there is an interesting contrast between the two case studies: while at Kröller-Müller, the highlight of the collection, the *van Goghs*, seem to monopolize visitors' attention, at Louisiana most people are not interested in the special attractors of the collection (i.e. *Giacomettis*), but in seeing something new. This seems also consistent with the distinct emphases of the two museums, since Louisiana emphasizes spatial exploration, while Kröller-Müller focuses contemplation.

7.5 Quality of the experience

Further to the above arguments, which begin to clarify the fundamental differences between the two museums, this section will attempt to relate programmatic intentions, spatial data and 'objective' observation data on patterns of use, as different layers coexisting in both museums, seeking to interpret the character and the quality of visitors' experience.

It has been shown that at Kröller-Müller the lucid organization of a simple and regular plan is the key spatial tool for communicating a particular abstract message. Identical spaces, symmetrically arranged along a linear route, and equally accessible, structure a sequential, rhythmic reading of contrasts between realism and idealism that unfold diachronically, giving articulation to H. Kröller's art theory. Similarly, the looping route around the centre of the composition distinguishes it from the rest of spaces, lengthens the time of reading and gives the intended special emphasis on the nucleus of the collection. But a specific view of art presupposes also a particular viewing sequence; so the strong sequencing of Kröller-Müller structures an explicit order of how exhibits should be experienced, allows minor choices and hinders deviations. The intention is clearly pedagogical. H. Kröller collected and built the museum for the community, with the aim to educate and reform. The small galleries that encourage a more private

contemplation of the works are accompanied by the central spaces, which situated at the most strategic location, and providing spatial and visual continuity, maximize the awareness of other people and render viewing a shared experience - without however allowing an autonomous social dimension of the experience.

Seen from the perspective of the pedagogical intention, the distinguishing feature of the van de Velde wing, the visual isolation from the outside, enforced by the architecture, takes a special meaning. It can be seen as another explicit rule imposed on the spatial design, in order to dictate a pattern of experience. According to H.Kröller, '*art called for absorption*';[41] complete concentration and full immersion are the necessary conditions for contemplating the works. It should be noted however, that at the time of the creation of the museum, the landscape was the complete opposite to that encountered today: a bare, sandy plain, '*an empty wasteland*', which lends support to the argument that visual isolation operates like a concept rather than a practical requirement.

As argued earlier in relation to Pompidou (see chapter 6), the idea of an overall rational concept is suggested by the highly *ordered* layout of the building, the simple and geometrical spatial relations that can be easily grasped. So besides responding to functional requirements, the layout of Kröller-Müller, points to an *ideal* architecture, and strongly conveys a range of symbolic intentions. The balance implied by the symmetrical plan and the cruciform centre can be seen as a metaphorical reference to a spiritual, church-like environment.[42] Interestingly, the centre of the building, the patio, is a kind of negative space left void, to accommodate a pond in the middle. Either alluding to memory or symbolizing the '*mystery of sources, the mystery of origin of all things*' (Oxenaar et al. 1989, p.91), the mediation of the water intensifies the implied spiritual character of the building. [**Figure 7.35**]

The symbolic aspect of the architecture is coupled with the intellectual narrative and mode of looking at the works displayed: their groupings are based on conceptual links that require a complex mental process in order to be understood. Besides, as indicated above, the collection includes only the art that sought to bridge the gap between mind and matter, spiritual and perceptual -another rule of exclusion. H. Kröller argued that unity is to be found in the duality of mind and

matter: *Spirit and Materia Unum*[43] was her devise, inscribed on the façade of the museum. This idea, that unity is found in the balance between contrasting elements, is reflected in the set of oppositions that characterize the museum, both in terms of architecture -art and nature, open and closed, linear and circular-, and contents -realism and idealism, western and non western art.

It is clear that the museum becomes a representation; every element represents something other than itself. Physical, spatial and conceptual structure, are all bound up to support each other. Their interaction has a reflective function, to re-express the intended message. Since the goal is not to gain something new, but to convey a pre-given abstract concept, everything has to be carefully programmed in advance and must happen as planned. The role of space, both in terms of spatial design and display layout, is therefore on the one hand, to permit the intended movements and programmed readings, and on the other hand, to eliminate distractions and restrict unexpected information.

On the contrary, K. Jensen's attitude was neither missionary nor pedagogical. He preferred a sort of relaxed persuasiveness (Wechsler 1998, p.82). At the clarity and order of the layout of Kröller-Müller, Louisiana opposes an irregular geometry, an 'organic' plan. The buildings, arranged 'paratactically' in space, appear like fragments which fall in place as one goes along, an impression further emphasized by the articulation of the display as integral units synthesized into a whole. The museum structure cannot be learned like a system of relations; it becomes understood through movement -a fundamental point of difference between the *ordered* layout of Kröller-Müller and the *structured* of Louisiana, a point to which will return in later sections.[44] Furthermore, the frequent shifts in the direction of movement and the recurrent changes of levels, enhance a sense of temporal prolongation and spatial anticipation. The route through the galleries is thought of as a '*voyage of discovery*'. Morphological variation, axial fragmentation, and visual concealment stimulate curiosity, allow for surprises, and emphasize the sense of exploration. The display itself, based on visual codes and poetic juxtapositions of works, privileges aesthetic readings, but, at the same time, it is highly exploratory intellectually, since it engages the viewer with making the links between works and exploring possible meanings.

^ **FIGURE 7.35** The cruciform layout of Kröller-Müller (1938) [*Sembach* 1989, p.208]

If Kröller-Müller's severe architecture conveys a range of symbolic intentions, Louisiana's domestic setting does not attach symbols to forms; so there is no need for a key to understand it. It is no accident that, in contrast to the symbolic form of the centre of the van de Velde building which is devoid of a functional role, the park at Louisiana operates into strategic ways: surrounding (and being surrounded by) the galleries, it firstly opens up the exploration dimension by giving a series of significant choices; and so, secondly, generates a dense and random pattern of social encounter.

The deterministic experience of Kröller-Müller is here replaced by a dynamic experience. To the inward orientation and the visual isolation from the natural surroundings of Kröller-Müller, Louisiana opposes the openness to the pleasures of nature and sets up an intimate dialogue with the environment. Jensen trusted curiosity; it was part of his ideology. He had no intention to reproduce a specific concept or theory of art, but to produce something new, to create a richness of experiences. The overall message is open-ended. It is no accident that along the route the visitor is presented with openings to the landscape [**Figure 7.36**] that act like opportunities for exploration and deviation -an illustration of Jensen's principle of '*escapism*':

'*I tried to emphasize*', he argued '*that there is always a way out. Have you noticed how in museums that feel like labyrinths, part of your mind is always stuck on hypothesizing a means of escape?*' (cited Wechsler 1998, p.82).

It follows that space does not assume a restrictive role. On the contrary, it acts generatively. *Randomness* is introduced on a variety of levels, from the circulation route, to the pattern of encounter, and the groupings of the works. If we relate this finding to the fact that the majority of visitors are repeat visitors, then we get a picture of a critical difference in the visiting culture of the two museums: at Louisiana, people return to the museum because of the variety of the experience, while at Kröller-Müller it is the reputation for a part of the collection that strongly influences visitors' behaviour. It should finally be noted that both the *order-randomness* distinction and the *conservative-generative* opposition which seem to be here involved, constitute the core of the argument to be developed in the following section.

^ **FIGURE 7.36** The principle of '*escapism*' at Louisiana

Conclusion

Concluding, it could be argued that the above analysis has shown first, that the design of both buildings cannot be considered apart from the founders' ideology, just as the museum collections cannot be seen apart from their personal choices and particular view of art. It is their opposing concepts and intentions that lie behind the strategic differences between the two museums, in term of layout of space and objects. In one case, the aim is to convey a specific message; in the other case, the intention is to create a layered experience, of which the display is just a part. In the case of Kröller-Müller we have to do with a hermetic building, an ordered layout, an intellectual narrative structure; in the case of Louisiana, with an invisible architecture, an irregular space organization, an architectural-spatial narrative.

More importantly, it has been shown that it is, in turn, these strategic differences that have identifiable consequences on key dimensions of visitors' experience, from the morphology of their paths to the way they explore objects and become aware of other people. Kröller-Müller is first and foremost an informational experience, supported by the architecture, and this is shown in visitors' attention to the exhibits. On the other hand, at Louisiana it is the social experience that is rendered dominant and the visit integrated into people's everyday life, as manifested by their repeat visits and the relaxed character of their pattern of exploration.

Finally, it should be noted that the foregoing analysis offers a good foundation for developing in the following chapter the common theoretical framework for the layout of space and objects, by illustrating the two different types of information that space can communicate, *semantic*,[45] in the case of Kröller-Müller, and *aesthetic*, in the case of Louisiana.

Notes

[1] An earlier version of this paired study was presented at the 5th International Space Syntax Symposium (see Tzortzi 2005).

[2] For a detailed discussion on the museum see Hefting 1977; Wit 1977; Padovan 1978, pp.74-82; Oxenaar 1980; Eaton 1982; Musee Kröller Müller 1985; Gaerts and Puttemans 1987, p.366,406-408; Oxenaar et al. 1989; Sembach 1989, p.173-213; Sculpture in the Rijksmusuem Kröller Müller 1992; van der Wolk 1992; Bremer-Cox, 2003.

[3] For a detailed presentation of Mies' design see Riley and Bergdoll 2002, p.166-169.

[4] H.Kröller argued that art culminated in architecture and that '*essential architecture is the major field for the expression of one's innermost feelings;…without this there can be neither great nor idealistic architecture*' (See Oxenaar et al. 1989).

[5] For a detailed discussion on the museum see Louisiana 1959; *Arkitektur DK* 1982; *Progressive Architecture* 1983; Jensen 1984; Battaglini 1987; Skjøth 1989; *Louisiana Revy* 1991; Kipphoff 1992; Louisiana 1995; Nittve 1997; Kjeldsen 1998.

[6] Knud Jensen borrowed the name from the estate's owner Brun, who called the small house Louisiana, because he had three wives named Louise.

[7] The extensions include also the addition of the temporary exhibitions' wing (1966 and 1971), the Concert Hall (1976), and the Children's wing (1994). See **Figure 7.2**.

[8] Designed in 1961, it constitutes the first sculpture garden in a museum.

[9] Jensen argued : *'no matter how elaborate the museum might become in later years, I knew I'd always want the visitors to arrive through that modest, non-threatening 19th c. entrance hall…'*

[10] See below note 44.

[11] Correspondences can also be seen in the use of materials; for example, the wooden details (at the edge of the ceilings) in the south and east wings can be paralleled to the wooden ceilings of the 1958 galleries; also, the white-painted brick walls are to be found with consistency in all the buildings (though with slight differences in texture), and are either opposed to dark-red tile floors, in the original complex, or contrasted to the grey marble paving in the south extension.

[12] Similarly, the double-height '*Giacometti room'* in the original wing is echoed in the double-volume space at the end of the Graphics wing; also, the view of the lake from the former corresponds with the view of the sea from the last south gallery. Finally, the idea of artificially lit lower level, originally introduced in the 1971 addition, reappears in the ending gallery of the south wing and on a larger scale, in the entire underground east wing.

[13] But as the museum grew bigger, this intimate relationship between indoors and outdoors has been weakened, and closed interiors have finally outnumbered the glazed galleries. This constitutes an interesting contrast to the evolution of the Kröller-Müller, where the closed rooms of the van de Velde building have been counterbalanced by the open spaces of the Quist extension.

[14] The starting point of the collection, as defined by H. Kröller, was '*the realism of the years 1870-1890, which constituted a sound basis for a regular development of art up to the idealism'*. She argued that '*for each phase of this development a name, an –ism, has established itself. The point of departure will be Modern Realism which dissolved into Impressionism, expanded in Neo-Impressionism and gained depth in Pointillism, thereby deliberately veering towards the art of the idea, Idealism. To this Cubism also belongs, with its expressions of extreme abstraction*'. See Oxenaar *et al* 1989.

[15] H. Kröller argued that artistic movements are most clearly illustrated by works of minor artists, rather than works of major figures that cannot be strictly classified into artistic movements.

[16] By *realism* she referred to the nineteenth-century artists who focused on observation and perception (light, colour, perspective, and texture), as for instance *Corot, Courbet, Millet,* and *Fantin-Latour*, with influence on the contemporaneous Dutch painters (*Jongkind, Gabriël, Istraëls, Breitner*), also represented in the collection. By *idealism*, she referred to the artists of the end of the nineteenth century -beginning of the twentieth century, who were not concerned with representing the reality but expressing a personal interpretation of reality, as for instance, *Picasso, Braque, Gris, van Doesburg, van der Leck and Mondrian*. Artists that illustrate the passage from realism to idealism (i.e. *Signac, Seurat, Toorop*) are also included in the display.

[17] The juxtaposition of realism-idealism is not evident in the case of the *old masters*, displayed at the end of the sequence: the religious themes of the 15th-16th c. art (room 23) [**13** in **Figure 7.18**] are juxtaposed to the still lifes of the 16th-17th c. (room 24) in which the realistic representation of objects acquires symbolic function and religious meaning. [**14** in **Figure 7.18**]

[18] Van Gogh is also seen as '*the decisive reaction against naturalism'* and the, *'one of the first to lead Pictorial Art back into the paths of spiritualism*' (see Oxenaar et al 1989, p.39, 44).

[19] Monographic displays are dedicated to both artists (i.e. *van Doesburg, Ch.Toorop, Beeckman, Ensor, de Nuncques)* and artistic movements (Cubism, Russian Constructivism, and the Nabis).

[20] More precisely, the northeast side (room 13) shows his early works expressing intense emotions, while the southwest (rooms 16 and 16a) is devoted to the last period of his artistic production, with pictures conveying a sense of tranquillity. Grouping together formally and thematically related paintings brings out differences and encourages comparisons, as for instance between the dark atmosphere of the works of his '*Dutch period*' and the bright colours of the works of his '*French period*', which are shown in opposite walls in room 16. On the contrary, in the original display, one side of the ring was devoted to his paintings and the other, to his drawings.

[21] That is, *Impressionists* and *Neo-Impressionists,* artists with whom he shared common preoccupations and techniques, before developing his own pictorial language.

[22] Room 11, devoted to *pointillism*, brings together French and Dutch artists (i.e. *Signac, Seurat, Gestel, van Rijsselberge*) and works as the conclusion of '*idealism*', shown in the first sequence of

spaces. [**6** in **Figure 7.18**] Similarly, room 18, showing paintings by *Fatin-Latour* and *Toulouse Lautrec,* and sculptures by Maillol, introduces the viewer to '*realism'*, shown in the second sequence of spaces. [**10**]

[23] It is of interest to note that looking at photographs from the original display of the museum, in 1938, one immediately notices the similarities in the hanging strategy and the atmosphere of a private house, evoked by the plants and furniture that complement the spatial arrangement (see **Figure 7.16**).

[24] '*Le chahut'* by Seurat

[25] An illustrative example is the juxtaposition of *Dubuffet* and *Bacon:* the former frees himself from the conventions of painting and presents human figure in a rudimentary way, sometimes fused with the landscape, while the latter setting out from these conventions, distorts human faces and bodies.

[26] Different readings of the works of *Giacometti* are proposed as well: in room N8, his sculptures are juxtaposed to the portraits of *Kossof* (formal similarities), and the paintings of *Dubuffet* and *Auerbach* (common expressiveness of materials); also, in rooms N8 and N4 we encounter the typical pairing of *Giacometti* and *Bacon.*

[27] '*Spoon woman*', 1924 and '*Walking woman*', 1934.

[28] '*Femmes de Venise'*, 1952

[29] As noted in chapter 4, the observation study was conducted between 10 and 18 July 2004. Four rounds of observation were undertaken to cover different times of day (from 10am to 4pm).

[30] To get a picture of the pattern of space use in the entire museum complex, we recorded the static distribution of visitors in the galleries of the Quist wing (showing part of the permanent collection, organized in the form of three thematic temporary exhibitions). It was found that in comparison to the galleries of the van de Velde building, these spaces performed poorly, both in terms of moving and viewing: in both cases the rates were lower than the average of the old wing.

[31] The spaces that are most often omitted are rooms 20 and 26 and the last two galleries 27-29. [**Figure A.1e**]

[32] The data collection is based on '*gate counts*', suitable for picking up movement from one space to another, and '*snapshots*', for recording static people in each space (see chapters 3 and 4).

[33] It is of interest to note that a good relation is found between viewing rates (per space) and respective average numbers of stops (R^2=.405, p= <.0002).

[34] The observation study was carried out between 8 and 15 August 2004. Three rounds of observation were undertaken from 10am to 4pm.

[35] This fluidity of the route did not allow us to get a picture representative of all possible itineraries. For this reason, the observation study focused on recording the routes of people who started their exploration from the south wing. Visitors were not tracked while wandering in the park or pausing at the café. A small sample of visitors who started their exploration from the

opposite side, the north wing, was also included in the observation study in order to build up a global picture of the pattern of movement in the museum.

[36] On the whole, it is found that, the spaces that tend to be omitted are those that lie outside the predetermined path, as for instance, the video installation in room S3 or the display in the double-height room N25.

[37] As in the case of the east wing, a number of visitors seem to consider this part as the end of the continuous itinerary.

[38] The number of stops made by visitors tracked suggest a similar pattern– as also shown by the strong correlation between stops and viewing (R^2= .616, p=.0001).

[39] To note that the relation between viewing and the size of the rooms, or the spatial distribution of objects, is weak (R^2= .207 and R^2= .283 respectively).

[40] High viewing rates are found in the room N25 and the curved corridor-like space (room Ø6) which displays drawings (i.e. *Baselitz*) and photographs (i.e. *Sherman*).

[41] H.Kröller argued that '*the often complicated abstract art contained in the collection, because of its spiritual content, requires a great surrender and quiet absorption*' (Oxenaar et al. 1989, p.88).

[42] It is no accident that other buildings created in the Hoge Veluwe Park by the H. Kröller have also a cruciform layout.

[43] Meaning that '*mind and matter are united*'.

[44] This argument rests upon the *order-structure* distinction proposed in Hillier 1996 (p.234-235), that is, the distinction between the plan of an *ordered* town that, as argued in chapter 4, we can grasp all at once because it is dominated by rational '*order*' and the layout of an 'organic' town, apparently irregular, that we understand by living and moving in it, a process which, in turn, manifests the underlying *structure* of the layout.

[45] Terms borrowed from Moles (1966, p.5).

Chapter Eight
Theoretical synthesis

Introduction

The three preceding analytical chapters set out from the general theoretical model of the basic dimensions of spatial variability in museums (discussed in chapter 3) and explored, through carefully selected case studies, the interaction between the different components of this model, and their relation with, on the one hand, display strategies and, on the other hand, visitor experience, including as manifested in observable patterns of visiting. Taking into account the results of the analysis as well as the ideas generated by it, the aim of this concluding chapter is to offer, in the first part, a comparative review of the critical differences between museums, with a view to developing, in the second part, a conceptual model that seeks to interpret the principles that account for these differences. The comparative review is organized in three sections. The first section briefly reminds the reader of the key features of each museum analysed in the preceding chapters with special attention to observed visitor behaviour. This stance is guided by the belief that the analysis should start with a description of the 'phenomena' – that is, the visitor pattern considered as the dependent variable-, and then use this, to reconsider the questions raised throughout the study, related to the architectural and curatorial intent, as expressed in the building and exhibition programme, seen as the independent variables. The latter are addressed in the second and the third section of the review respectively. The intention is to try to answer two of the key theoretical questions raised in the introductory chapter and discussed in relation to individual cases throughout the study: Does the spatial layout make a difference and what kind of difference? How does it relate to the exhibition design? As we shall see, dealing with the sample as whole will allow drawing parallels between museums that extend beyond the intended paired comparisons and, more importantly, will reveal critical affinities and relations that could not be considered in advance. Against this background it will then be possible to arrive at a theoretical synthesis, at the end of this chapter. Re-considering the museums

within the theoretical framework set out in chapter 4, we will suggest reading museum space as a set of formal potentials, built out of a number of basic concepts.

8.1 A brief comparative review of the case studies with respect to visitor behaviour

Prior to the description of the visitor centred synthetic review of the case studies, to which the first part of this chapter is devoted, we should remind the reader of the essential numerical background, which was already introduced in chapter 4 (**Tables 4.3-4.8**) and will provide the base needed to follow the development of the whole argument. Precisely, the six tables, numerical summaries of the intensive studies of galleries, include from the most elementary information, the basic profile of the nine museums, presented in **Table 4.3**, to the more rigorous data, the results from the syntactic analysis tabulated in **Table 4.4**; and from the movement, viewing and encounter densities, set out in **Tables 4.5** and **4.6,** to the behaviour data of individual visitors observed, given in Tables **4.5** and **4.7**. Finally, **Table 4.8** draws selectively from the above tables and presents correlations between syntactic and space use variables, significantly contributing to the final argument, the *conservative* (or *reflective*) and *generative* potentials of space.

We would like for the moment to draw the reader's attention to some key findings presented in **Tables 4.5-4.7**, which prepare the grounds for the case studies review that will follow. **Tables 4.3**, **4.4** and **4.8** will be discussed in length in later sections of this chapter. Let us begin by the most conspicuous observations, the critical differences between museums in terms of densities. The Sainsbury Wing has by far the highest movement density values in the sample: it is five times as dense as Pompidou5; and Pompidou5, two times less than the average of the rest of the cases. It must be remembered, however, that these numbers are highly dependent on the museum visitor attendance. A more interesting finding concerns the differences we find in respect to the degree to which museum layouts are selectively visited. If we refer back to the *Tracking Score* in **Table 4.5,** we find

two pairs of museums at the two ends of the scale*:* the exhaustively visited spaces of the layouts of Tate5 and Castelvecchio at the one end, and the selectively visited spaces of Pompidou4 and Pompidou5, at the other. This finding could be interestingly associated with the observation that Tate5 is characterized by uniformity in the pattern of movement, while Pompidou5, by the greater differentiation of visitors' itineraries in the sample (as suggested by the respective *Tracking Score Differentiation Index)*. These visitor pattern properties of Tate5 are, as we will argue below, effects of its strong sequencing. Another conclusion drawn from **Table 4.6** which seems worthy of some emphasis is related to the extent to which museums seem to balance movement and viewing. The ratio between the two activities allows us to draw a distinction between museums -like Tate Modern and Kröller-Müller- characterized by congruence between viewing and movement, and museums -like Pompidou4- that are strongly biased towards movement. Among the most suggestive data is the average time spent in each museum setting, which seems to vary considerably, with visitors spending at Castelvecchio two times longer that the total average of the sample, and at Pompidou, two times less than the total average. One final comment worth making is related to the generally strong and consistent tendency for the majority of visitors to be '*object-driven*' (defined as visitors who look at individual objects). This makes particularly intriguing the cases of Castelvecchio and the Sainsbury Wing that constitute the exceptions to the rule, with a notable proportion of '*space-driven*' visitors (that is, visitors who seem to be engaged in exploring whole compositions in space). In order to set these findings in context and address the specificities of each case study, we will now deal with each museum in turn, describing it in terms of the pattern of space use it engenders.

The Sainsbury Wing is the museum setting of the smallest scale and with a discrete collection. It is the second most integrated and the most densely used setting both in terms of movement and viewing (numbers that, as outlined above, reflect the museum attendance). At first sight it appears to have a clear layout that alludes to the original setting of the paintings, and with key spatial features, the hierarchy, the distant visibility and the use of perspective. But on closer examination, a problem in the layout -the lack of the hamiltonian property-,

coupled with its small scale, makes it a not easily traversable gallery. This may be accounted for the fact that despite its scale, visitors move selectively and get to 68% of spaces in the gallery; and more intriguingly, though there is no predetermined route, a significant number of visitors ($19^{\%}$) follow exactly the same route. By contrast, the Sainsbury Wing has among the highest rates of viewing (as reflected in the ratio of movement to viewing) and number of stops (as indicated by the ratio of number of stops over floor area), a result that can be related to the appeal of its Renaissance collection. Visitors stay in average 16 minutes, which is the fourth highest value in the sample, in relation to the floor area. 32.3% spend longer than the average time. The morphology of visitors' paths and the locations of where they pause -kept to the perimeter of rooms - suggests that 50% are '*object-driven*' and 11.8%, '*eclectic*', that is, people who stay longer and look more closely at certain spaces and move rapidly through others, usually the central ones. This leaves a considerable number of visitors observed who seem to be '*space-driven*'. If this type of visitors is considered in more detail, it appears that the duration of their stay is by 20% lower that the average (see **Table 8.1**); this finding in conjunction with the observation that the distribution of their -fewer than the average- stops in the middle of spaces, may suggest that we have to do, to a large extent, with '*browsers*'[1] that scan space and get an overall picture of the display. To this pattern may contribute the ample cross-visibility of the layout: the Sainsbury Wing has the highest transparency value in the sample (.43), twice as high as the total average. But if we were to identify the most striking feature of the gallery, this would be the fact that, though the Sainsbury Wing seems oriented towards formality and its design emphasizes spatial centrality, it is not in the central sequence that the higher room densities are recorded.

Castelvecchio is by far the deepest gallery of the sample (six times as deep as Tate Modern). Its layout is the least integrated and among the most strongly sequenced of the sample. It shares in common with the Sainsbury Wing key spatial properties -the powerful axiality, the distant visibility, the systematic use of perspective-, but it handles them in the opposite way. Castelvecchio is the gallery where the visitors observed stay longer than in the rest of the cases, both in

absolute terms and in relation to the floor area: 50 minutes on average, that is, three times longer than at Pompidou and Tate Modern. Interestingly, more than half of the visitors stay longer than the average. On the whole, people tend to exhaust almost all the spaces in the museum (87%), but comparatively do not appear to make a high number of stops (as suggested by the ratio of sum of stops over sum of objects). This might indicate that exhibits make visitors stop but more importantly, make them stay. A second observation is also possible: bearing in mind the way objects are grouped, visitors may be looking at several works at once. This overall pattern of space use can be explained by the argument that, although the collection includes local art -the less well known works in the sample-, it is their atypical arrangement, and in particular, the manipulation of paintings, as three-dimensional objects, which attracts' visitors attention. This dynamic approach -the complete opposite to the static of the Sainsbury Wing-, which requires viewers to move around and among the objects and constantly shift positions, is mapped in the recorded intersecting and encircling orbits of visitors' paths, and the high percentage (38%) of '*space-driven*' visitors. The latter spend time close to the average and make a considerable number of stops that fill the exhibition spaces. Maybe we could infer from this finding that visitors do not tend to stand to view exhaustively the individual objects on display, but appear to stop at locations that allow a wider view of space or of objects as group compositions.

In complete contrast to Castelvecchio, Tate3 is the most integrated and among the most intelligible (in syntactic terms) layout of the sample, and one of the more shallow (with four entrance points). It appears that this is the main focus of concern of the museum: to offer large-scale intelligibility and be easily read. However the spatial means used to this end (i.e. long axes and distant views) have no relation to the display -another critical point of difference between Tate Modern and Castelvecchio, to which we will return below. This aside, the simple and equalitarian organization of space, with the galleries forming in effect a single ring, is coupled with similar principles underlying the organization of the display - key works and less well known exhibits are shown together and in a spare arrangement (Tate3 and Tate5 are among the museums with the lowest values in

the sample in terms of distribution of objects). As it is to be expected from the high degree of sequencing, this engenders a high degree of uniformity in the pattern of use, both in terms of movement and viewing, between the spaces of each floor and between floors. Moreover, visitors tracked spend also the same length of time at Tate3 and Tate5 (about 27 minutes on each floor); they also tend to exhaust the spaces of the layout (81% and 90% at Tate3 and Tate5, respectively), following the same route and making a similar rate of stops in the constituent spaces (as indicated by the low *Stops differentiation Index* and *Tracking Score differentiation Index*) However, a distinction can be established between Tate3 and Tate5**,** in respect to the dominant visitor activity: though both galleries are characterized by the congruence between movement and viewing (1.01 and 1.14 respectively), as opposed to most of the remaining cases, in Tate5 there is a stronger bias towards movement (as indicated by the fact that people visit 90% of spaces but look at only 12.5% of objects),[2] in comparison to Tate3 (they get to 81% of spaces but look at 18.5% of objects). Maybe this can be explained by the widely established argument that attention drops with the change in level (Niehoff 1968; Miles 1988; Falk and Dierking 2002). Another clue to the observed bias to movement at Tate5 comes from the high proportion of '*space-driven*' visitors (29.4%). It seems that, as in the case of the Sainsbury Wing, '*space-driven*' visitors tend to browse the works on display while moving in the middle of spaces and without standing frequently to appreciate individual objects (**Table 8.1**).

Pompidou5 and Pompidou4 are the biggest museum settings in the sample (with the exception of Tate Britain), and by far the most densely arranged in terms of object distribution, though the poorest in terms of movement and viewing densities. So it is hardly surprising that visitors cannot exhaust spaces or displays: they visit selectively 58% of the galleries at Pompidou4 and 60% at Pompidou5, and look at 10.4% and 8.3% of the objects on display respectively -numbers which are the lowest in the sample. Yet, the two layouts are among the more integrated and intelligible (in syntactic terms) museum settings of the sample, and, as argued in chapter 6, show a particular concern for visitors' spatial orientation, a feature that, as previously seen, characterizes also Tate Modern. But unlike the

latter, the layouts of Pompidou (particularly Pompidou5) are much more complex and hierarchical, and fundamental differences between the two floors extend to a number of levels -from the critical ratio of *c*- and *d-spaces* in the layout to the density of objects. Besides, one cannot expect to find homogeneity in the pattern of exploration, as in the case of Tate3 and Tate5, since both Pompidou4 and Pompidou5 offer a larger or smaller number of circulation alternatives; and this is reflected in the distribution of stops and the high degree of differentiation in visitors' paths, among the highest in the sample (the *Tracking Score Differentiation Index* and *Stops Differentiation Index* are .4 and .92 at Pompidou5 and .3 and 1.21 respectively at Pompidou4). These strategic differences in terms of structure of space are reflected in the morphology of space use: as discussed above, Pompidou4 is twice as dense as Pompidou5 and is characterized by a strong bias towards movement in that it has the highest ratio of movement to viewing (2.84) in the sample, meaning that people moving are almost three times as many as people viewing. On the contrary, Pompidou5 is more balanced in terms of the relation between movement and viewing; this might be related, among other reasons, to the fact that a notable percentage of visitors observed (16%) starts the exploration from the fifth floor; as a consequence, Pompidou5 is not systematically the last part of visitors' itineraries, as seen, for example, in the case of Tate Modern.

But with this difference observed, we can not ignore the fewer but meaningful similarities in the visitor pattern between Pompidou4 and Pompidou5: first, in both cases the axis concentrates the densities of use, in terms of movement as well as viewing. Second, the length of the time of visit in relation to floor area is in both cases among the lowest in the sample. Though at first sight, and in absolute terms, it might seem that visitors are staying longer at Pompidou in comparison to Tate Modern, the mean time spent is less in proportion to the floor area. This can be interestingly juxtaposed to the fact that, at Pompidou5 and Pompidou4, we encounter the longest duration of individual visit in the sample, that is, 111 and 110 minutes respectively; and this gives, we think, a picture of the time required to explore the museum in its entirety. A final similarity between the two floors concerns the dominant type of visitors, that is, the '*object-driven*' visitors (74.4%

at Pompidou4 and 62.2% at Pompidou5). However, the two cases differ considerably in terms of the proportion of '*space-driven*' and '*eclectic*' visitors. Pompidou5 has a high number of '*eclectic*' visitors (27%), while Pompidou4, a high percentage of '*space-driven*' visitors (17.9%). Nevertheless, this percentage might be illusionary, as closer examination shows that they spend less than the mean time by one-third, and could possibly be paralleled to the type of visitors we called '*browsers*' and encountered in the Sainsbury Wing and Tate5. On the contrary, at Pompidou5, the percentage of '*space-driven*' visitors is among the lowest in the sample; and this might be due, among other reasons, to the low transparency of the layout. Although Pompidou5 has the highest mean number of spaces visible from each space (almost three times as high as that of Louisiana), because of its compartmentalization, it is among the least transparent layouts of the sample.

Kröller-Müller is the second smallest setting of the sample, after the Sainsbury Wing. It is characterised by the synergy of building, spatial and exhibition design, which support each other in order to communicate H. Kröller's specific view of art. Its distinctive visitor pattern property is intensive viewing, equivalent in some sense to that encountered at Castelvecchio. This is manifest on a number of levels. First, Kröller-Müller has the second highest ratio of time spent over floor area in the sample: visitors tend to stay twice as long as in the Sainsbury Wing and Louisiana. Second, its intensive viewing is reflected in the exhaustive exploration of the galleries: viewers get to 81% of the galleries -the third highest percentage in the sample. Finally, it occupies the highest values in the sample in terms of rate of stops, both in absolute terms and in relation to the mean number of objects on display. Yet, Kröller-Müller and Castelvecchio constitute the two extremes in respect to visitors' focus of attention. At Kröller-Müller, the focus of all attention is placed on individual exhibits, as confirmed by a variety of empirical data -from the balance between moving and viewing, to the high rate of stops, and the high number (80%) of '*object–driven*' visitors. On the contrary, as we have seen, the emphasis at Castelvecchio is on spatial exploration. That said, there is an interesting, rather unexpected, affinity between the two cases to be noted: at Kröller-Müller, as at Castelvecchio, visitors tend to be actively

engaged with the exhibits. This may be inferred by the morphology of visitors' paths within the galleries which, we think, indicates that they tend to refer back to works already seen and make cross-comparisons. It is also worth stressing that Kröller-Müller constitutes the only case where '*space-driven*' visitors, though only 10%, stay longer than the total average, even longer than the '*object-driven*' visitors which are the most assiduous viewers. This observation is, we believe, another manifestation of the special attraction power of the individual exhibits of the museum -the works of van Gogh, and it may perhaps be explained by the grouping together of his works in the central, visually unified, spaces, which encourages comparative and ensemble viewing. In this respect, it is worth adding that more than half of the total number of stops is recorded in these central galleries, devoted to van Gogh.

Coming to the final main case study, Louisiana, we can immediately note that is differs emphatically from the rest of the cases. With its asymmetric arrangement of spaces, its atypical core, its surprising opacity and its intimate relation between inside and outside, Louisiana seems to go consistently against the trend and challenge the characteristics which tend to be common in most museums. In terms of pattern of use, Louisiana displays an interesting balance: it has one of the highest tracking scores in the sample (81%), meaning that it tends to be exhaustively visited, and one the highest ratio of sum of stops over sum of objects. Furthermore, its ratio of time spent over floor area is in the middle values within the sample: visitors spend in average 38 minutes, and perhaps more importantly, 48.3% stay longer than this. It is worth noting that the recorded amount of time spent does not include the exploration of the north wing and the park. Had they been included, the average stay of visit would no doubt have been longer (since at least the park is part of all visitors' itineraries). We may therefore argue that there is a parallel to Castelvecchio in two respects: first, Louisiana has, like Castelvecchio, a comparatively high percentage of '*space-driven*' visitors (17.9%), and second, is characterized by the exploratory morphology of visitors' paths (as inferred from their meandering orbits of movement). Both these patterns are observed mainly in the east galleries of Louisiana, which is particularly intriguing since their spatial properties (i.e. axial fragmentation, lack of cross-

visibility) do not encourage an exploration of compositions in space. Perhaps we might argue that, as at Castelvecchio, the arrangement of objects in space critically affects the pattern of exploration. Also, this finding lends support to the argument that the heterogeneity of space use patterns between galleries constitutes a key characteristic of Louisiana. In contrast to Pompidou, at Louisiana there are no spaces that monopolize movement, nor galleries that concentrate viewing, like at Kröller-Müller. Here the spaces with the key works of the collection have low viewing, but high movement, and on the contrary, the south galleries with the recent acquisitions of the museum get by far the highest viewing rates. This absence of a visitor pattern encountered with consistency throughout the museum reminds us of Tate Britain; the two museums are the only cases in the sample where we find different patterns in different parts of the museum, and this, as we shall see, gives us an important clue about their spatial structure -a point to which we will return in the context of the concluding discussion.

Concluding, it seems proper to dwell for a moment on Tate Britain, in order to remind the reader of its key features since, as argued in chapter 3, Tate Britain will be used in the theoretical conclusions in the final discussion. The biggest in scale of the museum settings analyzed in this thesis (four times as big as the Sainsbury Wing and three times as big as Castelvecchio and Kröller-Müller), Tate Britain provides the richest network of alternative paths and has by far the highest convex connectivity value in the sample. This can be accounted for by another key finding: the axis at Tate Britain, unlike the axis at Pompidou, does not monopolize movement but integrates exploration, in that side galleries, even those located deep into the building, tend to attract high densities of movement. A result of our study that seems more suggestive is that, at Tate Britain viewing is not dependent on movement in the sense that viewing does not take advantage of high movement areas so as to channel viewers into well defined paths; the axis, for instance, gets the highest movement rates in the gallery, but the lowest is terms of viewing -while the opposite is the case at Pompidou where, as we have seen, the axis concentrates both movement and viewing. A final point must be noted

Museum	Percentage '*space-driven*' visitors	Tot. mean time spent *(a)*	Avg time spent by '*space-driven*' visitors *(b)*	Ratio *(a)/(b)*	Tot. mean rate of stops *(c)*	Average rate of stops by '*space-driven*' visitors *(d)*	Ratio *(c)/(d)*
SW	38.2	16	12.8	1.3	32	23	1.4
CV	38	50.4	45.8	1.1	197	44	4.5
TM3	7	27.7	15	1.8	97	17	5.7
TM5	29.4	27.4	18.4	1.5	157	17	9.2
PO4	17.9	34.1	24.2	1.4	79	18	4.4
PO5	10.8	37	15.2	2.4	105	16	6.5
KM	10	36	41.7	0.9	270	67	4.0
LOU	17.9	38	34.8	1.1	165	41	4.0

^ **TABLE 8.1** The profile of the '*space-driven*' visitor

about space use patterns at Tate Britain. Though the empirical study did not include observations in all the exhibition spaces, the available data seem to suggest that there is a tendency towards viewing rather than movement -as indicated by the ratio between the two activities.

8.2 A model of the main dimensions of spatial variability

After the more detailed presentation of the case studies in terms of the patterns of movement and space use they engender, we now wish to move the focus of our analysis to the exploration of the underlying structures of space and object displays which give rise to the intriguing variety of the above patterns. But before proceeding to this, we may recall that the sample was selected so that it includes museums of different scale -from the small scale extension to the National Gallery, the Sainsbury Wing, to the more than four times bigger in scale Tate Britain-, and from the most highly articulated layouts (cf. *number of galleries* and *number of convex spaces*), as for instance Pompidou5, to the less fragmented, like Tate3.[3] Most importantly, the sample allows interesting comparisons between museums in terms of spatial structure, since it includes representatives of syntactically intelligible, transparent and shallow (in terms of *mean depth* and *depth from entrance*) spatial systems -best exemplified by the Sainsbury Wing-, as well as systems that constitute the opposite in all these respects -like Louisiana

and Castelvecchio. This variety lends support to the argument advanced earlier that the intention was to show the effects of strategic spatial variation in museum design, setting out form the spatial model established by the syntactic research. The two main components of this model, which will set the basis for the following comparative review of the critical spatial differences between museums, are the organization of spaces in a *visitable sequence* and the *gathering space,* the recurrent space in the sequence. As previously argued, these key spatial aspects create the two kinds of interface[4] characteristic of the museum as a building type: on the one hand, between visitors and curators -expressed in the arrangement of objects- (*informational* dimension), and on the other hand, among visitors (*social* dimension).

The ordering of spaces into sequences and the morphology of exploration

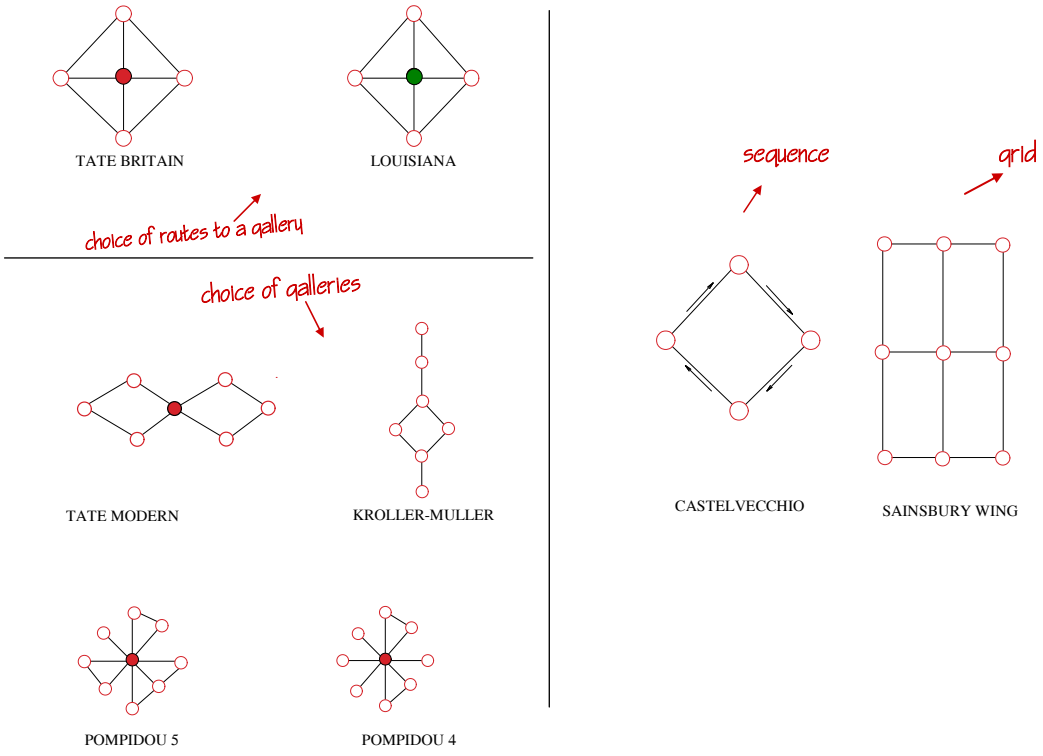
Let us begin by the organization of viewing spaces in a sequence, a principle intrinsic to museum design and instrumental for the accommodation of visitors' movement as well as the arrangement of objects. Looking back at the case studies we find approximations of the two theoretical extremes in terms of ordering of spaces into sequences: at one extreme is the grid, which is impossible to visit in an orderly sequence, but minimises the control that the layout places on the visitor and consequently, maximizes the randomness in the pattern of movement and exploration. In our sample, the grid is exemplified by the Sainsbury Wing, which, organized in three interconnected sequences of spaces, provides a measure of choice and turns out to be a non-easily traversable gallery. The other polar case is the single sequence, which imposes strong rules in the pattern of movement, and powerfully controls the pattern of exploration since visitors have to go through the same sequence of spaces in the same order with no option of changing the course. It is best illustrated by the layout of Castelvecchio, which forms in effect a single ring of spaces. Particularly relevant to our concerns is that these two theoretical extremes are related to the two ways of using space in buildings, discussed in chapters 3 and 4: the grid can be seen as a *short model* set up, associated with a

generative mode of using space, while the sequence, as a *long model* layout, associated with a *conservative* use of space.

The *grid* and the *sequence* structure the variety of layouts exemplified in the sample. Almost all the remaining cases (Pompidou4, Pompidou5, Tate Britain and, to some extent, Kröller-Müller) are in effect *sub-types of the same type*: there is a main sequence with sub-sequences, which constitute discrete experiences, but are dependent on the main axis, since one is forced to return -once or regularly- to the same space. Also, in these cases we have to do with a distinct circulation system, which can be distinguished from the direct connections between rooms found in the case of the grid (Sainsbury Wing) and the sequence (Castelvecchio).

To make visually clear these strategic differences in the underlying spatial *structure* which relate to the organization of movement, we suggest representing museum layouts as schematic diagrams. [**Figure 8.1**] A key point can be immediately made: the dissociation between geometry and topology -a key syntactic idea also found in the work of Brawne, reviewed in chapter 2. Let us look first at two museums that have no geometrical resemblance: the formalised neo-classical layout of Tate Britain and the asymmetrical arrangement of Louisiana. On geometrical grounds, one could hardly expect common ground between these two cases in terms of organization of circulation, but this is exactly what is brought to surface by their almost identical graphs. We can also consider the inverse case, namely the pair of Tate Britain and Pompidou, two museums with geometrical resemblance that have fundamental differences in terms of relational patterns, as made clear by their two distinctive graphs: a *wheel* form graph in the case of Tate Britain, and a *tree* form in the case of Pompidou (a purely *tree* form graph representing the extreme case of a layout where there is exactly one route from all spaces to all others).

But how are these differences relevant to the way museums function? At a basic level, the ability to identify the relational properties of layouts that transcend differences in geometry allows us to draw a fundamental distinction between museums that provide *choice of routes to (most of the) galleries* - illustrated in our sample by Tate Britain and Louisiana-, and those that permit *choice of galleries*, exemplified by Kröller-Müller and Pompidou4. In the former case, the spatial



^ **FIGURE 8.1** Schematic diagrams of the museum layouts of the sample. They make visually clear their similarities and differences in terms of organization of circulation: for example, Tate Britain and Louisiana, two museums with no geometrical resemblance, are represented as identical diagrams.

structure allows alternative route choices from one part of the layout to another (that is, at a global level), which, consequently, generate a probabilistic distribution of people. By contrast, in the latter case, choice is offered at a localized level but this becomes essentially merged in the global well defined route.

But to pursue the analysis a step further, we can add another significant dimension, the topological types of space. As intuitively argued in chapter 4, what seems critical in the organization of circulation is the ratios between pairs of *space-types* and the way they relate to one another with respect to the overall system in which they are embedded. To show this, let us turn once again to **Table 4.3** which presents the basic profile of the museum settings of the sample. We can immediately note certain general trends across the case studies in terms of *types of space*: the *c-spaces* form at least half of the total number of the constituent spaces in the layout; the ratio of *d-spaces* tends to be lower that one-third of spaces (with the exception of Pompidou4, and the extreme case of Kröller-Müller lacking completely choice-spaces), and *b-spaces* are almost absent. On the contrary, what appears to vary considerably between cases is the ratio of *a-spaces*. In respect to this, it seems intriguing that Kröller-Müller and Pompidou4, which, as already noted, are devoid of *d-spaces*, have the highest number of dead-end spaces. Despite our small case study base, these observations may perhaps lead to the argument that the lack of choice (the absence of *d-spaces*) is countered by the high number of *a-spaces,* which are linked to *c-* (or *d-*) *type complexes*. If this hypothesis is plausible, perhaps we could argue that a fundamental reason for this design choice is its critical configurational effects: on the one hand, it minimizes the depth of the spatial system creating *integration*;[5] and on the other hand, it allows for differentiation in visitors' paths reducing the rigidity of the circulation system. Therefore we see that it is the interrelationships between many spaces that affect the pattern of movement, and not simply the local properties of spaces.

This argument can be confirmed by a pair of illustrative examples, Tate3 and Louisiana. Tate3 has a high *d-ratio*, the highest in the sample, almost equal to that of the ringy layout of Tate Britain; yet, choice seems illusionary as we have to do with localized *d-complexes* disposed in such a way in the dominantly sequenced

spatial complex that one cannot take significant route decisions. Tate3 can be interestingly juxtaposed to the case of Louisiana: the latter does not have a high *d-ratio*, but it is the embedding of the powerful central space, the park, into the layout that critically affects the whole itinerary and offers choice at the global level. It follows from the above that an interesting tension arises between the global and the local properties of space, as visitors move around -a point that will be better clarified after the discussion on the social implications of the ordering of spaces.

The gathering space and the morphology of encounter

This section turns attention to the second component of the spatial model, the gathering space. But to be able to understand how the museums of the sample interpret the common spatial theme of the gathering space, and what the critical implications of these different interpretations are, we need to remind the reader of the key syntactic concept, the unprogrammed social effects of the arrangement of space. In complete contrast to the lack of emphasis on this issue in the dominant literature (reviewed in chapter 2), syntactic research (see chapter 3) has rendered explicit that the way in which the spatial layout organizes movement, affects the structure of the pattern of encounter, by potentially determining the degree of co-presence and the likelihood of encounter among its users. This argument informs our analysis of the morphology of co-presence and encounter in the museums of the sample: it enables us to look for the social function over and above the programmed space that the museum provides to accommodate encounter, and seek social effects in the way the gathering space of the museum relates to the galleries, and in the gallery sequencing.

Accumulated syntactic studies and the analysis of the selected museums suggest that the gathering space is more than the obvious social gatherer; it is the space that assumes a variety of key functions: from playing the role of the reference point in the spatial sequence and providing orientation, to working as the space of large-scale circulation that imparts movement to the galleries and, as a consequence, the space where local movement is interfaced with global

movement. Using the two syntactic concepts introduced in chapter 6, of *synchrony* -which refers to the scale of a space- and of *description* -which refers to the whole embedding of the space in its context-, we could describe the gathering space as the space in the layout that tends to be strongly *synchronised* (since a large amount of space –axial or convex- is invested in the gathering space) and highly *descriptive* (in that a large number of spaces are related to this). More significantly, from a syntactic point of view the gathering space tends to be part of the *integration core* of the gallery, that is, the space (or system of spaces) most directly connected to every other space in the gallery. As we shall see below, this syntactic property plays a key role in the spatial structure and the functioning of museum buildings since by being most directly accessible, the integration core attracts higher movement and by implication, maximizes the opportunities for co-presence and encounter.

However, these relational properties do not seem to determine the shape of the gathering space. Interestingly, its form varies considerably from one case to another, allowing a critical distinction between the museums of the sample on the basis of the geometrical properties of their gathering space: at Tate Britain and Pompidou, it stretches in space and takes the form of the *axis;* at Tate Modern, it is represented by the *escalator space*; more surprisingly, at Louisiana, it takes the form of the *park*.

This argument about the different possible forms of the gathering space is worth expanding, by first examining closer the museums where it takes the form of the *axis*, that is, Tate Britain and Pompidou. What is of particular interest is that even within this group of museums, meaningful functional differences arise from the way it is embedded in the global system, reinforcing the argument made earlier. Focusing attention on Tate Britain and Pompidou, the main axes have the same area in the same shape (in other words, they have a similar *synchrony*), but are embedded in different syntactic contexts (that is, they have different *descriptions)*. More precisely, at Tate Britain, the axis becomes the centre of a symmetric organization of spatial elements, but, as previously argued, it does not organize the whole building. The complexes of spaces on both sides structure independent routes, that allow the exploration of the gallery independently of the

axis; so one can make the whole route just by crossing once the main axis to get from one side of the gallery to the other. Moreover, the gathering space can be explored and discovered in many different ways; the visitor can stay long exploring part of the building, omit the axis and then be surprised to find himself in this space and encounter by chance people moving around the gallery or those moving in and out of the building. This constitutes in effect the key feature of Tate Britain: the gathering space is also the key element in the *shallow core* of the gallery, that is, in the *integration core* that links the entry to the building to its deeper parts, and so interfaces in-and-out movement with movement around the complex, enlivening the sense of encounter; so people who enter the museum together, split onto different paths, and then re-encounter each other probabilistically, at some point of their itinerary.

On the contrary, the main axis at Pompidou5, though it is also the integration core of the layout that spreads out at full length, assumes a different function. It organizes the whole layout and links the sub-cycles on each side, but as these are not interconnected, and circulation choices are restricted on the local scale, people have to return to the main axis regularly and in a certain order. Moreover, the fact that it also works as the way back, further reinforces its role as an ordering device and contributes to its overwhelming presence. It could therefore be argued that what differentiates the axis at Pompidou from that at Tate Britain is the degree of compulsion: while the axis at Tate Britain permits movement and empowers visitors, that at Pompidou enforces movement and guides visitors' exploration. Though in both cases the axis operates like the social gatherer, at Pompidou, the pattern of co-presence seems enforced, in the sense that it is dominated by a strong overall sequencing, while at Tate Britain, relaxed and probabilistically generated.

More surprisingly, and despite initial appearances, the *park* at Louisiana plays the role of the axis at Tate Britain, in that it opens up the exploration dimension, by allowing significant route choices. In both cases, the gathering space, the main integration space of the layout, works as a generative social space, and the pattern of encounter is a global emergent phenomenon: interactions between visitors extend beyond one's immediate neighbour, as local encounters

are unified into a dense pattern of encounter realized by a larger group of visitors in the park, rendering the whole experience much richer socially. As already indicated, this is an underlying similarity between Tate Britain and Louisiana, and a critical difference between these two museums and the remaining case studies. However, two further points should be added. The gathering space of Louisiana differs from that of Tate Britain in terms of shape, since it increases *convex synchrony* by increasing the two-dimensional space invested in the park, in contrast to the latter which increases *axial synchrony* by increasing the one-dimensional space invested in the main axis. This differentiation might indicate a different functional emphasis: on social interaction, in one instance, and on organization of circulation, in the other. A second point derives form the first: though the gathering space -the park- at Louisiana operates as part of the display, it is outside the museum building, and more importantly, it is not a compulsory space (as in Tate Britain), since the localized sequences allow for a continuous circuit of movement; yet it constitutes an essential part of the experience, and more importantly, it extends the pattern of socialization outside the galleries.

Returning to the sample, we find that the remaining museums miss this extra resource. The Sainsbury Wing has no gathering space, and its central axis cannot play the role of the space that maximizes opportunities for encounter, since people omit this sequence. Yet it seems that the spatial configuration acts on the pattern of co-presence: the open spatial relationships between the galleries and the rich cross-visibility make people constantly aware of each other as they move around and explore the displays. In other words, the visibility structure of the layout enhances co-awareness, rather than co-presence, and sustains a dense pattern of visual encounter; and this can be seen as the most primitive form of socialization. This points to the fundamental difference between the sense of co-presence created by spaces with their own, clear boundary, and the sense of co-awareness generated by visibility across boundaries.

Castelvecchio and Tate Modern do not really add social experiences; given the explicit spatial rules, there is little change in the pattern of exploration and, by implication, in the pattern of co-presence -particularly Castelvecchio is completely devoid of a gathering space; or, it could be argued that if these two

museums do add social experiences, it is at a localized level.[6] This is an interesting distinction between Louisiana and Tate Britain, on the one hand, and Castelvecchio, on the other hand: in the former, as we have seen, the local groups of visitors are linked to a between-groups contact in the large-scale movement space (the park or the axis), while in the latter, it is the short and local encounters that are reinforced. At this point an objection may be raised, since in the case of Tate Modern the escalator space operates like a gathering space; moreover, it is visually on the main axis and part of the integration core of the gallery. However, as shown in chapter 6, the central space is located outside the viewing sequence, and so it does not play an active role in the organization of movement within the limits of the exhibition space, but rather tends to be constrained to the global circulation function. On this basis, it could be argued that the escalator space at Tate Modern seems more instrumental than social, a conclusion that seems worthy of some emphasis. Adopting two terms coined by Borhegyi,[7] we could describe the key difference between the central space at Tate Modern, and the gathering space in the rest of the cases (Louisiana, Pompidou, Kröller-Müller and Tate Britain) as follows: the former is *sociofugal*, intended to distribute visitors, while the latter are *sociopetal* spaces, intended to bring people together.

Ultimately let us consider the idiosyncratic case of Kröller-Müller, since here it is the spatial distribution of objects (supported by the structure of space) that accounts for the pattern of social encounter to a higher degree than the spatial configuration in itself. Kröller-Müller is marked by the absence of a gathering space; yet the set of spatially and visually continuous galleries that accommodates the highlights of the collection, and which constitutes the centre of the building, both from a geometrical and syntactic point of view (that is, form its integration core) appears to bring people together, lengthens the time of their physical co-presence and visual contact, and thus enhances, on the local scale, an otherwise restricted social dimension.

A main conclusion that can be drawn from the foregoing discussion on the main dimensions of spatial variability in museums is that a critical tension is created between *social* and *informational* function. This tension arises as a contrasting requirement in cases where the layout of space, dictated by the order

in which information is received, operates to enforce spatial separation, rather than to create connections. Kröller-Müller is a good case in point: the constraints imposed on the spatial design (i.e. sequencing, visual insulation from the outside), required by the realization in space of the specific message, separate and insulate, rather than create the conditions for encounter. But the reverse can also happen, and the informational function can contribute to enhancing the social function, in the cases where the spatial proximity required by the organization of information maximizes the randomness of encounter and creates the conditions for social interaction. This case is best illustrated by Louisiana, where the display, with a minimum of rules restricting the viewing order, does not impose a deliberate sequence to the pattern of exploration and by implication, encourages encounter density.

8.3 A model of the basic dimensions of variability of display strategies

Let us now return to examine further the interaction between space and display, the second critical issue for this thesis. In contradistinction to the art historical literature (reviewed in chapter 2) which, though it acknowledges the intimate relationship between arrangement of space and presentation of art, does not rigorously deal with its spatial dimension, the aim of this study was to direct attention towards the description of the organization of the collections from a spatial point of view. Guided by the belief that the arrangement of objects in space suggests a spatial structure over and above the conceptual one, one of the initial questions raised in this thesis was whether the display layout can generate particular ways of looking at objects, which are not dependent only on the inherent qualities of the works themselves but also on their spatial arrangement. To this end, the tools were provided by the syntactic analysis, which has revealed fundamental spatial qualities -such as, hierarchy, axiality and perspective- and key configurational properties –as, for instance, *integration, connectivity* and *control*- that appear to have critical effects on the way objects are seen and explored. In what follows it is therefore suggested that depending on the way these properties are handled in respect to display decisions, a basic distinction could be drawn

between three main strategies of relating spatial and display layout -each with its own affects and consequences: using space to enhance the impact of objects, or using objects to enhance space, and a third possibility, that space and display retain their autonomy.

Exploiting space to enhance the impact of objects

Let us begin by the most common strategy, adopted by the majority of the museums of the sample -Sainsbury Wing, Pompidou5 and Kröller-Müller-, according to which the display layout exploits the qualities of the setting in order to maximize the impact of the objects. Consistent themes in the spatial design of these three museums are the strong main axis that runs the length of the building, the long perspective vistas, and the cross-visibility, which also become key spatial tools that serve the presentation of the collections. Particularly in the Sainsbury Wing and Pompidou5 –among the layouts with the highest values in the sample in terms of visibility properties (see **Table 4.4**)-, views from, through and into spaces punctuate the narrative, and door openings act as frames of visual compositions, in varying depths, that focus attention on specific objects, while enriching the visual experience. Especially in the Sainsbury Wing, vistas anchored from afar offer a dramatic pull to visitors entering the gallery, while powerful works, systematically placed as stops to major axes, transform the circulation paths into goal-directed tracks. Similarly, at Kröller-Müller, H. Kröller's favourite painting is positioned at the end of the first main view, fulfilling the same function: to 'freeze-frame' the object at the end of the line from the point of view of the moving observer, enhancing its importance and inducing movement. At Pompidou5, we find a variation of this strategy. The most well known works are systematically installed in relation to the axes of the viewers' passage, placed in the spaces that are directly open to the circulation axis of the gallery, intended to draw visitors further into the exhibition spaces.

But at a more fundamental level, it appears that curators tend to relate the distribution and categorization of objects to spatial decisions. It should be remembered that the three museums under consideration are characterized by a

hierarchal spatial organization. In other words, they structure space in such a way as to privilege certain galleries with respect to others, by means of direct accessibility, ample or distant visibility, rich network of connections. Let us consider, for example, the Sainsbury Wing and Pompidou5: they both use the key property of depth, but invert it. In the case of the Sainsbury Wing, some key displays are in sets of spaces of more restricted access, located at the deepest parts of the gallery, in dead-end rooms. In contrast, at Pompidou5, key displays are richly connected and among the most integrated and strong control spaces of the layout –either those open onto the axis or those structuring the continuous interior axis. In other words, the two museums seem to proceed from opposite principles in their attempt to induce movement and increase the probabilities that objects will be seen: in the first instance, by drawing people further into the deepest parts of the gallery and trying to inhibit the bypassing of rooms; in the latter, by exploiting movement generated by the most integrated spaces in order to attract higher densities of viewing in these spaces. A variation of this strategy is encountered at Kröller-Müller. The highlights of the collection are not placed at the deepest spaces of the building (as in the Sainsbury Wing) nor at the shallowest galleries (as in Pompidou5), but at the centre of the composition, privileged by the spatial design: a highly integrated and controlling space and a compulsory passage in the layout.

We begin therefore to see that this close link between design choices and display decisions can extend beyond the aesthetic and visual aspect and affect the semantic content of the exhibition -an idea that reminds us of the critical argument advanced in the art historical literature about the layout of space and the arrangement of displays being manifestations of ideology (Duncan 1995; Staniszewski 1998). But let us examine our sample more closely to explain this point. We have argued earlier that cross-visibility seems to be a distinguishing spatial quality of the three museums and a consistent property of their display, aiming to create a visual effect and thus induce movement. But it turns out that in all these cases, it also operates as a powerful means for mediating additional relationships between works, multiplying certain kinds of affinities and cross-references. Both in the Sainsbury Wing and Pompidou5, visual connections

between spaces allow for thematic or aesthetic relationships among individual works, arranged in adjacent spaces. More fundamentally, at Kröller-Müller, the visual relationships between the symmetric side galleries are specially designed so as to produce the intended readings, the cross-comparisons between the two co-existing artistic movements.

But more than that, what seems to further establish the argument about the interaction between spatial design and exhibition set up is the fact that in these three museums we can detect a persistent relation between structure of space and conceptual structure of display, or between *syntactic* and *semantic* aspect of the layout. To explain this, let us first consider the underlying principles of organization of the collections. In the Sainsbury Wing and Pompidou5, the organization of the display follows the art historical scheme hanging by movements and artists in a *chronological* narrative. In other words, the collection is shown in a more or less canonical way, and the arrangement is based on a specific theory of art. Works are therefore non-interchangeable, and the links between them well determined. This points to a *long model* display, according to the definition proposed in chapter 4 (a highly structured message and intellectually controlled by the curator). Yet there is a certain degree of flexibility in the conceptual structure, since artistic movements can co-exist or interact. This flexibility, as previously argued, is expressed in the spatial design: the layout takes the form of a grid, a dense network of spatial and visual relationships between galleries, which render the viewing sequence implicit, and encourage comparisons. Spatial flexibility seems also in accordance with the high degree of *redundancy* (or the a priori knowledge of the message, as also suggested in chapter 4), that characterizes the display, since the narrative is based on principles that are likely to be familiar to the viewer and consequently, expected. The opposite is the case at Kröller-Müller. Here we have to do with a *conceptual* arrangement, in the sense that though objects are set in a broad chronological framework, their arrangement reflects the development of a particular argument, the specific view of art of the founder. As in the case of the chronological organization, works are non-interchangeable, and information highly structured; but unlike it, it is characterized by low *redundancy* and high *originality*, since it is

a subjective organization of the collection and the underlying principles are not likely to be known to the viewer. This mode of grouping can offer unexpected readings, but on the other hand, it is marked by a high degree of conceptual intervention by the curator (or, the founder in that case). Perhaps this is a fundamental reason why rules and constraints are imposed on the architecture and spatial design: they are required to control the order of the information, and ensure that the proposed links between works will be read as planned.

It is therefore clear that in the above cases, spatial and conceptual structure are in some kind of a relation of *correspondence*, meaning that we understand the relation of works of art by the proximity and the relation of spaces. This has a two-fold effect: on the one hand, it affects the reading of the display. Nowhere is this clearer than at Kröller-Müller, with the contrasting juxtaposition of the two movements shown in the opposite and identical side galleries, and the heart of the building accommodating the works of the artist that represent the culmination of these movements. On the other hand, it critically determines the way the intended message is communicated to the viewer. But to explain this we must first discuss the alternative display strategies deployed in our case studies.

Using objects to create space

Castelvecchio and Louisiana offer the opportunity to identify another possibility of relating space and display layout, which involves the opposite curatorial choices, as compared to those discussed above. Instead of the exhibition layout exploiting the qualities of the setting in order to maximize the impact of the objects, the exhibits are set so as to emphasise and bring out the qualities of architectural space. Here arrangement of objects and design of space are conceived as a single composition, meaning that works can not be experienced independently of the space that contains and displays them.

As seen in the paired analysis with the Sainsbury Wing in chapter 5, Castelvecchio constitutes the atypical case in which the arrangement of objects is used to re-order and articulate space: paintings, treated as three-dimensional objects are detached from the static wall surfaces and used to subdivide the

galleries; sculptures, arranged asymmetrically on the sides of the main axis, unify the enfilade of galleries, while enhancing the sense of visual depth. Intriguingly, though Castelvecchio has spatial qualities similar to those of the Sainsbury Wing - for instance, the strong axiality and perspective- these are used in a diametrically different way. The long perspective vistas that are end-stopped by blank walls are a good case in point. Louisiana manifests similar tendencies but through different means. Recurrent are the galleries that afford a bird's-eye view over the adjacent room, enhancing spatial sense; one can survey the exhibition area in its entirety before descending to examine its parts. On the whole, and in both cases, the most interesting views are within rooms or from rooms to the outside, rather than between the rooms themselves.

This may be related to the fact that the arrangement of objects is not aimed at inducing through movement. On the contrary; it seems that the effort is directed towards slowing down visitors' paths and delaying the rhythm of perception. Structure of space and distribution of objects seem to work together so as to encourage local exploration. At Castelvecchio, statues first encountered from behind, require the viewer to move close to, and around them, in order to face their front; paintings stand in the way as temporary obstructions, offering short-term destinations, and screen what is ahead. A similar effect is created at Louisiana. Axial fragmentation and frequent shifts of direction impose a piece by piece exploration and enhance a sense of temporal prolongation and spatial anticipation.

It may therefore be argued that, rather than being a function of decisions dependent on the relational properties of the layout, the arrangement of objects arises from the integration of objects within their immediate architectural/spatial setting. It is no accident that in both cases, key works are dispersed throughout the museum, indicating that there is no systematic concern to take advantage of movement densities or establish differentiations of objects by means of spatial differentiations. Here we have to do with the inverse relationship between conceptual and spatial structure, that is, a *non-correspondence* relation. If we look back at the organization of their collections, both Castelvecchio and Louisiana adopt a *visual* arrangement within a broad chronological framework. They

accentuate visual links between works and are mainly concerned with the creation of an aesthetic unity. This mode of grouping is characterized by a high degree of semantic *randomness* -in the sense that there is uncertainty in the message-, and interchangeability among objects. In complete contrast to the chronological and mainly the conceptual arrangements discussed earlier, the visual is the most exploratory intellectually, since it gives the intellectual control to the viewer: the curator puts things that look nice together -and in this sense he prioritises space as an independent variable-, but it is the visitor's task to reconstruct the story semantically and explore possible meanings. And since there is not a precise idea behind, but on the contrary, the curator juxtaposes works outside the normal frame of reference, there is a high degree of *unexpectedness* (or *information*, as defined in chapter 4), rendering the arrangement a 'visual adventure' and expanding the *information* content - that is the 'unexpectedness' content - of what is shown. It is therefore tempting to conclude that the visual arrangement is not about understanding the underlying concept or intellectually appreciating art, but mainly about appreciating works with the eyes and perceiving them within their surrounding architectural reality.

Having observed this, the question that arises is: is there a systematic relation between spatial layout and conceptual structure of the display, since we do not have to do with a *correspondence* model? The museums of the sample seem to counter this idea, pointing to a duality. On the one hand, we have the case of Louisiana, where the locally sequenced but globally permissive layout is consistent with the open-ended exhibition message; and on the other hand, we have the example of Castelvecchio, where we run into a paradox: the strong sequencing is in apparent contrast with the field of freedom of the exhibition message. It is worth examining this paradox closely, proposing two possible interpretations. First, as we have seen, at Castelvecchio objects are arranged by Scarpa in they way they should be seen, and construct what is essentially an architectural-spatial narrative. It is worth adding here that Scarpa did not include in the installation of the collection key works whose qualities could not contribute to his intended visual compositions and aesthetic juxtapositions.[8] We may therefore argue that the narrative is not in the information, but in the subordination

of the objects to space. We can then see that the controlled viewing order, the 'directional itinerary', serves the spatial theme of unfolding, like in a sequence of montage. The second possible interpretation that could perhaps resolve this paradox is that, a simple spatial progression can work in parallel with, if not in support of, the local complexities created by the changing relationships between objects, or between objects and space, and the richness of visual experiences. Spatial sequencing and intellectual narrative seem to be in the background, in comparison to the constantly changing spatial experiences that the viewer discovers as he or she goes along.

Space and display retain their autonomy

Let us now consider a completely different approach, illustrated by Tate Modern and Pompidou4: the neutralized spatial design distances itself from the objects, and the layout appears to unfold almost automatically and quite independently from the presentation of the collection. The key curatorial strategies discussed earlier seem here reversed. Both Tate Modern and Pompidou4 eliminate symbolic statements (as seen, for instance, in the case of Kröller-Müller) and reject the idea of using objects to transform space (as in the case of Castelvecchio). What seems particularly intriguing is that, though the spatial properties of their layouts resemble to a large extent those analyzed earlier (cf. Sainsbury Wing and Castelvecchio), they appear to have no critical role in the organization of the displays. The intersecting axes organizing the plan, both at Tate Modern and Pompidou4, are not exploited to enhance the impact of objects nor used to add to the narrative; the distant visibility, key quality of both layouts (see *Axial line index* and *Mean number of spaces visible from a space* in **Table 4.4**), is seen as a functional end in itself, rather than a spatial tool for expressing the intended message or lend emphasis to the experience of space. This points perhaps to the conclusion that function (i.e. intelligibility, global orientation) defines a particular way of organizing the building, which, however, does not relate to the arrangement of objects.

Maybe a closer look to the spatial organization of the collections at Tate Modern and Pompidou4 might suggest a little more about this curatorial approach. It seems particularly revealing that in both instances, we encounter a lack of consistent and rigid principles underlying the arrangement of objects. At Pompidou4, the *chronological* narrative in the side galleries is coupled with the *thematic* display along the main axis. At Tate Modern, the overall *ahistorical* arrangement is a mix of thematic, monographic and more traditional historical displays. Furthermore, the works are arranged in galleries that are conceived autonomously and displays are discrete units of meaning, which, however, are set in some kind of an overall thematic organisation; so, as in the case of Pompidou4, there is a tension between local and global level of organization of the different galleries. It could therefore be argued that, in information-theoretic terms, we have to do, in both cases, with displays that lack the *necessary structure* (or *redundancy*), which would render the message easy to read and grasp. Even more remarkably, this kind of spatial arrangement of exhibits -that of Tate Modern in particular- has, in our view, parallels, with the *conceptual* arrangement at Kröller-Müller. This argument is based first, on the fact that the relationships between works are intellectual, rather than visual; there is a specific concept behind the grouping of objects, which, in addition, is not always visually evident (and this may perhaps be related to the observed use of the information panels at Tate Modern). The second reason that justifies the proposed correspondence between Tate Modern and Kröller-Müller has to do with the fact that the viewer has a low degree of intellectual control upon the exhibition message, since the links between works are already set up by the curator, and more than that, they cannot be easily retrieved (see chapter 6). So, as already argued in the case of Kröller-Müller, this exhibition arrangement generates unexpected juxtapositions and leads to innovative approaches, but it also requires knowledge of the non-easily discoverable principles of grouping; and this no doubt reduces the explorative dimension of the display. Concluding, it could be argued that this approach, according to which space and display constitute two layered, rather than intersecting, levels of organization should be associated to- the recent tendency

for museums to regularly re-arrange their collections (as reported in chapter 2), a tendency which presupposes maximum spatial flexibility and display autonomy.

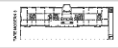
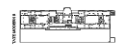
Taken together, the last three sections on the main dimensions of variability of display strategies may be seen as significantly contributing with new ideas to the unravelling of the interaction between space and display. The first argument that derives from the analysis is that, in addition to the experience of objects (*informational*) and that of other people (*social*), we begin to see another critical dimension to the way we experience museums and that is the experience of space itself. This critical issue of the *non-discursive* aspect of our experience of museums will be further developed in the next, final, section. A second idea follows from the first: it is not only the architectural strategies that affect curatorial choices but strategic curatorial decisions can determine our spatial experience. The last two contrasting object layout styles constitute evidence of this. In one instance, by using objects to create space, curators expand the spatial potential and enhance our experience of space; in the other, by distancing the display from the spatial design, they place the experience of space in the background, as a passive and inert frame for the foregrounded display.

8.4 Theoretical synthesis

As we have seen, the preceding sections sought to describe and account for the main dimensions of variability in respect to spatial layouts, object layouts and visiting cultures, and begin to suggest the systematic relationships between them. The idea was to relate alternative solutions to the key issues involved in the design of museums, described in terms of three fundamental tensions between three things: the ordering of spaces into viewing sequences and the gathering space; the informational and the social function; and the spatial design and the exhibition set up. In the light of the above account, and on the basis of the general theoretical scheme set out in chapter 4, this final part attempts to build an overall model of the underlying principles that govern different possible forms of layouts and their implications on the main dimensions of our experience of museums.

To facilitate the development of the argument, it would perhaps be helpful to restate the basic dimensions of the proposed theoretical framework. Our starting points were two. One was the recurrent in space syntax theory dialectic between *order-randomness*; the second was the dialectical dipole *redundancy-information* (or *predictability-originality*), borrowed form the information theory. By considering these concepts together, and applying the same ideas to the spatial and display structure, we proposed a fundamental distinction between the two extreme theoretical possibilities of laying out space and objects: the *long model* set-up, meaning a strongly structured organization, which is associated with a *conservative* (or *reflective*) way of using space, aiming to restrict relations (i.e. among objects, among viewers) and *reproduce* something already known; and the *short model* layout, less structured and so less redundant (or more original), which is associated with a *generative* (or *morphogenetic*) mode of using space, acting to *produce* emergent relations, to *create* something that did not exist before.

This conceptual framework will enable an informed backward glance at the case studies. By pointing to key spatial properties of the closely linked morphologies of space, display and space use, we will show that the museums of the sample - and the museums in general- are in effect variations between the two theoretical poles -*long* and *short* model. For convenience, we will deal with them in two parts: in the first part we will consider museums that *convey pre-given meaning* and in the second, we will explore museums that *create meaning*. However, to render more explicit their strategic variation, we propose **Table 8.2**. and **Figures 8.2-8.3**, which show clearly the fundamental differences between museums and constitute an essential background to the discussion that follows. Because, as we shall see, even if it is only a difference of the length of the *model* or the degree of *randomness* that distinguishes one case from the other, this difference is of fundamental significance in determining the way the museum is explored and experienced.

MUSEUM		SPATIAL ORDER																	
		GEOMETRICAL ORDER	HIERARCHY	SYMMETRY	HOMOGENEITY	REPETITIVNESS	SIMILAR RELATIONS	SEQUENCING	LONG AXES	TRANSPARENCY	SYNTACTIC INTELLIGIBILITY	STRUCTURED ARRANGEMENT OF OBJECTS	LOW DISPLAY RANDOMNESS	HIGH RATE OF ORIGINALITY	UNIFROMITY OF VISITORS' ITINERARIES	PREDICTABILITY OF SPACE USE PATTERNS	EMERGENT SOCIAL EFFECT	BIAS TOWARDS MOVEMENT	
SW			•	•	•	•	•		•	•	•	•	•		•				
CASTELVECCHIO		•						•	•					•	•				
TATE3		•		•	•	•	•	•	•		•		•	•	•	•		•	
TATE5		•		•	•	•	•	•	•				•	•	•	•		•	
POMPIDOU4			•		•	•					•								
POMPIDOU5			•	•	•	•	•		•		•	•	•		•				
KM		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•			
LOU														•		•	•	•	
TB									•								•		

^ **TABLE 8.2** The key properties of the morphology of space (in red), of display (in blue) and of space use (in green) in the museums of the sample

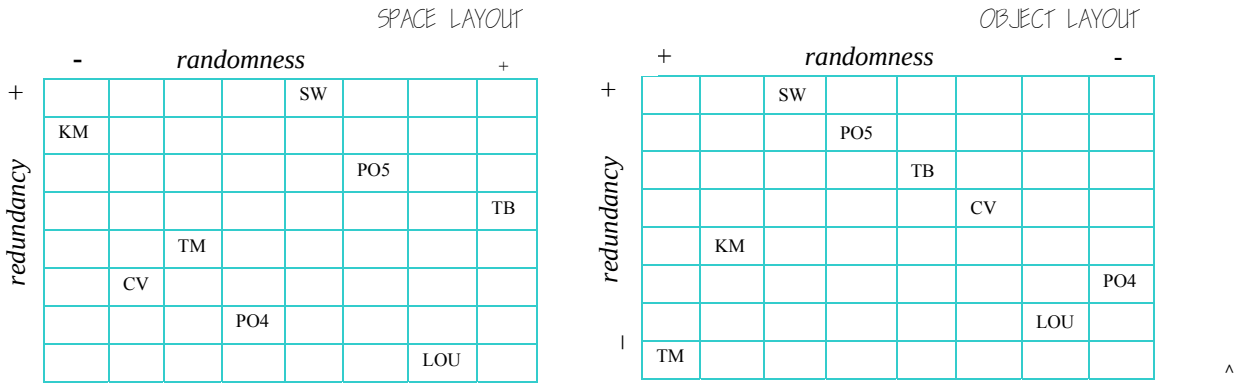


FIGURE 8.2 The degree of *randomness* and the rate of *redundancy* in the space (a) and object layouts (b) of the museums of the sample

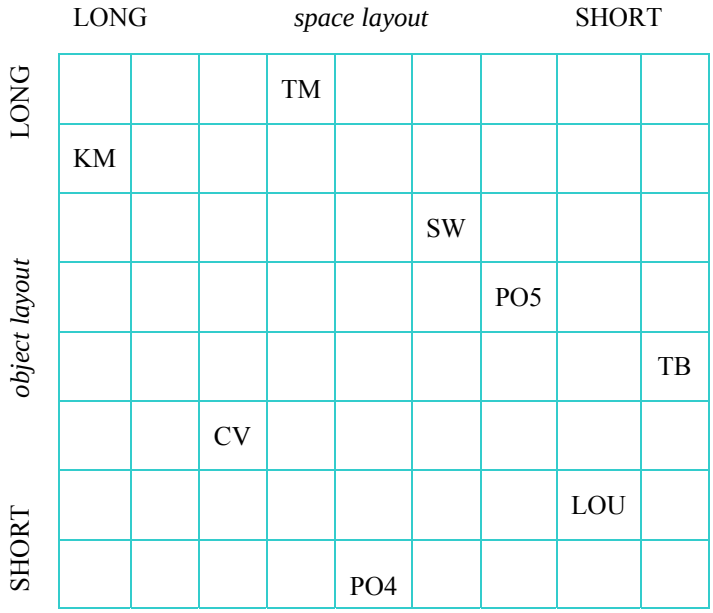
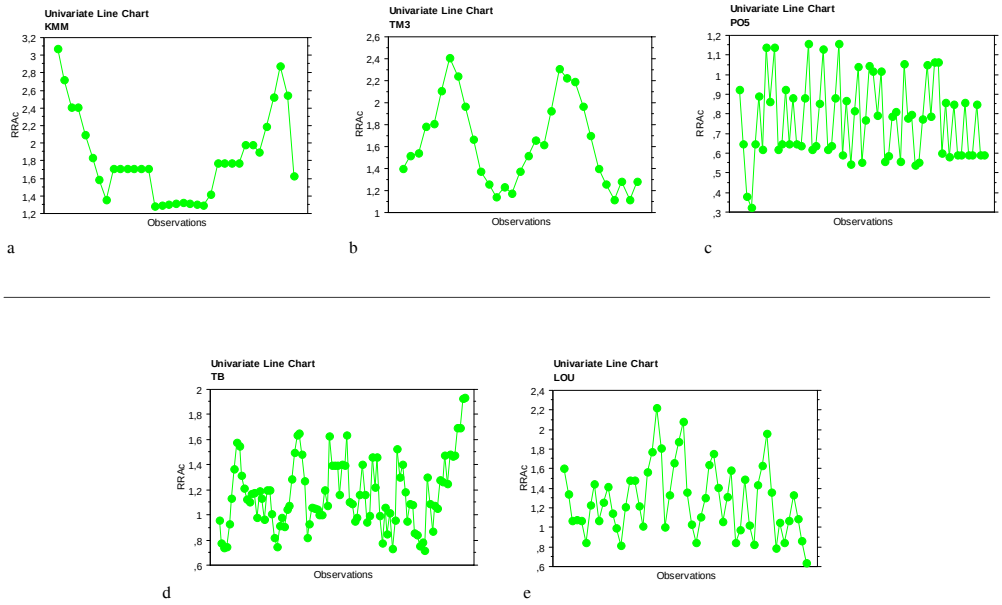


FIGURE 8.3 The space and display layouts of the sample on the *long-short model* grid

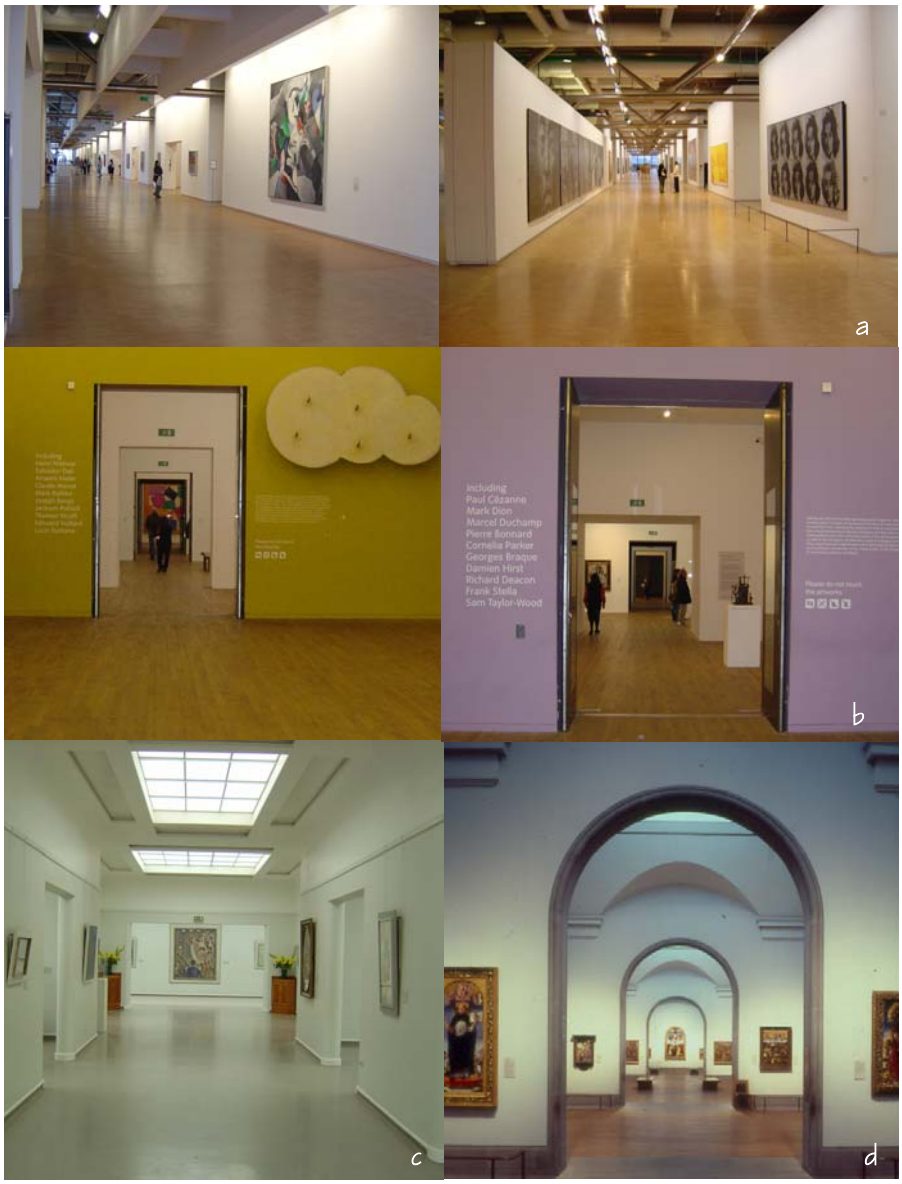
Conveying pre- given meaning

Looking at the sample as a whole, there is a comparable spatial style to be immediately observed between the Sainsbury Wing, Pompidou5, Kröller-Müller and Tate Modern (the exclusion of Tate Britain will be justified later). Each museum exhibits geometrical order -manifested in symmetries of shape and application of proportions-, and displays spatial order -expressed by the more or less identical spaces (or sequences of spaces) that make up the layout, arranged in similar spatial relations. [**Figure 8.4**] In all four cases, long axes traverse the building in its length and width, constantly giving clues about the global structure of the gallery, and responding to the key concern for clarity of plan and lucid organization of spatial elements. The visibility structure which in these museums contributes significantly to this search for intelligibility is also to be compared; axially synchronized views, revealing vistas and relatively uniform isovists enhance *information stability*. [**Figure 8.5**] But, on the other hand, providing the viewer with a large flow of visual information beyond the space he is in, means reducing unexpectedness and spatial anticipation, and decreasing the impact of visual impressions. The generous visual fields at the Sainsbury Wing, the omni-directional, at Pompidou5 and the symmetric, at Kröller-Müller, are cases in point.

Even more remarkably, there is more than a little similarity between the four museums in the way they structure space. As argued above, all layouts guide exploration and restrict random patterns of movement, though to different degrees. The layout of Kröller-Müller and Tate Modern forms a single sequence, permitting restricted local choice; that of the Sainsbury Wing and Pompidou5 allows for route choice by means of a rich network of connections, but does not intend to structure a probabilistic distribution of visitors. By implication, as already indicated, in all four cases, the field of encounter seems enforced, rather than dynamically generated. It is therefore legitimate to consider these properties of the morphology of space as characteristic of a *long model*, in the sense that they control both the visitor's pattern of movement and the amount of information he receives, determining in turn the predictability of his experience.



^ **FIGURE 8.4** Line charts of the RRA values (indicating an index of depth) of spaces at Kröller-Müller (a), Tate3 (b), Pompidou5 (c), Tate Britain (d), and Louisiana (e). Juxtaposing the ordered graphs of the first three cases to the more random graphs of the cases (d) and (e) makes visually clear differences in their underlying spatial structure.



^ **FIGURE 8.5** Long axes traversing the length of the building are a key spatial feature of Pompidou (a), Tate Modern (b), Kröller-Müller (c) and the Sainsbury Wing (d)

But perhaps more significantly, it is the way the four museums relate layout of space and objects that invites their linking together under the characterization of *long models*. To explain this, we must first recall that in these cases we have to do with either a *chronological* (Sainsbury Wing, Pompidou5) or with a *conceptual* arrangement of objects (Kröller-Müller, Tate Modern). In other words, we have a mode of grouping that is marked by a high degree of conceptual intervention by the curator, though not necessarily by a correspondence between the syntactic (spatial) and semantic (objects) aspects of the layout. Furthermore, the message to be communicated is well defined, and more importantly perhaps, it is a *transpatial* message, based on a specific concept or argument which is realized in spatial form. Our sample indicates that there is a close link between conceptual and spatial control, meaning that the higher the intellectual control upon the message to be communicated, the more strongly structured the organization of space. If this is the case, it is tempting to pursue the argument a step further and add a third dimension, the degree of uncertainty (or *originality*) of the message : the higher the rate of originality, the more pronounced the need of a space that regulates exploration and guides readings. The case of Kröller-Müller is particularly clear. Nevertheless, to further explore this question would require more extensive data.

Against this background, the *correspondence* model discussed above can be better interpreted: in the cases of the Sainsbury Wing, Pompidou5 and Kröller-Müller, the layout of space and objects point in the same direction in order to support each other. By doing so, they reinforce the redundancy of the message and decrease the unexpected, in order to effectively convey the intended, well defined meaning. It is no accident that there seems to be direct parallel between the spatial principles that govern the arrangement of space and those that underlie the physical arrangement of objects (i.e. order, symmetry, homogeneity). [**Figure 8.6**] It could therefore be argued that in these cases, space *represents* rather than presents; the way objects are put together means something other than the objects themselves. Once again the clearest evidence of this is the symbolic function of space at Kröller-Müller: the entire form of the building and the overall configuration of

^ **FIGURE 8.6** Examples of symmetric arrangement of objects in the Sainsbury wing (a), Kröller-Müller (b) and Pompidou5 (c)

the plan are adapted to support the message which has to be transmitted into the future.

The situation at Tate Modern seems slightly different. Though its inclusion in the above group is justified by its spatial qualities, it must be differentiated from the rest of the cases since, as already indicated, the spatial sequence has no relation to the organization of information. On the contrary, Tate Modern seems the outcome of systematically opposite values -as, for instance, the contrast between spatial *redundancy* and display variety, or spatial predictability and display originality- all converging to the argument that the innovative ideas in the display were not followed through at the layout level.

Let us now consider a case study deliberately not included in the discussion so far, that is, Pompidou4. If the spatial structure is much the same (as a *long model* layout), its exhibition set up is at the opposite end of the model, in that it is characterized by both much *randomness* and *originality* (cf. absence of a consistent organizing principle). In other words, the two levels of organization at Pompidou4 seem to work in opposite directions, perhaps indicating that we have to do with an unusual case in the sense that the two strategies run counter to each other rather than support each other.

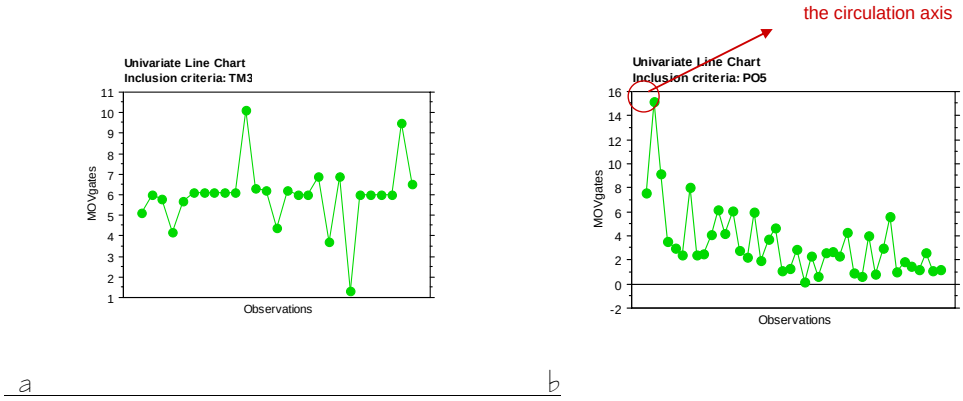
But to further establish the argument advanced above, that conservative functions of space derive from a definite morphological structure, we should now move to examine whether we can detect empirically observable consequences on the morphology of space use. Let us begin the exploration by considering the effects of a strongly structured spatial layout on visitors' pattern of movement and exploration. Repeatedly we have argued that nowhere is the *deterministic* role of space in structuring the movement pattern clearer than at Tate Modern, characterized by both the surprising uniformity of visitors' itineraries and the equalized movement rates throughout the galleries. [**Figure 8.7**] Further to this, it is of interest that, though our sample is too small to allow general conclusions, there are suggestive indications that, the higher the degree of choice of pathways the less uniform the movement pattern -a result theoretically expected, since as repeatedly argued, in a ring all spatial values are equal and so the differences between spaces will be just random variation. Precisely, the correlation between

d-ringMean and *Tracking Score Differentiation Index* (R^2=.834, p= .0302, **Figure 8.8**) at the Sainsbury Wing, Pompidou5, Pompidou4, Kröller-Müller and Tate Modern, suggests that the degree of differentiation of visitors' paths seems to be dependent on the ringyness of the layout. More interestingly, the positive correlations between movement and local properties of space (for instance, *local integration* or the *reciprocal of DepthEntrance multiplied by convaxial connectivity*, see **Table 4.8**) allow some more particular observations: in the above cases, where there are no significant route choices at a global level, people appear to take decisions at different stages of their itinerary -another element that comes to confirm the tension identified earlier, between global and local properties of space as people move around.

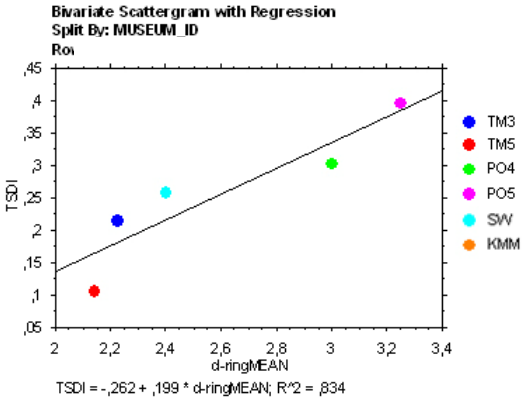
However, the most striking empirical finding is that, not only movement but also viewing is affected by the structure of space. This is best illustrated by Tate Modern, where viewing rates, like movement densities, are equalized, as a by-product effect of the strong sequencing. Also, in the case of the Sainsbury Wing, Pompidou5 and Kröller-Müller, correlations between *viewing* (or *number of stops*) and configurational factors (that is, *global integration* and the *reciprocal of Depth Entrance multiplied by convaxial connectivity,* **Table 4.8**) are weak but remain significant.

A still more significant, though not unexpected, finding is that the higher viewing rates are recorded in the museums of this group (*long model* museums) -with the highest numbers encountered at Tate Modern and Kröller-Müller, the museum settings with the strongest sequencing. It is evident that a prescribed spatial sequence, by decreasing choice, requires less input from visitors and at the same time increases the didactic potential of the layout, refraining them from bypassing rooms and objects.

Yet it was felt that what would powerfully confirm the argument about the *conservative* use of space is to identify observable overall effects of the *correspondence* model used by the museums under consideration. From this point of view, it seems particularly suggestive that both Pompidou5 and Kröller-Müller are seen to work exactly as programmed. As indicated, at Pompidou5, high movement, and more intriguingly, high viewing rates are found in the spaces



^ **FIGURE 8.7** Movement rates graphs that demonstrate graphically the uniformity of the movement pattern at Tate3 (a) as opposed to the differentiation of movement densities at Pompidou5 (b)



^ **FIGURE 8.8** Scattergram showing the correlation between *d-ringMean* and *Tracking Score Differentiation Index* (including the Sainsbury Wing, Pompidou5, Pompidou4, Kröller-Müller and Tate Modern)

designed to be the focus of attention (that is, the more integrated and accessible spaces but also those accommodating the key displays). The programmed effect is even more powerful at Kröller-Müller: the reputation for a part of the collection strongly precedes the exploration of the display and critically influences visitors' behaviour (see chapter 7).

But what best illuminates the effects under investigation is the unanticipated problems -not obvious at first sight- that arise when organization of space and display do not work together as originally planned. The evidence of this derives from the analysis of the Sainsbury Wing and Kröller-Müller, both layouts subordinated to an idea. Precisely, in the former instance, the spatial layout determines a visitor pattern, which emerges irrespective of design intention, and, as a consequence, is not in accordance with the curatorial intent; in the latter, the opposite is the case, meaning that it is the layout of objects that is not in consistency with the original architectural intent, and by implication, cannot be read as conceived.

Attempting to summarize research results and observations related to the *long model* museums, it could be argued that through the arrangement of spaces and objects, the designer (architect or curator) controls the information and reduces the exploratory aspect of the visit both spatially and intellectually. So in both these senses, space is used in a *conservative/restrictive* way so as to *reflect* something already known, to reproduce a set of relationships previously specified, and restrict randomness both in the experience of objects and in the experience of other people. The emphasis is on the intellectual communication and comes to the fore, with the spatial and social experiences in the background. Perhaps the didactic gain can be seen as potentially counterbalancing the lack of unpredictability and the absence of variety of experiences. Because, it is clear that, rather than the spatial means, in a *long model* museum, priority is given to the functional ends, since there is the characteristic of intent, to convey a precise meaning.

Creating meaning

Coming back to our sample, we find museums, at the other end of the scale, Castelvecchio, Louisiana and Tate Britain, museums which despite their conspicuous and meaningful differences, have a key feature in common: they exist to generate something new -new relations, new ideas, new encounter patterns. This is, we believe, what essentially differentiates them from the previously discussed cases which exist to *reproduce*. But before developing our argument and clarifying the properties that characterize the *short model* museums, we should note that instead of considering the case studies as a group, we will deal with them as individual cases or in pairs. As it will be progressively made clear, the reason for this is that, in contrast to the *long models* which tend to resemble one another, *short models* tend to individualization.

So let us begin with Louisiana, the museum which most obviously appears to concentrate the key spatial features of a *short model*. Invisible architecture, asymmetric arrangement of galleries, variety in the morphology of spaces and their relations, strategic presence of the park, all show clearly that we have to do with a layout organized with a minimum of restrictive rules, highly original, and almost devoid of redundancy. Interestingly, in certain of its spatial qualities Tate Britain resembles Louisiana -as, for instance, the ringy layout, the variety in spatial relations, the diversity of circulation systems coexisting within the same spatial system. Both museums, as seen earlier, optimize and structure randomised patterns of movement and exploration, at the global and the local level, and by implication, generate an emergent pattern of encounter (see above).

But Louisiana has some additional features, which can be paralleled to the spatial structure of Castelvecchio. Both are concerned with accentuating unexpectedness, and surprise takes precedence over intelligibility. The layout -marked either by short axes or by long but not revealing lines of sight- can not be grasped as a whole from any central point; it requires the viewer to move around and experience it gradually, in an *asynchronous* way. [**Figure 8.9**] To this contribute significantly the frequent changes of levels and shifts of direction that, as suggested above, restrict the amount of information he receives and maximize the

unpredictability of his experience (Hillier 2003a). Thus the moving observer comes across spaces and objects rather unexpectedly, motivated to discover things *en route*. Furthermore, the mediation, in the spatial narrative, of lengthy intervals and breaks (in the form of outdoor spaces and passages) creates a sense of journey, further enhancing the spatial theme of exploration.

Perhaps more importantly, the sense of exploration is followed at the level of the display. We have seen that at Castelvecchio and Louisiana, the arrangement of objects privileges visual impact, a mode of grouping with a low rate of *redundancy* and a high rate of *originality*, that engages the viewer in discovering the relations between objects and invites interpretation, maximizing both the intellectual effort and control of the viewer. A less pronounced exploratory aspect characterizes the display layout at Tate Britain. Objects are not rigidly categorized, but clustered locally; and this means that there are no global rules governing the organization of the display, as for instance in the case of Sainsbury Wing, or Kröller-Müller. On the whole, Tate Britain seems to be marked by a balance between the *necessary structure* (expressed, for instance, by the fact that people know that by going left, they see the earlier works and right, contemporary art) and *originality* (deriving from a certain degree of *randomness* in the groupings of objects).

It could therefore be argued that in the case of Louisiana and Tate Britain, space (both in terms of the layout of galleries and objects) is characterized by few restricting and local in scope rules, and a certain degree of *randomness*, and so it operates morphogenetically, both intellectually and socially. The two galleries make people explore and this applies to the informational as well as the social programme. Thus they gain more information, since by not knowing what to expect, their attention is focused and their awareness, heightened.

This, however, does not hold in our third case, Castelvecchio. Here we have a tension between the *long model* syntactic and the *short model* semantic aspects of the layout. Yet, it should be remembered that the spatial order and the subsequent control of movement is not associated with conceptual constraints but with the sequential viewing, the control of the desired sequence of images (as discussed

^ **FIGURE 8.9** The sense of unexpectedness, a distinguishing quality of Louisiana (a) and Castelvecchio (b)

above). This creates the interesting tension between the two layers of organization (quite distinct from that seen earlier at Pompidou4), and by no means, undermines the morphogenetic function of space. It might therefore be argued that at Castelvecchio, though space does not act to structure *social meaning* (or *relations*) -as in the case of Louisiana and Tate Britain-, it does contribute to the creation of *spatial meaning*[9] -a point to which we shall return at the end of this section.

At present we would like to turn attention to the visiting patterns, in search of traces of any empirically observed consequences of the *short model* set up. We suggest beginning by some illustrative findings relating to the movement pattern. At Tate Britain while the museum map proposes a starting point and a route, the majority of visitors start the exploration from a different point and structure their own experience (as shown by both the 1996 and 2002 studies). This pattern echoes with the heterogeneity of the initial directional splits of visitors observed at Louisiana -though in that case there is neither predetermined route nor a specified initial direction to follow. Equally interesting, at Castelvecchio, where the dictating overall spatial structure offers less scope for differentiation of visitors' itineraries, the meandering morphology of the viewers' paths within the rooms indicates an exploratory nature of movement on the local scale (see chapter 5).

Traces of *generative* effects of space can also be detected in the pattern of viewing. Neither at Tate Britain, nor at Castelvecchio and Louisiana is it possible to predict all the spaces with high viewing since, as reported earlier, the spatial distribution of objects does not follow specific rules. Particularly revealing is the example of Louisiana, where it is not the highlights of the collection, but the new displays, that attract viewers' attention, implying perhaps that visitors return to the museum to have a different experience. Closely related to this is the observation that at Castelvecchio and Louisiana (there are no numerical data for Tate Britain) visitors stay for a longer amount of time than the total average of the sample, and more remarkably, a high percentage of people observed spend longer than the museum average (see **Table 8.1**). To explain this finding, we must first reflect on two distinctive features of Castelvecchio and Louisiana: first, that in complete contrast to the *long model* museums discussed above, here the arrangement of objects mean nothing else than the objects themselves (cf. *non-correspondence*

relation); second, that the information is not only on the conceptual content of the works, but an extra story is told by the way they are put together. These features point to the most fundamental distinction between *long* and *short model* museums. Rather than *reflecting* a specific meaning, the intent (if there is any) is to *create* fields of possible meaning. After all, meaning does not exist in advance, but is created and exists by virtue of the existence of the specific museum (Hillier 2004). Furthermore, instead of placing the emphasis on the conceptual structure and the functional ends, priority is given to the spatial structure and the architectural/spatial means; and the spatial means is the basis of the aesthetics of space, which is the complete opposite of the didactic (Hillier 1996, p.441). The aesthetic information can perhaps explain the amount of time spent in these museum settings, and become a motive to revisit, to repeat the message, because even if the logical information -the semantic content of the works- is exhausted, there is the field of freedom of the aesthetic information that can not be immediately assimilated.

This distinction enables us to propose a possible insight to the question initially raised, whether the influence of space on the display can extend as distinct from and beyond the *discursive* dimension of the experience of exhibits. It seems to us that, when a richer spatial structure is produced by the effects of the synthesis of spatial and display layout, the informational function of the museum extends beyond the didactic aims, and acts through its aesthetic quality. Moreover, when space is used in a more subtle way, the experience of space itself is rendered more complex and information rich.

Epilogue

We have sought in this study to offer a description of the spatial properties of the morphology of space and display, and provide a coherent theoretical model of the functional and experiential differences between one museum and another. In no sense was the aim to establish a definitive account. Our conceptual model is proposed as a *way of thinking*, as a method for reading museum space as a set of formal potentials, built out of a number of basic concepts. As the detailed analysis

of the carefully selected case studies showed, museums share in common, despite the heterogeneity of their spatial design and the differentiated scale and nature of their collections, a set of basic principles, which are given as possibilities to be explored, adapted and combined, but also as restrictions to a vast range of possibilities. In this respect, perhaps the most significant contribution of the proposed model is that it rendered explicit that morphological strategies are rule-governed, that layout decisions relate lawfully to aspects of the structure of the experience. It is precisely the way in which principles and properties come into a configuration, and contrasting requirements are resolved, that determines the quality and the individuality of the experience (as, for instance, the spatial experience at Castelvecchio, the social emphasis at Louisiana, or the intellectual communication at Tate Modern).

In that sense it might be suggested that the theoretical ideas and research findings could be a valuable contribution to the design of museums in that they provide designers with a better understanding of principles and some knowledge of systematic consequences of strategic design decisions. This theoretical knowledge makes possible design choices and facilitates evaluation of alternative solutions in relation to specific requirements and intentions. More importantly perhaps, it can also inform the application of new rules, generate ideas, and encourage new ways of handling spatial and display considerations. Interestingly, this argument brings us back to the opening statement by Eisenman and his concern about the functional programme of a museum building imposing constraints on innovative possibility in architecture. We can see now, we hope, that museum design does not in itself determines formal potential; yet it is developed against some background of lawfulness, but this lies in the relation between morphological strategies and their functional and experiential implications.

It is our hope that these ideas have some real potential. If indeed this is the case, further research directions could be identified. In methodological terms, possible developments can be sought in the direction of a more rigorous analysis of spatial layouts. The analysis could, for instance, be enriched by a systematic quantitative description of the *intermediate* properties of spaces between the local and the global (such as the degree of sequencing) which, we suspect, are closely

related to visitors' patterns of movement and exploration. Also, research results from our small sample begin to suggest that visibility properties of layouts may be accounted for the occurrence of '*space-driven*' visitors. Testing the relevance of these properties might therefore be worth further investigation. This would, however, require a more extensive sample and focused observation of visitors' behaviour that would allow for the statistical exploration of general trends between spatial variables and types of visitors. Furthermore, the syntactic model allowed us also to capture key properties of museum layouts which are of interest with respect to their effects on the spatial arrangement of the collection. Therefore, it seems to us that further use of this method for a detailed and accurate description of object layouts might contribute to the sharpening of problem of display as '*a branch of architecture*' as suggested by Johnson, to return to the argument with which we began.

In theoretical terms, a program of researches can be sought in the direction of the main concern of this thesis, the patterns of interaction between spatial and display strategies. It would be of interest to extend the study to investigate whether there is a systematic relation between the length of the model used in the layout of space and that adopted by the exhibition set-up. This would perhaps allow tracing museums where space transcends the *reflective* function, and operates to expand the information content of the displays, as indicated by some of our cases studies. This in turn would contribute to the awareness of possibility in museum morphology and lend emphasis to the key belief of the thesis that the creative potential in the design of museums derives from the theoretical knowledge of their morphology.

Notes

[1] Term borrowed by Niehoff (1968, p.43).

[2] As suggested in chapter 4, the ratio of *Sum of stops* over *Sum of objects* is taken to indicate the proportion of objects on display with which the viewer interacted.

[3] Looking at the sample as a whole, it seems natural that there is a significant correlation between the number of the constituent convex spaces and the size of the layout (R^2 = .564, p= <.02), suggesting that larger museum settings tend to be more articulated.

[4] The interface being defined as a spatial relation between or among two broad categories of persons (see Hillier and Penn 1991, p.33).

[5] For a fuller discussion of the four topological types see Hillier 1996, chapter 8.

[6] However, a different kind of social experience has been identified by Stavroulaki and Peponis (2003). They have argued that the inter-visitor gaze intersects the visitor-object gaze and thus visitors and objects become a quasi-interacting set, so that the social is embedded in the aesthetic.

[7] Borhegyi (1968, p.43) uses the terms in analogy to the terms centripetal and centrifugal.

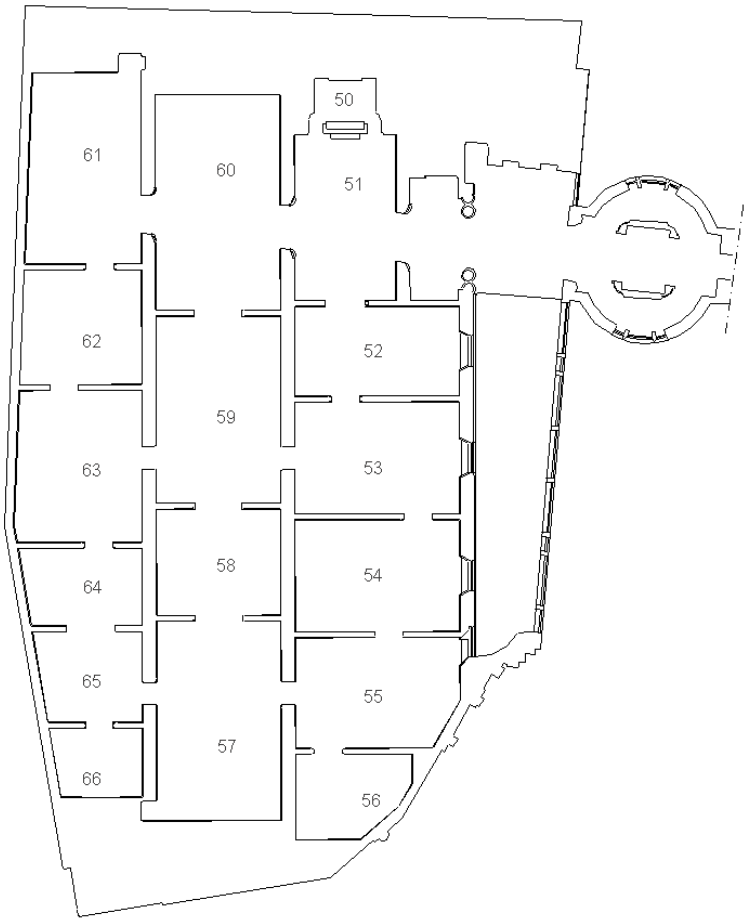
[8] See chapter 5, p. 228.

[9] Maybe this is also related to the theory behind the exhibition design, and more specifically, the influence of Croce's aesthetics on Scarpa. It seems particularly revealing that for the Italian philosopher art is '*intuition*' and '*feeling*', and has no symbolic or historical references. (See Croce 1992; Murray 2003, pp.79-84.)

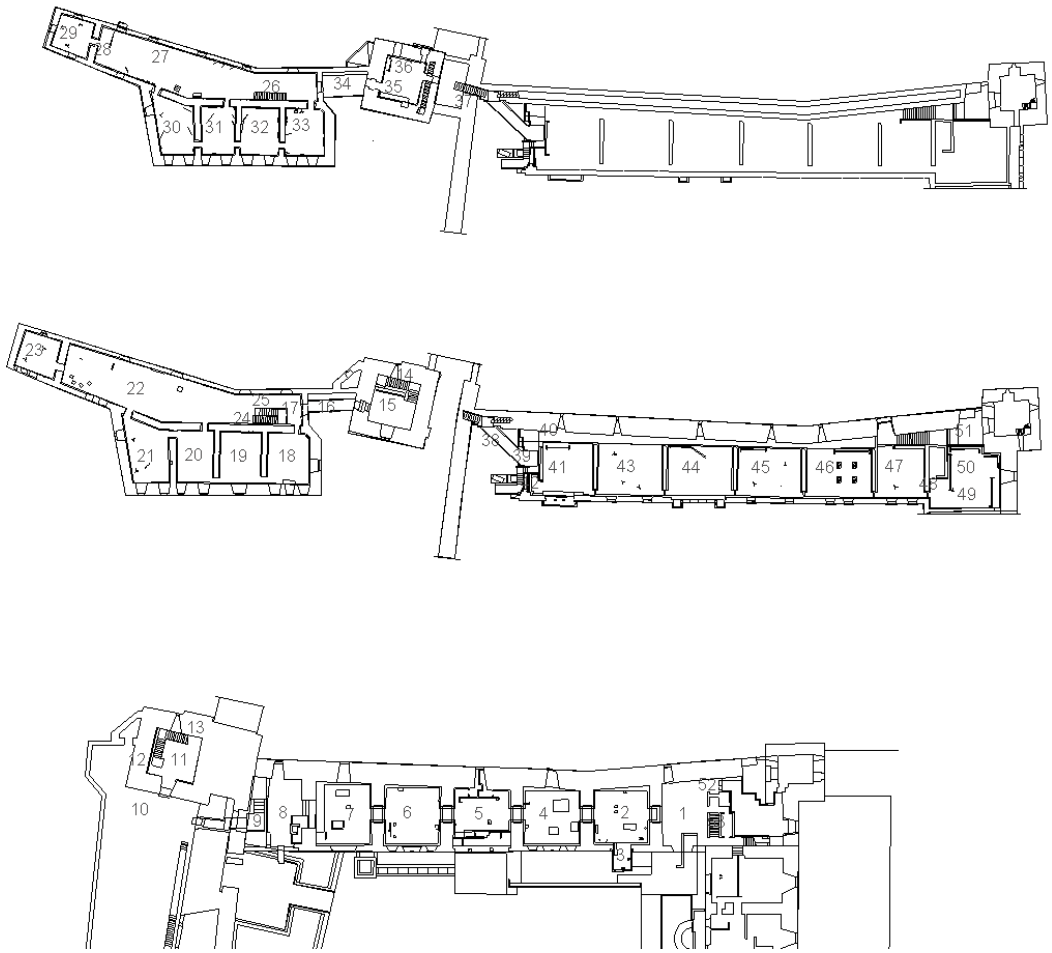
Appendix 1 Floor plans of the study cases

Appendix 2 Convaxial analysis of the museum layouts of the sample

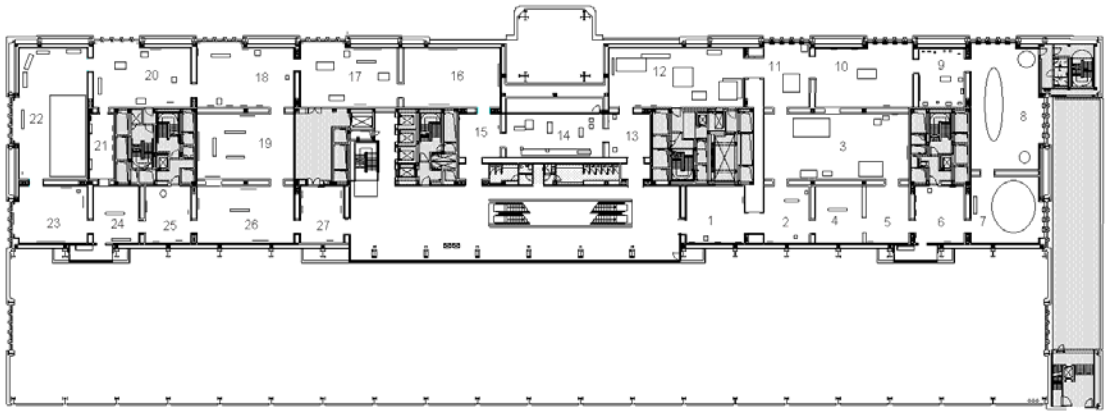
Appendix 3 Space type analysis of the museum layouts of the sample



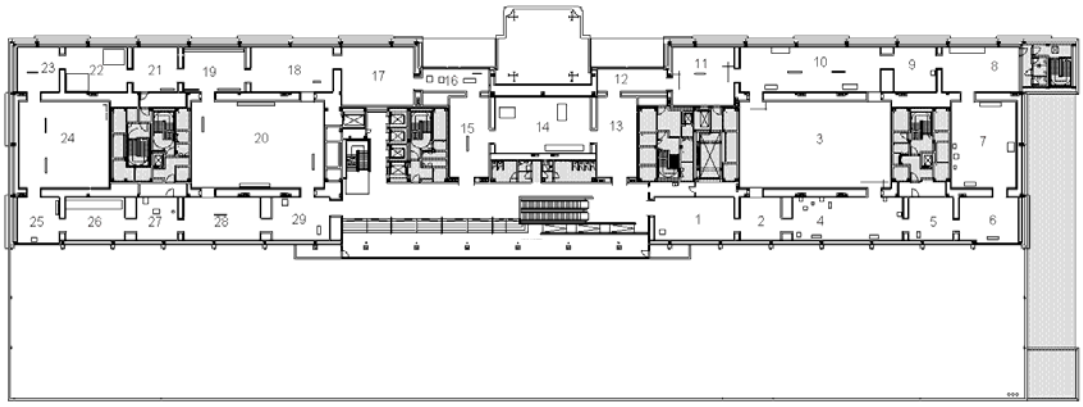
^ FIGURE A.1 Floor plans of the study cases, also indicating the room numbers:
(a) the Sainsbury Wing



^ FIGURE A.1 continued: (b) Castelvecchio

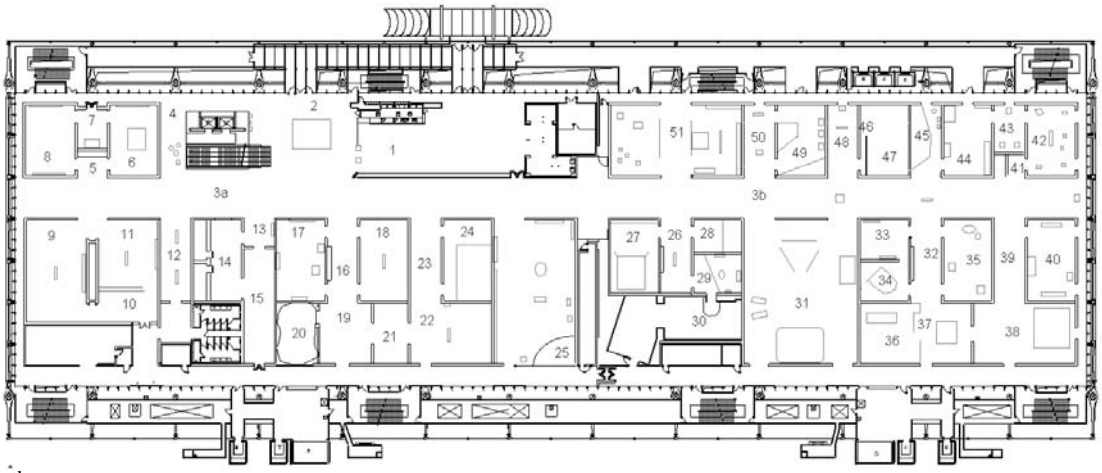


3rd floor

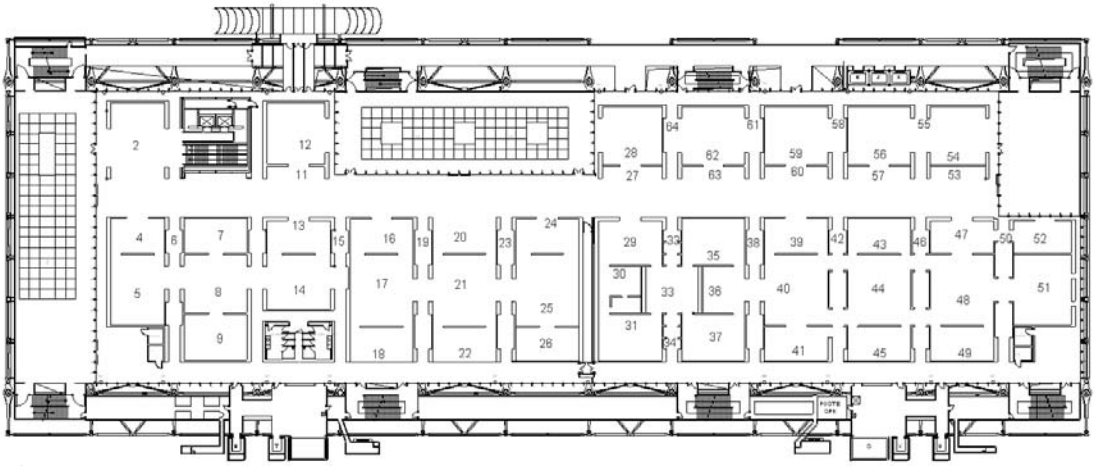


5th floor

^ FIGURE A.1 continued: (c) Tate Modern

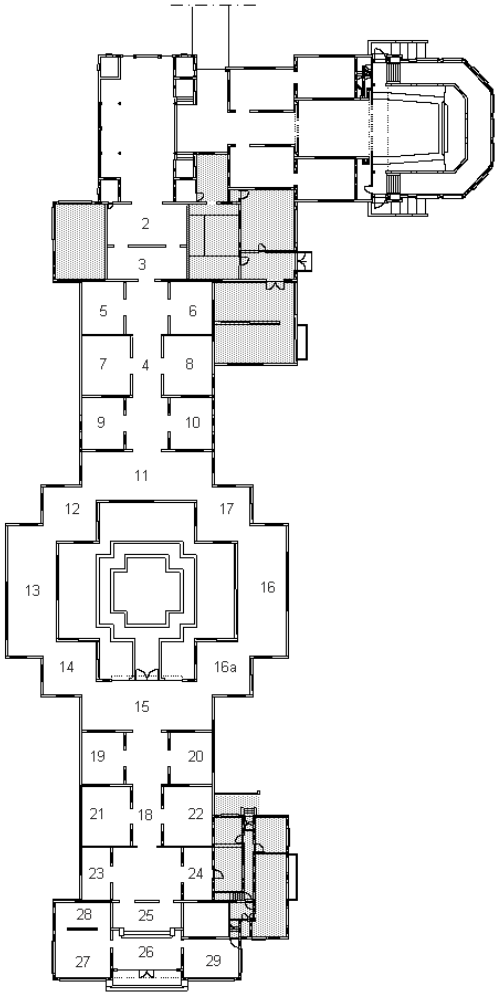


4th floor

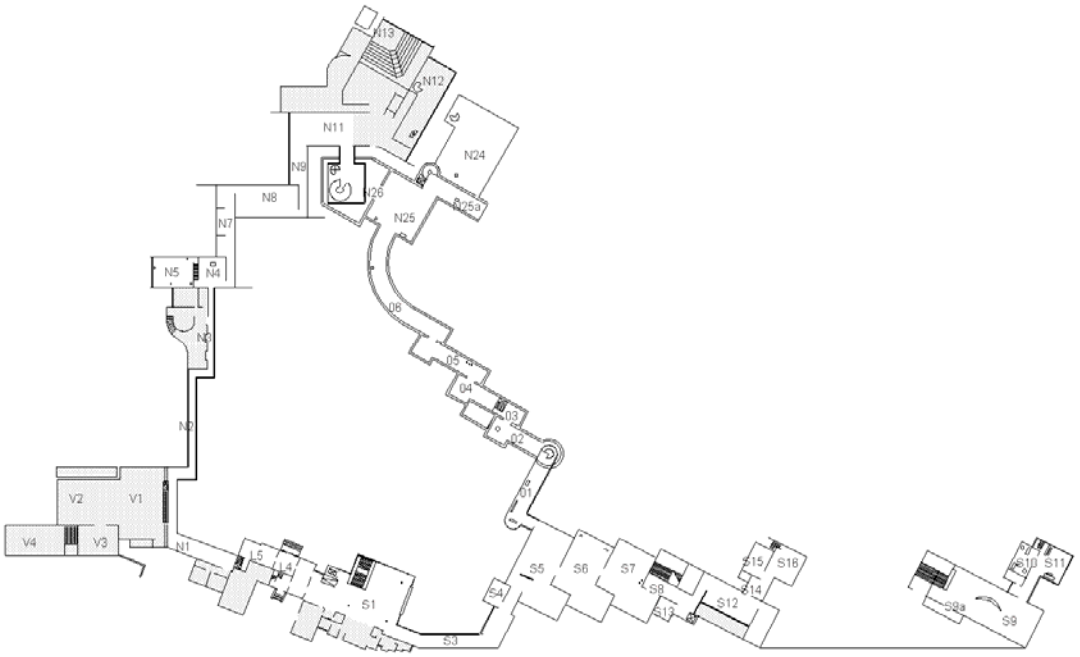


5th floor

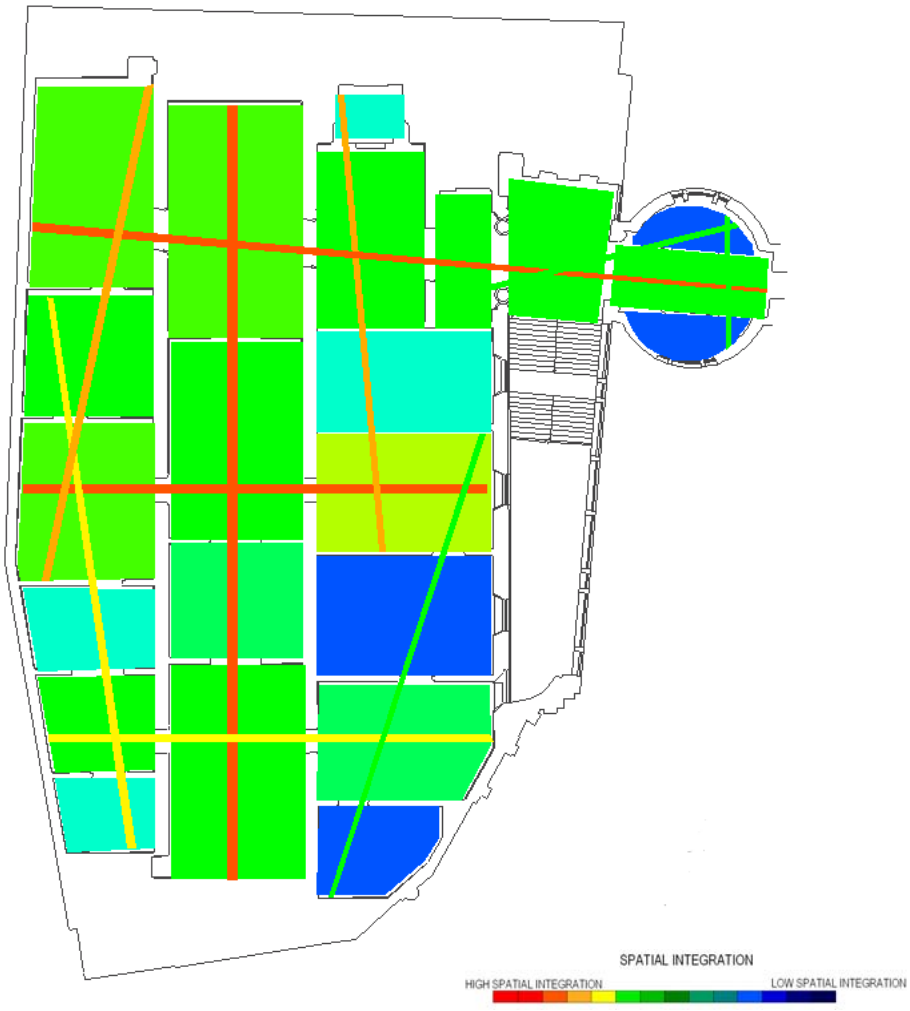
^ FIGURE A.1 continued: (d) Pompidou



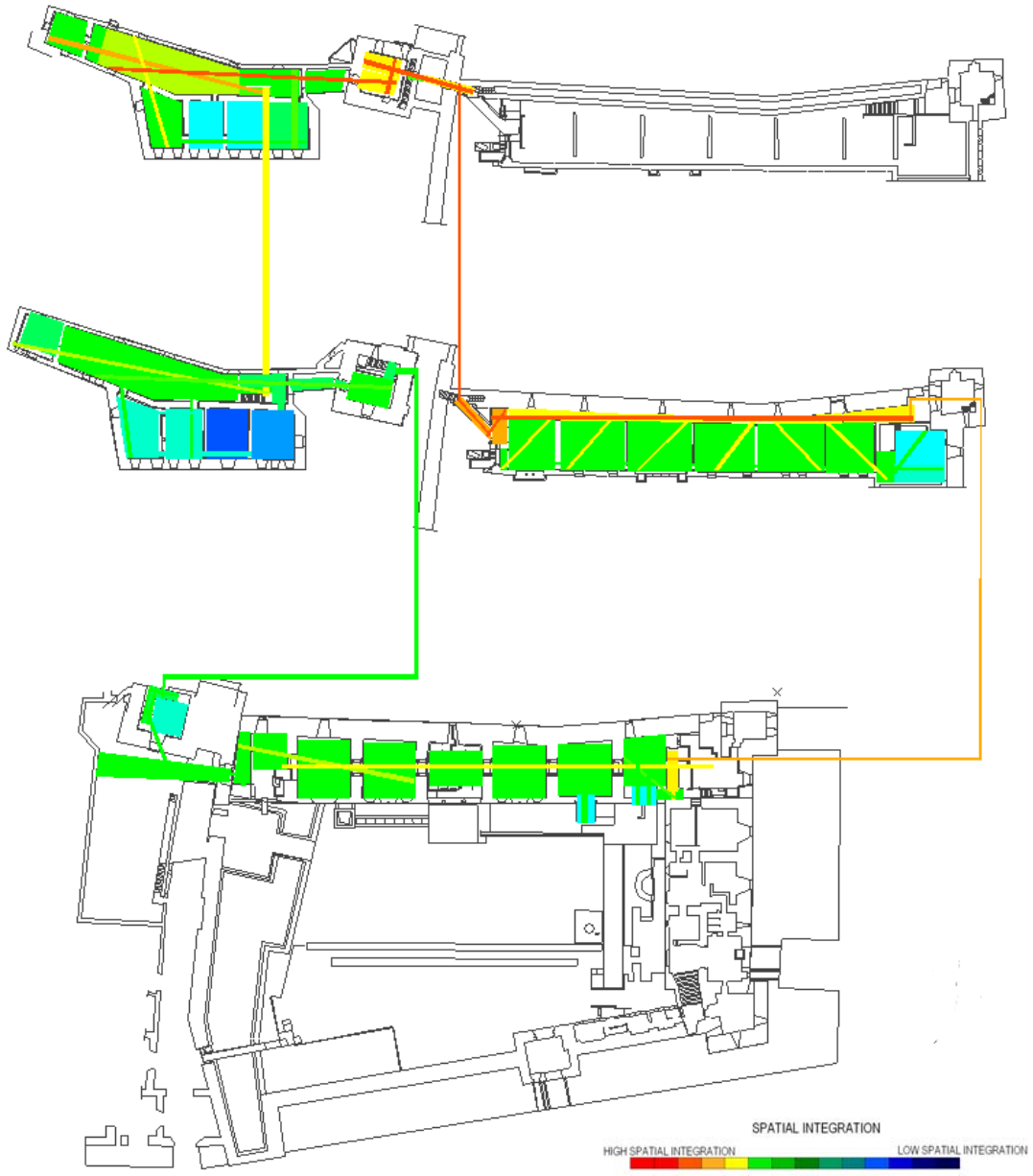
^ FIGURE A.1 continued: (e) Kröller - Müller



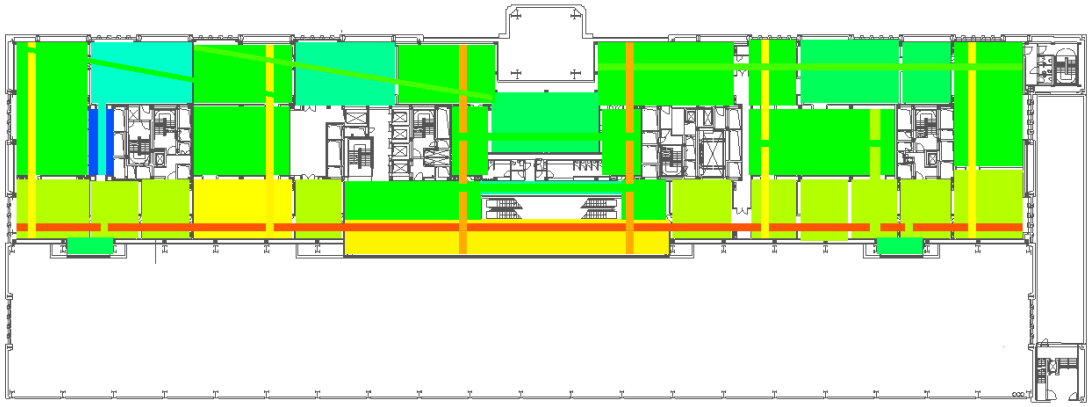
^ FIGURE A.1 continued: (f) Louisiana



^ FIGURE A.2 Composite axial/convex analysis of the museum layouts of the sample: (a) the Sainsbury Wing



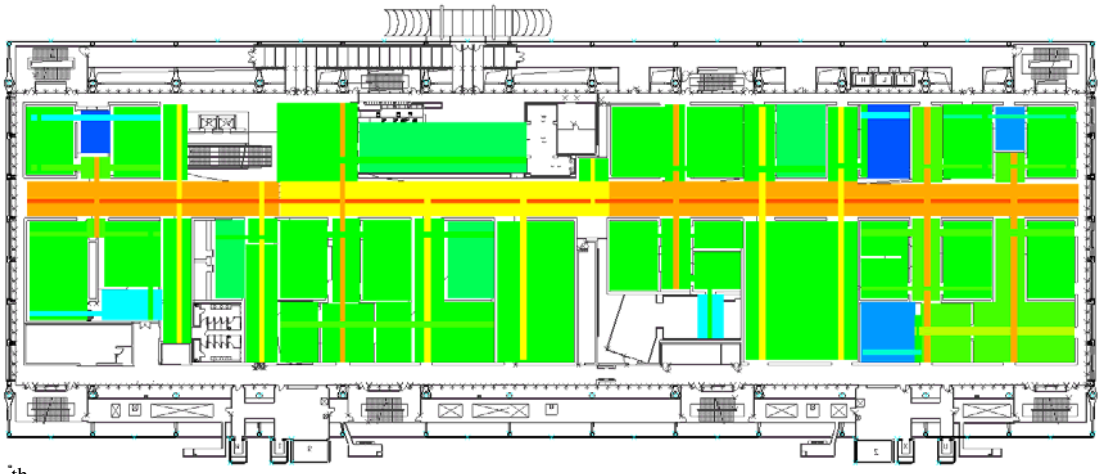
^ FIGURE A.2 continued: (b) Castelvecchio



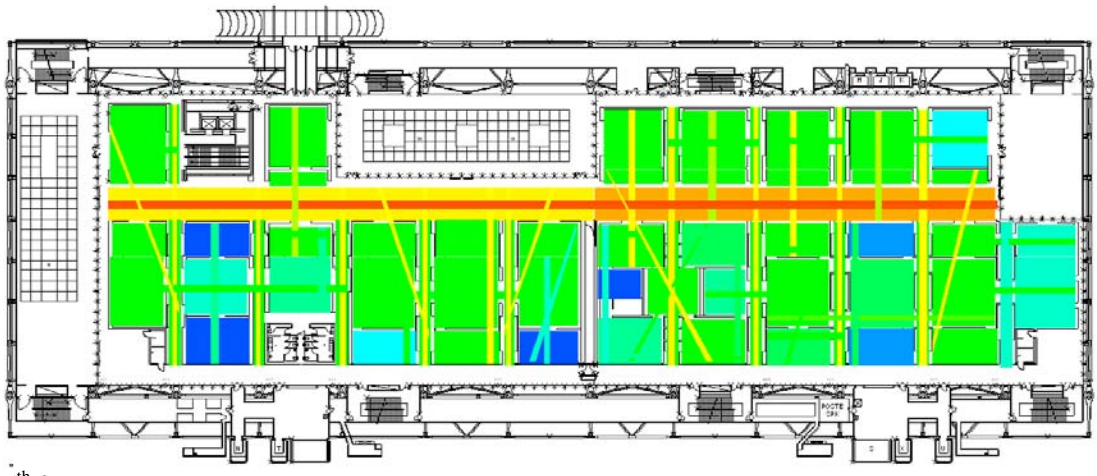
3rd floor

5th floor

^ FIGURE A.2 continued: (c) Tate Modern

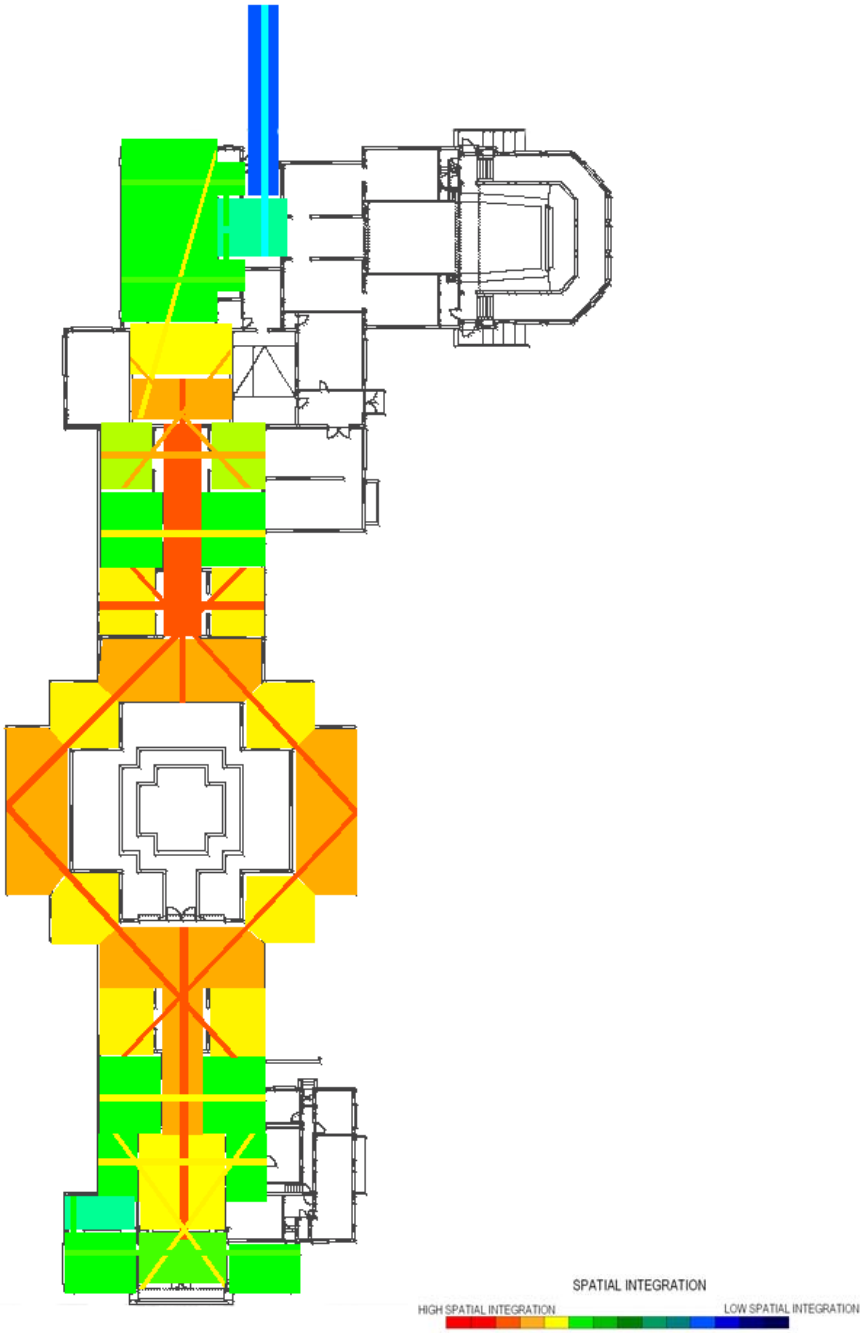


4th floor



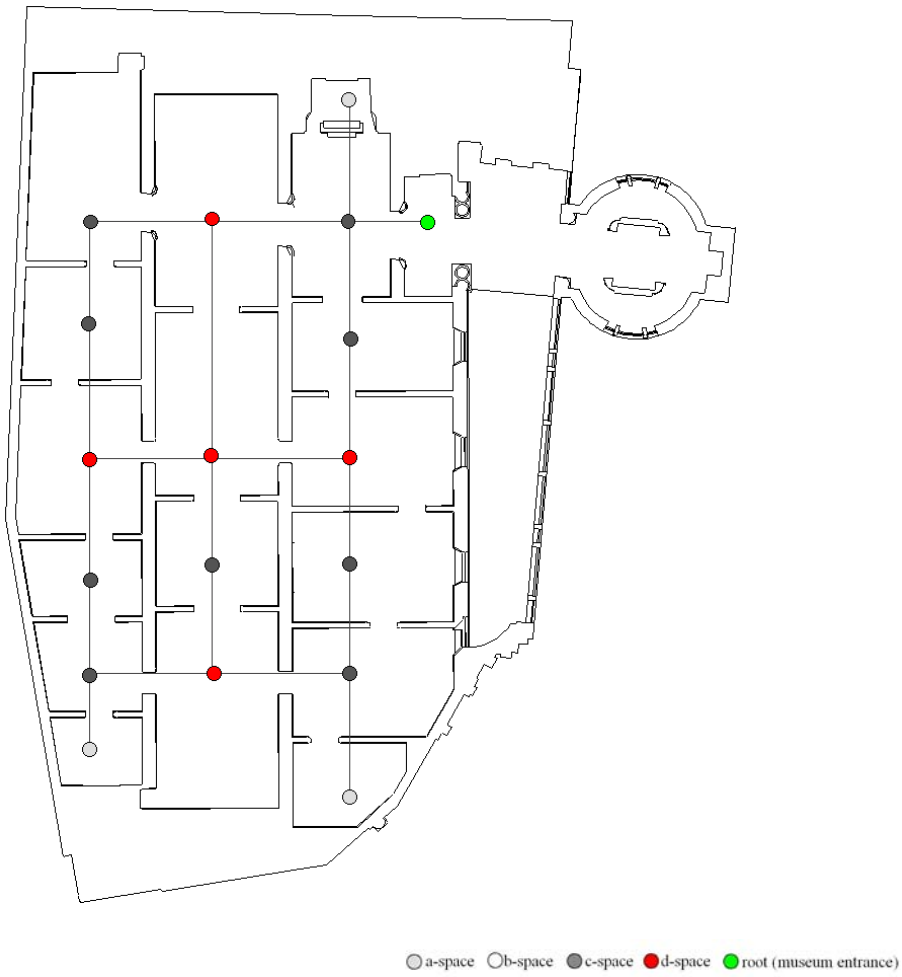
5th floor

^ FIGURE A.2 continued: (d) Pompidou

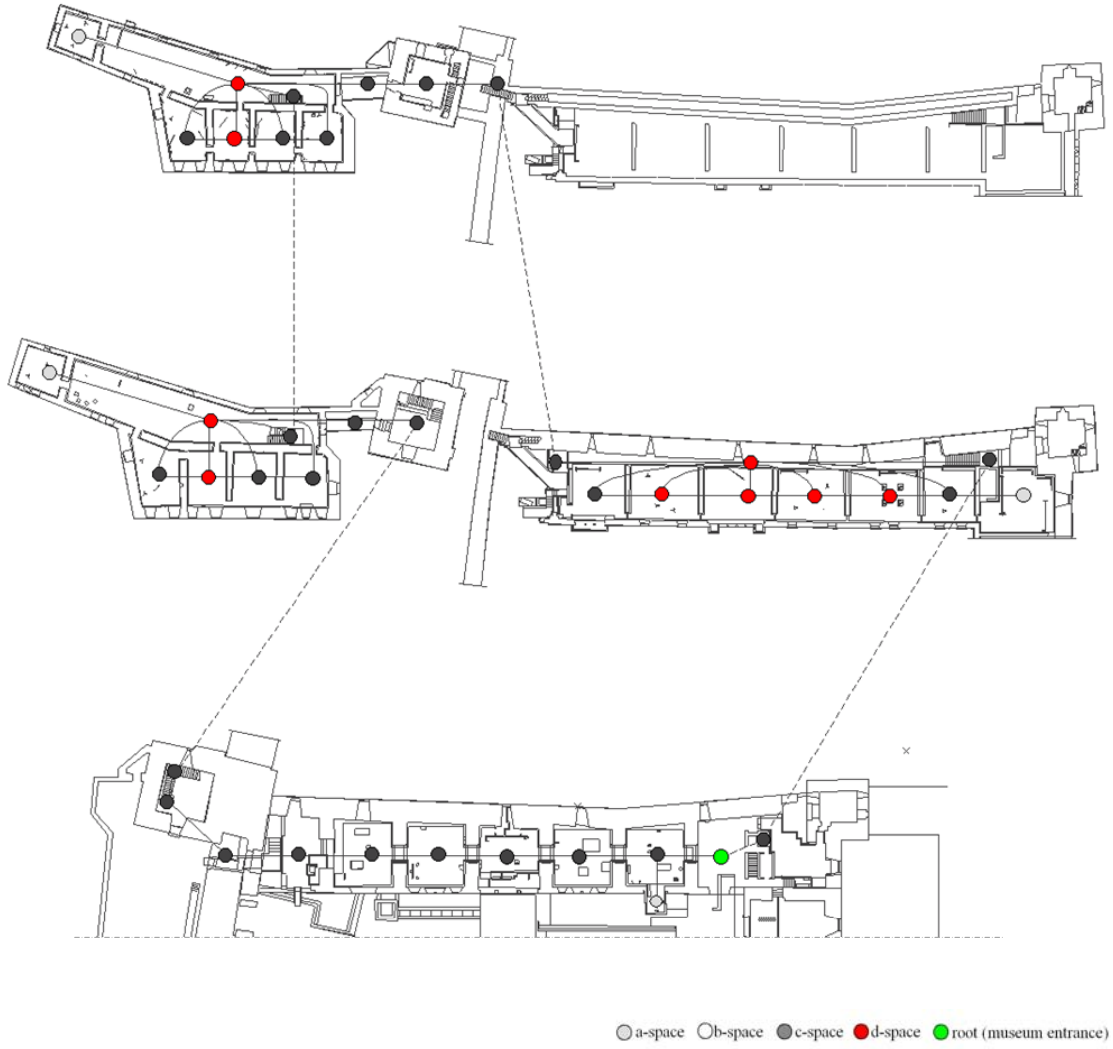


^ FIGURE A.2 continued: (e) Kröller - Müller

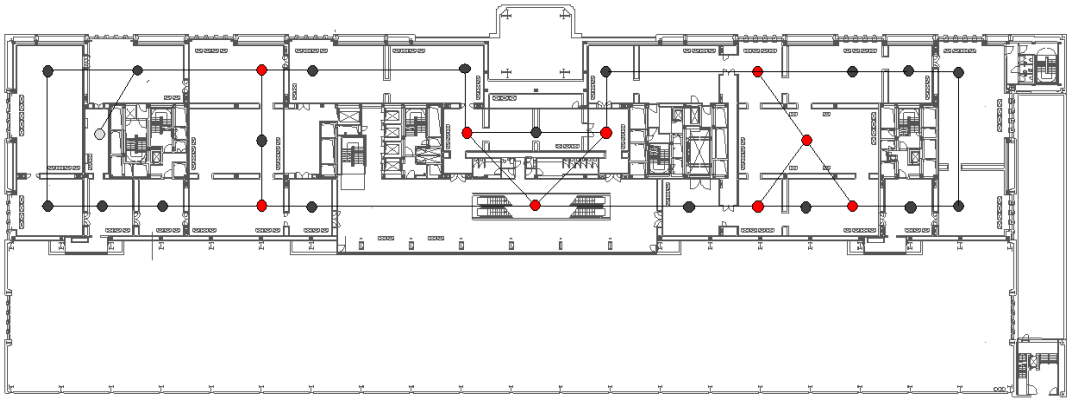
^ FIGURE A.2 continued: (f) Louisiana



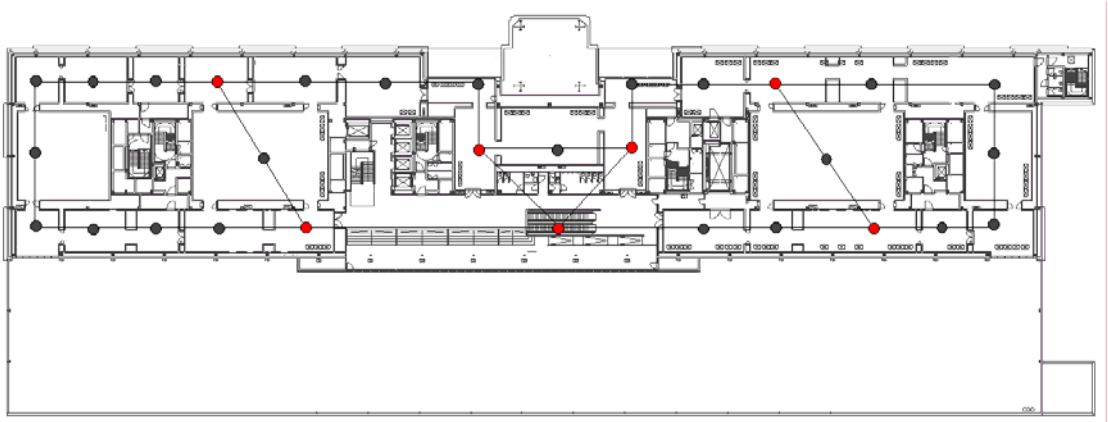
^ FIGURE A.3 Space type analysis of the museum layouts of the sample:
(a) the Sainsbury Wing



^ FIGURE A.3 continued: (b) Castelvecchio



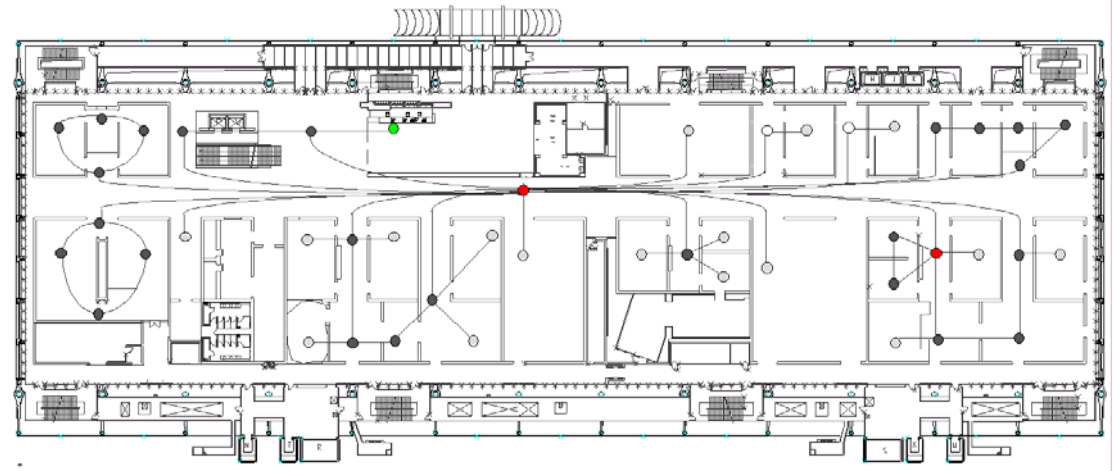
3rd floor



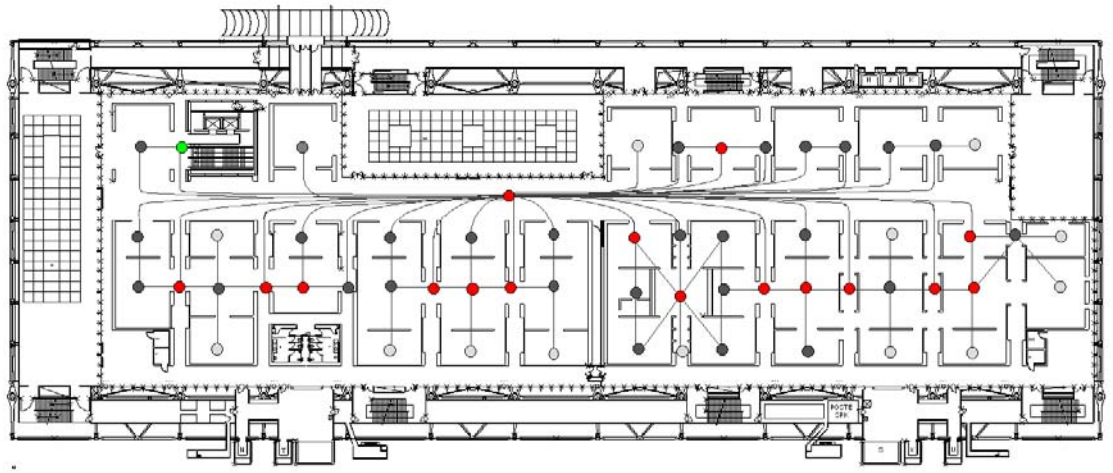
5th floor

a-space b-space c-space d-space

^ FIGURE A.3 continued: (c) Tate Modern



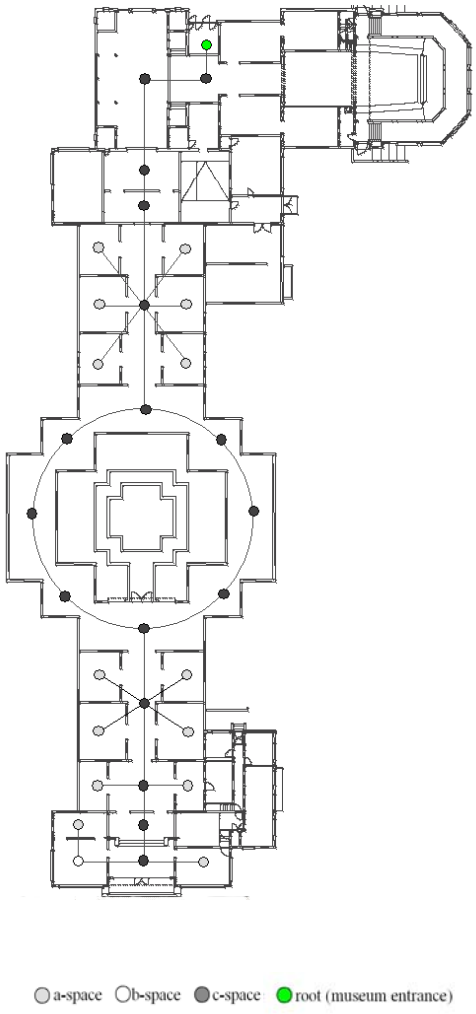
4th floor



5th floor

a-space b-space c-space d-space root (museum entrance)

^ FIGURE A.3 continued: (d) Pompidou



^ FIGURE A.3 continued: (e) Kröller - Müller

^ FIGURE A.3 continued: (f) Louisiana

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