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Streets, Spaces and Places
Three Pompeiian Movement Axes Analysed

With an Appendix by
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Abstract


This study is an urban analysis of Roman Pompeii. It explores the spatial structure of the town just before the eruption of Vesuvius in AD 72, and how public space was used for movement, activity and interaction between people.

For this, Space Syntax was used, a topological method developed in the 1980s to analyse and plan modern urban contexts, based on the configuration of spatial systems in the axial and in the convex dimension, representing movement and “place” respectively. This method was used to establish an axial map of Pompeii, and to analyse the spatial configuration of three specific movement axes. The axial map strengthens one of the hypotheses discussed in current research about Pompeii, namely that of an older town nucleus in the west part of Pompeii.

One part of the thesis is a hypothetical reconstruction of a town-wide traffic system for wheel-borne traffic. The routes were reconstructed to fit the archaeological evidence and meet certain other criteria, and were then independently checked against the axial analysis. As a conclusion, a regulated traffic system could be seen to have existed. A good case was made for how it could have worked.

Another part of the thesis deals with the relation between public and interior space. The different types of interior spatial units lining the three chosen movement axes were investigated. The aim was to see how differences in both density of doorways and type of interface gave rise to different urban environments. It was found that commerce and a concomitant dense interface with many street doors largely followed the dimension of movement.

The segmentation of public space along the movement axes was explored in order to gain an insight into which segments of space held specific functions, and how how these functions related to dense and less dense interfaces between public and interior space. This segmentation emphasizes official buildings and monuments, which are allowed to disrupt what is otherwise the norm for the permeable interface between exterior and interior space.

As a result, the picture of a town with two different types of interaction between people emerges. On the one hand, both fleeting and more intense interaction was facilitated in those spaces where official buildings and monuments were prominent, and where group identity was stressed. On the other hand, the more unregulated interaction largely took place “along the road” between these spaces.

Key words: Pompeii, Space Syntax, urban analysis, activities in public space, traffic

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For Andreas, Sofia and Filip
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Acknowledgements

This thesis started out as a joint project called “Pompeii: life in the urban space”, which docent Karin Fridell Anter and I started in 1998. Gradually this project somehow grew larger and larger, until it took its present form. My thesis and Karin’s large study of colour in the public space of Pompeii both have their ultimate source in this project. The thesis includes the first part of this volume, as well as two large supplementary tables with basic data, published digitally only on the Diva website for scientific publications. A separate article is also published on the Diva website, but not included in the thesis. Karin’s study on colour is published as an appendix in this volume.

The fieldwork and extensive data collection in Pompeii was done by Karin and I together, endlessly discussing possible doorways in walls, colour on patches of plaster and the qualities of kerbstones. The use and analysis of this data, the theoretical and methodological framework into which it is integrated, the literature studies and the conclusions drawn are, however, the independent work of each one of us and applied independently in my thesis and in Karin’s study.

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1. Introduction

In Pompeii, buried by the eruption of Vesuvius in AD 79, the urban structure of a Roman town from the first century has been preserved. Its ruins give us an unparalleled opportunity to study the urban fabric of the Roman world, since both the exterior public space and the buildings lining it are preserved to a large extent.

The aim of this study is to recapture something of how public space functioned in the daily life of Pompeii just before the eruption in AD 79, how people moved about town, interacted, saw themselves as participants in different contexts, and both built and maintained their identities. At least a fragment of the urban life in the once living town’s streets and squares can be glimpsed through an analysis of its remains and their spatial characteristics.

There are, of course, many ways to study an urban environment. The questions that are central to my analysis focus on the movement of people through the urban grid, the different activities in various segments of the public space and the intensity of these activities, and not least, how people perceived themselves as part of different groups in this urban environment, entitled to the use of places and spaces. Therefore, a method that addresses these kinds of questions was needed for the analysis.

Space Syntax is a method first developed by Hillier and Hanson in 1984, and used today for both architectural analysis and modern planning. It provides some tools to explore urban space scientifically. It can be used to identify the streets that have the highest potential for movement and to see how these streets relate to the totality of the urban environment, so that we can get an impression of the flow of people in Pompeii. Thus, it helps us to understand how people walked about town and which streets they chose.

Space Syntax can also be used to distinguish between segments of exterior public space, enabling us to get a clearer picture of how different types of urban spaces functioned – was there a specific Pompeian way to use small squares, broad or narrow street sections, and intersection spaces between streets of varying character? We can investigate how commercial establishments, representative houses, temples and street-side food shops were placed.

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1 Hillier & Hanson 1984.
Furthermore, the concepts and parameters of Space Syntax are also helpful when looking at how exterior public space relates to interior space, so that we may gain an understanding of how the interface between these two types of space – that is, the walls and their openings lining the realm of public space – is structured.

The ultimate goal of my analysis is to analyse the character of exterior public space and its potential for different types of activities, in order to learn something about what happened in the past in specific spots in the urban environment. In the process we may also understand more about how the Pompeiians saw themselves. We can get an understanding of where and how different individual and collective identities were expressed and reinforced in the structure of public space, where in town the Pompeiians got strengthened in their view of themselves as town dwellers, as inhabitants of a specific quarter, as tradesmen of a specific trade or as customers.

All these possibilities made Space Syntax a suitable choice for the analysis of public space in Pompeii.

This is, however, not a rigorously applied Space Syntax study. Rather concepts and parameters are discussed, developed and/or simplified to provide answers to questions posed, and other more traditional ways of investigating an archaeological context are also used. Finally, the method and its explanatory power will be evaluated to assess the knowledge gained.

1.1. The structure of the urban analysis

First, it needs to be said that this thesis is not concerned with detailed studies of specific phenomena like individual houses, shops or artefacts. To get a better understanding of urban Pompeii and its life, the larger picture of the urban structure is sought.\(^2\) The focus is primarily on activity in the public space – the town’s streets, alleys and open places, and on the interaction between stationary activities and passers-by.

The thesis consists of four case studies (Chapters 3 – 6) and a methodological framework (Chapter 2) that is evaluated together with the final conclusions (Chapter 7). I have chosen to study Pompeii from a holistic point of view, looking at sections of the town and how they functioned in a larger perspective.

\(^2\) Measurements used are only of the accuracy needed for the studies, which means they are an approximation (taken on the site with only “normal” accuracy or measured on maps with a common ruler) and should not be used in a work where more precise measurements are needed.
These studies of different aspects, as well as the appended study *Colour in the Pompeian cityscape* by Karin Fridell Anter regarding the colours in public space, are steps in an urban analysis of Pompeii.  

Chapter 2 is a description of the method used, mainly derived from Space Syntax methodology, and also a discussion of its applicability in the context of Pompeii. Some of the parameters used are developed by me in order to adapt the method to this specific context.

In Chapter 3 I analyse the axial system of Pompeii, that is, the potential for movement through public space. This highlights some streets – or movement axes – that are chosen for further investigation, namely the Via del Vesuvio/Via Stabiana, leading from one town gate to another, the Via di Mercurio/Via del Foro/Forum/Via delle Scuole, which traverses Pompeii’s administrative and religious centre, and the Vicolo del Fauno, a small alley often cited as a backstreet.

In Chapter 4 I present a study of the types of interior spatial systems (houses, shops, flats, etc.) lining public space along these streets, or movement axes. This gives a general comprehension of the similarities and differences between the chosen axes, which is important in itself, but also for the continued study of how public space was perceived and used.

Chapter 5, comprising the second part of the investigation of these particular three movement axes, pursues this aspect. Here, the activity in public space, both that which is generated by its interface with interior spatial systems and that which is generated in a particular segment of public space itself, is scrutinized.

Chapter 6 is an analysis of how traffic on wheels may have been systematized in Pompeii and how the existence of a traffic system could have facilitated transports into and out of town.

Finally, Chapter 7 contains a concluding discussion on Pompeii’s urban structure that sums up and evaluates the results reached and the methods used.

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3 My fieldwork and data collecting was done together with Docent Karin Fridell Anter, PhD in architecture. When starting out with the urban study, we divided up the analysis between ourselves. Karin, as a renowned colour expert, took charge of the colour aspect of Pompeii’s streets, and I analysed spatial structure.

4 In this text, I will use the modern, Italian names given to streets, gates and urban features. A street named “via” is generally wider than a street called “vicolo” (lane). Town blocks are called *insulae*, and the modern division into *regiones* (districts) and *insulae* is followed. Inside an insula, the street openings are numbered, so that a house in Regio VI, insula 2, with the street entrance no.12 is referred to as VI 2.12.
2. Method

2.1. Space Syntax – a theoretical baseline

I have chosen to use as a baseline the topological method Space Syntax, first developed by Bill Hillier and Julienne Hanson,\(^5\) as it gave me the possibility to handle urbanistic parameters. As part of my work, I have adapted the method to the material and will discuss both the parameters used and the adaptations in relevant sections below. This makes for a rather lengthy theoretical section that can be used as a reference when different key concepts are employed in the case studies in Chapters 3 to 6. In each of these chapters there are also shorter theoretical summaries for those who would like to go straight to the discussion of things Pompeian.

Space Syntax was initially developed as an instrument for urban planning to understand how space works in human societies and, with the aid of this knowledge, create functional environments adapted to their users. Theoretical development often focused on why certain, seemingly well thought-out urban environments became dysfunctional. An example of this is Hillier’s analysis of and suggestions for development of a London area that went from award-winning architecture to crime-ridden environment in a few years time; Hillier analysed the spatial mechanisms behind anti-social behaviour and also suggested a new method of syntactical urban planning.\(^6\) However, Space Syntax quickly also became a method used to analyse historical, traditional and archaeological contexts.\(^7\) The basic parameters of Space Syntax were further developed by Hillier in *Space is the machine* in 1996.

Of course criticism has been levelled at Space Syntax as an explanatory method for understanding space. This has mainly centred on the two-dimensional representation of space and the disregard for the metric dimension (large and small, long or short).\(^8\) Some of these issues will be addressed below (section 2.2), but already here I would like to point out that I combine the quantifiable parameters of Space Syntax with other types of data.

\(^{5}\) Hillier & Hanson, 1984.

\(^{6}\) See, for instance, Miller 1989, esp. 63; Hillier & Vaughan 2007, section 1.9; Marcus, section 3.4.

\(^{7}\) Early examples are Hillier 1987, on farmhouses in France; Yiannouli & Mithen 1986 on traditional village architecture on Siphnos in the Cyclades, and Chapman 1990 on a prehistoric settlement at Varna, Bulgaria. Recently Space Syntax was used by Grahame 2000 to analyse the Pompeian houses, a study that I have used extensively in developing my method.

\(^{8}\) Brown 1990; Ratti 2004.
Much of the later development of Space Syntax consists of computer-aided analysis of large urban systems, putting mathematics and computation in the forefront.\(^9\) I have not attempted this kind of study for several reasons. First, there is an element of subjectivity inherent in Space Syntax as an analytical method, as there is perhaps in all methods for analysis of architecture, since basic precepts have to be defined by the person doing the analysis. This subjectivity runs the risk of being institutionalized if used in extensive mathematical computations. Second, this risk is multiplied by the fact that our knowledge of an archaeological context is not as detailed and exact as our knowledge of a functioning context in our own time. We cannot see, measure and count the traffic flow, we cannot interview people about their perceptions, and we cannot measure the time they use for different trajectories and occupations. These are all methods used in contemporary Space Syntax research.\(^10\) Putting archaeological data, which are rather more tentative and the result of continuously changing excavation results and discussions, into such an exact mathematical system would make them take on an absoluteness that simply is not there.

There is also an ideological aspect of Space Syntax that must be addressed. From the beginning, it was much more than just a method for its developers, who based it on structuralist tenets and claimed its capacity to explain a society solely on the basis of its spatial arrangements.\(^11\) This is to assume that, to use the title of Bill Hillier’s 1996 book, that “space is the machine”, that arrangement of space actually is what shapes society. This is a philosophical question rather than a practical one, and an aspect I will not delve deeply into here. In my analysis I combine Space Syntax with facts acquired in other ways, and I do not attempt any ranking of the importance of these facts. Still, I have found that Space Syntax reveals hidden dimensions in buildings and public space, which is why I use it. Perhaps insight into these aspects could have been achieved in some other way, perhaps not. The last chapter of this thesis is dedicated to an evaluation of method, where some of these questions are addressed.

In archaeological situations Space Syntax has been used in a rather more simple way.\(^12\) For Pompeii, the use in an exterior urban context was hitherto limited to Laurence’s approach, where he used Space Syntax concepts to look at the character of some interior spatial systems lining certain streets.\(^13\)

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\(^9\) See for instance Omer & Zafrir-Reuven for a rather mild example of this type of study.

\(^10\) The quantifiable observation has always been important in Space Syntax, see for instance Peponis et al., 1989, 51-52, Hillier & Penn 1992, 55 & fig. 8, 58-60. Penn has also discussed in more depth how Space Syntax describes human movement and use of space as well as the nature of human cognition, see Penn 2001. For a more recent study and its methodology, see Ferguson 2006.

\(^11\) Hillier & Hanson 1984, 3-5.

\(^12\) See, for instance, Chapman 1990, who concentrates on features of the access graphs of dwellings.

\(^13\) Laurence 1994, 115-121.
The most extensive Space Syntax work on Pompeii is, however, the analysis of domestic buildings by Grahame.\footnote{Grahame 2000.} Space Syntax definitions are by no means a fixed set and the initial parameters are continually multiplied to include new ways of decoding the mysteries of spatial arrangement. In an archaeological context, Grahame’s work adds several new parameters, for instance degree of convexity, which I use in this study.\footnote{See section 2.2.1.} I have thus made extensive use of both the basic tenets and Grahame’s developments, but I have always tried to stay on the less mathematical side of Space Syntax.

The first two sections of this chapter concern Space Syntax theory and parameters, with some references as to how I have used them in my study. The last two sections deal in a more detailed way with the practical adaptation of the method for my work.

2.1.1. The spatial system and its carrier

In any analysis, the entity analysed must be defined. In Space Syntax, this entity is a spatial system. Definition, however, is not something that stands apart from the person who formulates it. If one uses the normal characterization of a spatial system, it would be defined as a group of different spaces, all of which are interconnected with one another either directly or indirectly. The simplest example is a house with its front door closed. All rooms in this house are considered separate spaces, but as any room can be reached from any other room, either directly through a door or by passing through several doors and other rooms, the house is a spatial system. This house is still a separate spatial system once its front door is open (since the door is there and can be closed at will by the inhabitant), and it can be analysed as such in both situations.

But the house I want to analyse could be joined together with other houses, for instance by a loggia or veranda extending the length of them. In this case I would have to define what I mean by a spatial system before I start the analysis, stating that such a loggia or veranda would not serve to create a spatial system, or that it would in fact serve as such. Likewise, a flat that forms part of a single structure (building) containing several other flats, could be treated as a separate spatial system or as part of a larger system, the entire block of flats. Changing the viewpoint might lead to different characteristics being brought out as important.

When interior spatial systems are discussed in the studies below, there are numerous other and more complicated issues to take a stand on (see section 2.4.1). What I define as an interior spatial system in this study is thus valid for this study alone. Someone else might make other decisions. This element of subjectivity is to be kept in mind in the coming discussions and analyses.
A spatial system need not be a building or a part of a building; it could also be the exterior space left over when all the buildings are built in a certain area.\footnote{Hillier & Hanson 1984, 89-90.} The boundary of any spatial system will have to be defined subjectively. The world at large, in which the spatial system sits, and which can vary in structure and even contain other systems, is called the \textit{carrier}.\footnote{Hillier & Hanson 1984, 95.}

Where do the streets and squares of a town end so that we would be outside it? Do suburbs get included? \footnote{Hillier & Hanson (1984, 95) mention this problem in passing, the carrier being everything surrounding the “system of interest”. Hillier (1996, 170-181) discusses hierarchies of integration, where the spread of integration values for a larger system indicates its subdivision into constituent, smaller systems. How to define the carrier for the larger system is not discussed, however. The problem of “edge-effect”, a skewing of results if two systems are analysed conjointly instead of separately, is addressed by Ratti (2004, 10-11), where he discusses an example where a single axial space connects two axial systems. Ratti, however, seems to look for a solution to the problem within Space Syntax method, which I do not think is possible.} In this study the spatial system consists of the exterior spaces that form the urban grid of Pompeii inside the town walls, a choice made as this unit stands out as easily defined and as most of the excavation data concern this area.

\textbf{Public and interior space}

In a town or city the streets and alleys, the planned official open spaces like the town squares, and the spontaneously formed enlargements in a street corner all make up the exterior, open, public space. \textit{Public space} as I use it here refers to these outdoor spaces that are accessible to basically everyone, even if there may be certain rules governing their use. There may also be interior public spaces, for instance public latrines, baths and temples, but such spaces are not subsumed under the heading of public space in this study.

\textit{Interior space} is the term used for everything situated behind doorways, be it interior public space, like a bath, or interior private space, like a dwelling. An unroofed private garden accessed by a gate or door, or through a house, is thus classed as interior space, as is the open temenos of a temple, which is accessed in a similar way.

\subsection*{2.1.2. Representations of space – the plan and the access graph}

We are used to seeing space geometrically represented in the form of a map or a plan, where dimensions and measurements define how the rooms are shown. The basic concepts are best explained by the use of a building, so if we start with a map showing a Pompeian house, it may look like Fig. 1A. By letting each room be represented by a dot, it is possible to join all the dots via doorways and other connections, creating a kind of “flow chart” as in Fig. 1B.
2.1. Space Syntax – a theoretical baseline

Fig. 1A. Geometric plan of VI 16.15-17, Casa dell’Ara Massima. This spatial system is shown with three street doors, but the northernmost door is considered to belong to a separate *taberna* unit\(^{19}\) in this analysis, and the middle door gives access to a separate upper floor apartment.

Fig. 1B. Flow chart of VI 16.15-17. Each room is represented by a ring, and the outside space as a ring with a cross inside.

In a Space Syntax analysis, one chooses one of these spaces/dots as the point of departure and aligns all the other spaces above it. The important aspect here is the relations between the different spaces to one another – we get a topological picture of the spatial system.

The spaces that can be accessed directly from the basic space are placed one level above it, so that the *access graph* resembles a tree with branches. Those spaces one would access by passing through one intermediate space

\(^{19}\) I use the word “taberna” as synonymous with “shop” or “workshop”, since its ancient meaning seems to have shifted over time, and also never seems to have been a very precise term. Cf. note 53.
are placed two levels above, and so forth. These levels are called *steps*. When analysing a house or any other interior spatial system, often the point of departure used is the carrier, though it need not be. One says, in this case, that the access graph is justified from the carrier, or from any other space that is chosen as the point of departure. In order to see how a specific system unfolds from any particular space, this space is placed at the lowest level, *Fig. 1C.*²⁰

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**Fig. 1C.** Access graph of VI 16.15-17. The access graph depends on what is considered to be included in the spatial system. Syntactically, the taberna and living unit are one system. The door to the upper floor could possibly also have given access to the ground floor, which gives two alternative access graphs to choose from. In the left graph the door to the upper floor is excluded, in the right it is included.

For a fairly small structure, this access graph can be very illuminating – it can for instance show that a very intricate system, where every space has multiple connections, is divided into two sections by the means of a single passage. It can reveal added-on structures and show whether the spaces are arranged one after the other in a “deep” structure or flattened out with “ring-like” connections. This may or may not be visible already on a plan, but in general when it comes to structures more complicated than the very simplest ones, new facts can be deduced.

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²⁰ Hillier & Hanson 1984, 93-94, 106-107, 147-150 – here the access graphs are called gamma maps (buildings) or alpha maps (exterior spaces); Hillier 1996, 33-35, where “j-graph” is used for justified access graphs.
2.1.3. The patterns of space: room sequences and star-shaped patterns

How spaces in a system are arranged depends to some extent on the (conscious or subconscious) social conventions that order space in a given society.\(^{21}\)

At a very general level there are two ways for spatial conventions to generate structure in a system of spatial units:

- they generate rings or long sequences of spaces, where one space leads to another, or
- they generate structures where several units/spaces are linked to one central space.

Looking at the extremes, the first case results in a long chain of rooms, possibly connecting the first and last spaces to a ring, and the second case results in a star-shaped pattern where a central space opens onto several other spaces that do not communicate with each other, Figs. 2A and 2B. In reality, however, every spatial configuration exhibits a mix of sequenced spaces and spaces arranged around a distributing space. It is the variation between these two structuring modes that produces structures that differ from each other – and though the possibility of combinations is infinite, every given built environment tends to show some specific trends.

Fig. 2A. Spaces forming a row or a ring, one of the “modes” of spatial arrangement. This mode is present to some degree in every spatial system, but the proportions of rows or rings vary greatly, as does their placement in the system. This accounts for every spatial system’s unique qualities.

\(^{21}\) Within the terminology of Space Syntax these conventions are sometimes called rules, but as this gives an unhappy association to enforced and consciously applied regulations, I have chosen the more adequate description “social conventions”. Cf. Grahame 2000, 25-26. See also Hillier & Hanson 1984, 33-36 and Hillier 1996, 35-38, where the conventions are called cultural patterns, which is also a good way to describe them.
Such a trend or convention is *local*, which is to say it influences a specific detail in the spatial arrangement of a configuration. If we, for instance, imagine that there is a convention regarding how a new house and an open space associated with it are to be joined to a village, then this “rule” is local since it affects the constituent parts of the exterior spatial system. The outcome is, however, a certain village structure which is a *general*, all-encompassing or *global* phenomenon.\(^{22}\) This could be applied to buildings as well. For example, if we imagine a convention that says “if you build a house, it is suitable that a latrine is placed so that it is accessible from the entrance hall”, then that is a local convention, affecting part of the house. It limits the variety of possible structures, although not very severely, and it produces many houses with a trait in common. This similarity is then a global phenomenon.

A convention or “rule” may also be much longer and more complicated, describing each and every particular of the constituent parts and having an ordering impact that produces highly regular spatial configurations that are similar to one another at the general level. Typically such a long description is something imposed from outside the spatial system itself – ceremonial cities embodying religion and ideology, and the layout of Roman colonies, embodying the new ruling class, could be cited as examples.\(^{23}\) When it comes to individual buildings, a description like “A house should have a single entrance hall from which both the single latrine in the house and the two receptions rooms should be accessed, but neither of these should communicate with each other or with any of the other spaces in the house or with the exterior space” would produce houses of a much more similar layout than the first example. The global element is thus stronger.

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\(^{22}\) Hillier 1989, 6-7.

\(^{23}\) Grahame (2000, 43-45) gives a good summary of local and global phenomena. Hillier & Hanson (1984, 206-222) use complicated language partly borrowed from biology and provide a more thorough working through of the principles. Hillier (1989, 19-20) also sums up some key concepts.
2.2. Space Syntax – the main concepts

2.2.1. Axiality and convexity, two ways of looking at space

Before we return to the access graphs and the characteristics that can be deduced from them, it is important to understand the two ways of looking at space that are a cornerstone in Space Syntax method. The two different viewpoints from which to consider space are the axial viewpoint and the convex viewpoint. It is important to understand that convexity and axiality are two co-existing aspects of the same spatial system. When separated in an analysis, it means one switches the way of looking at space.

**Convexity**

The convex dimension is the dimension that is most easily imagined as deployed in space – a room in a house takes up space, and thus it is a convex space. In Space Syntax analysis this kind of space becomes a two-dimensional surface, as the volume dimension is disregarded, but it is still termed a *convex space*. The access graph of the house discussed above (*Fig. 1C*) was based on the convex spaces of the house. Defining the different convex spaces of a house is usually easy to do, as roughly one room is one convex space.
Of course, the open, public space of a town or a city can also be broken down into its constituent convex spatial segments. A convex space is a space where the shortest way between two different points in the space is *inside* the same space. This means that a space of this kind cannot have a concavity in its border, because if there were such a concavity, the shortest way between some points in the space would go *outside* of the space, see Figs. 3A and 3B.

![Fig. 3A. A convex space. The shortest trajectory between any two points a and b is contained inside the space proper.](image)

Fig. 3A. A convex space. The shortest trajectory between any two points a and b is contained inside the space proper.

![Fig. 3B. Not a convex space. There exist points a and b, where the shortest trajectory between them passes outside the space proper.](image)

Fig. 3B. Not a convex space. There exist points a and b, where the shortest trajectory between them passes outside the space proper.

Looking at the convex dimension is especially useful when analysing public space, since breaking up space results in a series of definite, interconnecting, convex spaces that captures irregularities or changes of direction along a street. Also, the definition of the convex spaces is necessary for establishing

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24 The usual way to make a convex map is to let the convex spaces follow one another without overlapping. It is, however, also possible to base convex segments on for instance the facades of city blocks, allowing them to extend fully and be overlapped by other such segments, cf. Hillier 1996, 124-132. This requires advanced computer analysis and has not been attempted here.

*Boreas 33*
the axial map, as the axial spaces must pass through every single convex space and tie it into the axial system.

Public space is often of low definition, which means that it consists of what is left over once the buildings bordering it are erected.\textsuperscript{25} Looking at a spontaneously formed town this is certainly clear: it is primarily the buildings that are planned and except for the proviso that there should be a passage between them at certain places, no special effort goes into street planning – it is truly “what gets left over”. But even in a town where the street grid is totally or partially laid out in advance, buildings come to define much of the public space. The result is an irregularity in street width or street direction, where facades either protrude into the street or recede from it. This irregularity would be difficult to incorporate into an analysis without establishing the convex spaces of a given system of public space. The border between one convex space and the next is situated at the exact point where a concavity in the open space is placed. Extending a space past this point would produce an indrawn border due to the irregularities shaped by the adjacent buildings.\textsuperscript{26} This space would no longer be a convex space, Fig. 3B.

The guiding principle in establishing the convex spaces is that they should be as fat (as near as possible to the form of a perfect square) and as large as possible. Inevitably this sometimes produces problem situations. An example of such is where a partition into two not so very fat but very large spaces is opposed to a partition into three very fat but smaller spaces. The solution is either to consistently give priority to “fatness” in such a situation (the space is allowed to expand to its limits, followed by the next fattest space, and so on) or to give priority to creating the fewest spaces. In this analysis of three movement axes in Pompeii, a problem situation is discussed in section 5.6.2.

Degree of convexity
For any convex space, the degree of convexity can be established by computing the relationship between its short and its long side.\textsuperscript{27} The perfect convex space, the square, would receive the value 1. Thus, the “fatter” a space is, the more the value for the degree of convexity will approach 1. With regard to how this parameter has been applied, see section 2.4.2.

What does the convex dimension represent?
The convex spaces are areas where all persons inside the space are visible to each other and interaction is facilitated. Indoors, people stay in rooms or parts of rooms where different activities are performed, and they would remain there some time to perform these activities. Likewise, in public space

\textsuperscript{25} Grahame 2000, 30-32.
\textsuperscript{26} Hillier & Hanson 1984, 97-98.
\textsuperscript{27} Grahame 2000, 57.
people stay at a certain spot, in a small square or in a specific section of the street, to be part of different activities. When we look at these places where people stop and stay, we are looking at space in the convex dimension, the dimension of stationary activity. This is not to say that in the convex spaces one does not move from one point to another. But as soon as one moves, one moves in the axial dimension through the convex dimension. For all intents and purposes small movements inside a convex space can be seen as stationary activity, as they are in this analysis.

Some convex spaces would have seen a lot of activity, such as the busy shop room or the small square with the poultry market. Others would have seen little stationary activity, such as a narrow corridor in a house or a narrow stretch of a busy road. Which spaces in Pompeii had much activity and which had little is the ultimate subject of Chapters 4 and 5 in this analysis. What is to be remembered here is that when we look at the convex dimension, we look at this stationary activity or the lack thereof, and not at people making use of the convex space simply by passing through it.

Convexity as used in this analysis

When the convex spaces are defined, whether in interior or public space, one has to choose the amount of concavity in the border of a space that should be acknowledged. There is no fixed rule to follow, and depending on the environment analysed one may choose an appropriate degree of irregularities to take into account. The definition of articulation and the problems inherent in it are discussed below in section 2.4.2 in this chapter, but I will say already here that my choice in determining the exterior, public, convex spaces was to take notice of concavities of approximately 0.2 m and larger.

Regarding interior spatial systems in my analysis, the needed accuracy did not necessitate any extensive definitions of the interior convex spaces. Spaces were identified as such from the detailed town plans available, and wherever possible their existence was confirmed on site.28 As the type of interior spatial units lining public convex spaces is a main underpinning of the analysis in Chapters 4 and 5, dubious spatial situations often had to be discussed in detail, but these mainly concerned the connections between spaces, not the spaces themselves and how they were to be established. In Table of interior spatial units lining the Stabiana, Mercurio and Fauno movement axes in Pompeii (henceforth called Table of spatial units) extensive details about interior spatial units can be found.29

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28 Most useful were the plans of specific insulae in CTP vol. IIIa, the CTP-map for the whole of the excavated areas of Pompeii in CTP vol. IIIb and the town plan in EGB, as well as maps of specific insulae in Wallace-Hadrill 1994.

29 Table of interior spatial units lining the Stabiana, Mercurio and Fauno movement axes in Pompeii, http://urn.kb.se/resolve?urn=urn:nbn:se:uu:diva-153180
Axiality

In addition to the convex dimension, there is a dimension of axially that shows the potential for movement within the public space. In analogy to what was said above about moving in convex spaces, one can certainly become stationary at some point along an axial space. In this case one stops moving in the axial dimension through the convex spaces and instead stops inside one of them.

To analyse the axial dimension, it is first necessary to establish the convex map of the system to be analysed. Thereafter the axial spaces – the longest and fewest lines that can be drawn and that at the same time connect (cross through) all the convex spaces – are drawn. That these lines are called axial spaces may seem like a contradiction, but this term actually captures the spatial dimension in which people move along these “spaces for axial movement”. All convex spaces have to be crossed by at least one axial space, and are thus strung into the common net. The axial spaces should be as few and as long as possible.

What does the axial dimension represent? The axial dimension is in some ways more difficult to define than the convex dimension. Axial spaces in many ways can be seen either as “movement lines” or “visual lines” but Space Syntax theory is rather vague about what they really are, although both these aspects are implied. Looking for confirmation of my own opinion that axial spaces are an abstraction of the dominant trajectory choices, a statement such as the following was helpful: “[The axial map] represents the distance up to which observers can have an uninterrupted impression of visibility and permeability as they move about the town and look in various directions. The map is derived by drawing the fewest and the longest lines of uninterrupted permeability”. What it says is that people moving have an impression of visibility and permeability – movement is thus necessary to understand an axial space and to use it to get into town.

Most often, of course, large parts of an axial space are visible from any point along it, but the total length of the space may not be visible as the ground rises and dips. The entirety of the axial space will unfold visually while moving along it, together with possible new lines that are useful for moving along toward new goals. Looking at all trajectories that were ever made and will ever be made through a convex space, it could be said that the movement of people will generally follow the direction of the axial spaces crossing it, although a smaller or greater part will have other trajectories.

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30 Hiller & Hanson 1984, 99 and Hillier et al. 1983, 50 for construction of the axial map.
31 Hiller (1996, 153-154) describes natural human movement as movement along a line, and in 156-161 describes how London’s axial structure has a “two line logic”, which means that as you shift from one line to another you can see both where you came from and a possible goal. This implies visibility along most axial lines.
32 Topçu & Kubat 2007, 3.
(criss-crossing over the axial space, turning around to walk back and forth in convex spaces, etc.). Axial lines are thus something more than movement lines and visual lines added up; they sum up and indicate the likeliest movement choice through the convex spaces.

**Axiality as used in this analysis**

In this project, the system of axial spaces was established for Pompeii inside the town walls, based on maps and fieldwork. For the unexcavated parts inside the walls, reasonable suppositions were made.33

In the analysis of the three chosen streets or movement axes, not only the most important and longest axial space along the street in question is considered, but also some other axial spaces intimately related to it, *Fig. 4.*

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**Fig. 4.** The axial spaces at the Porta del Vesuvio. The axial space (A) follows the Via Stabiana from the Porta di Stabia in the south, up to the gate structure at the Porta del Vesuvio. To the left of this a parallel axial space (B) links the spaces inside the gate and the Castellum Acquae square to the carrier. A short axial space from the northeast (C) connects the agger street to the axial system, and finally, the axial space (D) ties the Castellum Acquae square to the axial spaces on the Via Stabiana and the Vicolo dei Vettii.

These extra axial spaces may owe their existence to parallel convex spaces along the street, spaces that had to be tied into the axial system by an extra axial space. They are thus an intimate part of the street’s environment. They may also be due to, for example, the longest axial space of the street being broken by a directional change and connected to another axial space within the confines of the street. When such a break occurs and the two axial spaces are still directly connected to each other, and both follow the general

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33 Section 3.2.2.
direction of the street, both these axial spaces are included. Fig. 4 shows the situation just south of the Porta del Vesuvio on the Via Stabiana, where the longest axial space ends at a gate structure, and a very short axial space covers the remaining meters over the small square and out through the gate. These two axial spaces (A and B) are both part of the Stabiana movement axis, while the other axial spaces in Fig. 4 are not.

Therefore, what is analysed is not a set of three axial lines, but rather what I term three different movement axes.

2.2.2. Axial and convex integration

The convex map and the axial map may be difficult to establish in practice, and they depend on some subjective choices, but they are not theoretically complex phenomena. There is, however, a limit to the information they provide by themselves. Therefore, some characteristics of these maps (and consequently of the access graphs that could be drawn from both the convex and the axial map) need to be assessed. The most important of the characteristics is the integration value.

If we look at the access graph for a Pompeiian house in Fig. 1C, we can compute an integration value for every space represented by a dot. The mathematical formula for this can be said to show an average of how distant a specific space is from all other spaces in the system. “Distant” here means “distant by the number of spaces to be passed”, not “distant by a specific number of length units”. A low value means that a specific space is on the average set apart from other spaces in the system (it can still be very easy to reach this space from some other spaces and from the latter spaces it can still be very easy to perceive that the former space exists). It is segregated. A high value means that a specific space is on the average near other spaces in the system and is central to the spatial system (it can still be very difficult to reach this space from some other spaces and from the latter spaces it can still be difficult to perceive that the former space exists). It is integrated.

The integration value has to be calibrated if systems with a different number of spaces are to be compared, and this is done with a standard calculation.\(^3\) The integration values given in this analysis are thus calibrated and

\(^{3}\) Hillier & Hanson 1984, 108, 112 gives the formula for calculating Relative Assymetry and Real Relative Assymetry (“integration”) for a space. The RA-value is calculated with the formula \(RA = \frac{2(MD - 1)}{k - 2}\) and can only be compared between systems with the same number of spaces. MD is the system’s mean depth. This is calculated by assigning a depth value to each space above the original space in the justified access graph, according to how many steps away from the original space it is. These values are summed up and divided by the number of spaces in the system minus one (the original space). \(k\) is the number of spaces in the system. To be able to compare systems of different sizes, RA has to be compared to the RA-values for diamond-shaped patterns to yield the RRA-value, by use of the formula \(\text{RRA} = \frac{\text{RA}}{Dk}\). The \(D\) values are given in Hillier & Hanson 1984, 112. These computations result in high integration getting lower values and vice versa, which in turn has led...
can be compared to the values of other spatial systems. The integration is most often calculated for axial spaces when analysing public space and for convex spaces when analysing interior space, for reasons presented below.

**Axial integration of public space**

When public space is analysed, it is usually based on calculation of the integration values of the axial spaces and thus on the dimension of movement. Axial integration is held to indicate the potential for human movement, or even to tell us where the flow of human movement was or is strong, and therefore it is necessary to penetrate more deeply into the mystery of what information the integration value really conveys.

What is visible from an axial map, where spaces are for instance plotted with different colours according to their integration value (*Fig. 16*), is that an axial space with a high integration value is a space with connections to many other axial spaces. But counting connections is obviously not enough, since there are other spaces with just as many connections but with differing integration values. This is because the integration value is abstracted not only from the direct connections but also from the indirect ones.

Any space in a system has some direct connections, some connections that are one step removed, some that are two steps removed, and so on. A space that has many direct connections, many one-step-removed connections, many two-steps-removed connections and so forth is a highly integrated space. To spontaneously pick out a space that is rich in all sorts of connections may actually be done in a small and simple system, but in a complicated system the problem is how to evaluate connections: should four one step-removed connections be considered as important as two direct ones, or how should it be? What the calculation of integration does is to evaluate this. The formula compares the actual connections of a given space in a given spatial system to the maximum number of connections in every step this space could have had in this system.

Thus, the integration value is an abstract measurement of the distance from a given space to all the other spaces in the system. A high integration value tells us that the axial space in a general way is central to the system and near to all other axial spaces. And a space that is near to all other spaces is a space that will see much traffic, since it will be used often to get from a more distant space to another such space – it is a hub in the communications network. This is why a high integration value means that there is a high potential for movement along this axial space.

These highly integrated axial spaces may show some secondary characteristics – they may be long, since obviously it is easier to connect long spaces to a variety of other spaces, they may connect to the carrier, since it may be to the use of inverted values to let high values represent high integration. See Grahame 2000, 34-35.
important for people coming from outside the system to have access to a communications hub, and so forth. But such characteristics are not what makes them integrated. Such characteristics only denote what integration was used for in a given society.

In modern cities or villages with actual people moving about, the link between a high axial integration value and movement of people has been confirmed as a reality. Since we are dealing here with an archaeological context, however, I would hesitate to move beyond the statement that axial integration denotes a potential for a strong traffic flow. The integration values for the axial spaces of Pompeii are analysed and discussed in Chapter 3.

**Why not convex integration of public space?**

The integration values for a system of public convex spaces are almost never calculated, and this needs to be explained as well as why I do not use these values in the analysis presented here. This is taken as a given in Space Syntax analysis, but there is a rationale behind it. We might think that calculating convex integration would tell us which outdoor stationary activities were central to the town and which were peripheral. But would this really be the case? What exactly would these values tell us? If a space were distinguished by high convex integration, this would certainly mean that this space in a general way was near to all other convex spaces in Pompeii.

But does this nearness tell us anything about the use of this convex space? The convex dimension denotes stationary activity – and the stationary activity by its very nature stays put approximately where it is. The abstract nearness of, for example, a convex space with a market to a convex space with street food at the other end of the town actually tells us very little. The activities in these spaces are quite separate from each other, and events and interactions in one space do not create directly linked reactions in the other. What does tell us something is, of course, how these spaces were linked in reality, how people moved between them – whether one space could take away the customers of the other, if one of them was harder to reach than the other, if the trades pursued exploited the connection between the spaces or ignored it. And for this we must turn once again to the dimension of movement and look at the axial spaces connecting the convex spaces, and the likelihood of people moving along these axial spaces.

Thus, in the large-scale analysis of public space, axial integration is of paramount importance while convex integration may be ignored.

**Convex integration of interior space**

In contrast, the integration values for interior spatial systems are generally calculated for the convex spaces that make up the access graph. In this case, the systems are small and movement is regulated by the arrangement of the

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different rooms and their doors – axially is built, so to speak, into the system from the beginning. Axiality and convexity are much more interwoven, and by the convex arrangement of spaces we also understand how people could have moved from one space to the other. Furthermore, in the small system the practical activities in one convex space directly influence the activities in another, and convex integration thus can tell us important things about which activities were integrated and which were segregated in the daily life of the occupants. In a very small system of public space the calculation of convex integration could also have some information value, but Pompeii is too large for this to be pursued.

So, in the small-scale analysis of private interior space, convex integration is the more important aspect. In this analysis, which focuses on public space, integration for interior spatial systems is not calculated.

**Some problems in Space Syntax method**

What is often perceived as a problem with Space Syntax is that the method represents three-dimensional space in two dimensions, using lines and areas instead of spaces with volumes. One aspect of this is has been discussed by Ratti, who supposes that different building volumes create different movement patterns in the urban environment. 36 Large buildings contain more people and should generate more movement in the streets they open onto, irrespective of where they are placed in the axial map. This would compromise the information on movement potential inherent in the integration of axial spaces, since if a movement generator (a huge building) were placed on a segregated street, this street would see lots of movement despite its low integration value. Through, for instance, a political decision such movement generators could be placed on segregated streets where much movement normally is not expected and where establishments would normally not accrue.

What also strikes me is that volume could possibly influence the behaviour of people in other ways – people might hesitate to use a narrow alley between high walls instead of a broad, sunlit street, even if the narrow alley was highly integrated.

In Space Syntax the assumption is, of course, that segregated axial spaces with low movement potential would generally coincide with inhospitable small alleys, and that broad, sunlit streets would have a high axial integration value indicating a lot of traffic. Generally it is also supposed that the movement generators would be placed along highly integrated axial spaces.

The second problem area is measurement, since in Space Syntax this is not about metres or miles but about how many spaces one has to pass from one space to the other (topology). Walking along an extremely long axial space, passing two other long drawn-out axial spaces and arriving at the

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goal, should thus in some way be equal to walking through a very short space, passing two equally short spaces and then arrive at the goal. This position is criticized. Hillier has advocated that geometry or shape influences how the axial map turns out, so that the axial map in itself already incorporates these geometric differences. This means that the short trajectory using three axial steps and the long trajectory using three axial steps have turned out to use this number of steps for a reason that overrides geometry’s shaping of the axial map – so, yes, somehow both the three-step trajectories are the same thing.

Actually, this becomes even more curious if we move to the convex dimension with the same expectancy of similarity. One room in a house may be a large, open space and one may be a closet, yet their integration values are the same. Are we now to suppose that people think the experience of being in the closet is the same as that of being in the large room?

I think these are problems only if one looks to Space Syntax for the explanation of all things spatial. But what if we look where movement generators are placed — would their actual positions enable us to gain new information about them, especially if we find them in unexpected places? The same goes for the anomaly of a narrow, dark and highly integrated backstreet or a room in a house displaying an unexpected integration value. In my opinion the solution is to use Space Syntax to expose a certain general pattern. Admittedly, this general pattern is based on a two-dimensional analysis that is a simplification, but it is a reasonable one since people in fact move along a trajectory in the first dimension (the line) and stand about on surfaces in the second dimension. This overall pattern should be used to reveal what is not general, to help us see the anomalies. These anomalies then have to be analysed by using further Space Syntax parameters, or perhaps in terms of political decisions, climate, religious beliefs or other factors.

2.2.3. Control value

The control value parameter is of local value only and should be used for comparing a few communicating spaces. It is a parameter that is possible to determine for a convex or axial space, indicating the relationship of a space to its nearest neighbours and giving a picture of a small part of the spatial system. It is calculated as follows: the value of 1 unit is given to every space, and then shared out among its directly adjacent neighbours. A space having

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37 Ratti 2004, section 3.2.
38 Hillier 1999, 182.
40 Efforts are being made to develop Space Syntax to incorporate the geometric dimension. One example is Peponis et al. 2007. The calculations are extensive and complicated, and a spatial description of this magnitude necessitates considerable computer use, but the ideas underlying it may prove to hold an interesting solution.
two neighbours would give them each ½. Every space shares out its value of 1 unit, and receives shares from its adjacent spaces. Adding the shares received produces the control value.\(^{41}\)

**The significance of the control value for determining the type of space**

It is usually said that a low control value means that a space is controlled, while a high value means it is a controlling space.

The word “control” should not be interpreted as a kind of physical control exercised by people in the controlling space over people in the controlled spaces, though certainly a space with what we usually term “control function”, e.g. a reception, would tend to have a high control value. Rather, being in a controlling space means that a person is in control of information, able to see who is moving to and from this part of the system and which spaces/activities they are going to or away from. This person monitors what happens in the immediate surroundings and acts upon his or her information according to cultural and societal norms.\(^{42}\)

Identifying a room with high control value in a house will basically mean that this room has many direct connections to other rooms. From these other rooms a high share of their respective value unit is received. These other rooms have relatively few connections and thus give much of their value to each adjacent room. In the same way, a control value may of course be determined for any public spatial unit, be it a convex space or an axial space.

**The simplified use in this analysis**

In this study the control value is used for two purposes.

First, the interior spatial units lining the movement axes studied are sorted into different groups for analytical purposes, to see if there are clusters of specific units lining the movement axes, see section 2.4 below. A significant criterion used in the sorting is the presence of one or several central circulation spaces, spaces which are at the center of a star-shaped syntactical pattern. These spaces would stand out by having a high control value in their immediate surroundings. Identifying such circulation spaces is of use, for instance, when determining whether a dwelling was used for representation or not.

Since the object of this study is not to analyse the interior spatial systems in their own right, but only to group them to aid in the characterization of exterior space, the calculation of exact control values was skipped.\(^{43}\) Spaces with four or more connections would generally have higher control values

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\(^{41}\) Hillier & Hanson 1984, 109; Grahame 2000, 46.
\(^{42}\) Grahame 2000, 34-35.
\(^{43}\) In a small system like a Pompeiian house, the spaces with a high control value are easily identified directly on the plan. Since the exact value was not needed, this was sufficient for my purposes. In the more complicated systems the control value was sometimes calculated just to make sure.
than their connected neighbours, and so the simplified characteristic of having these four or more connections to other spaces was used to find what here is termed a *strong node* in an interior spatial system.\footnote{In Space Syntax every space is technically called a node, since it is the origin of connections to other spaces. Grahame, 2000, 46 only uses “node” for high control value spaces (value above 2).}

Second, the control values of the convex spaces making up public space along the analysed movement axes were calculated and used in the discussion of “microcosms”, local spatial environments along these streets.

### 2.2.4. The permeable interface between public and interior space

A key part of this analysis concerns the interface between public and interior space, that is to say the facades that border the convex spaces and connect, through their doors, interior space to the outside. This interface is an important factor in determining what kind of interaction there is between people in the public space.

**Constitutedness**

The archaeological material is of primary importance when it comes to determining the type of interaction that took place. To get a clearer picture of this, it is necessary to study the character of the specific buildings that constitute, with their street entrances, the convex spaces of Pompeii, and the various types of interaction thus made possible. Did the doors along a street lead to grand representative houses, or to small workshops, or to other types of interior spatial units?

It is common to describe the interface between public and interior space by noting the number of doorways that lead to interior units from a certain convex space. In Space Syntax terminology this is called *constitutedness*.\footnote{Hillier & Hanson, 1984, 104-105.} Constitutedness gives an initial estimate of the interaction over the interface in any given convex space, but it does not permit comparisons of different convex spaces with each other in a meaningful way. Constitutedness tells us how many doorways a convex space has, but since convex spaces are of differing sizes, the same number of doorways can have very different impact. Constitutedness can therefore not be used to compare the impact of doorways with interior space between one convex space and another. For this purpose I have formulated and used the parameter of permeability.

**Permeability**

In *Roman Pompeii: space and society* (1994) Ray Laurence studied how the streets in different parts of Pompeii are defined by their entrances to private dwellings and shops/workshops, characterized by their very different door-
ways. He analysed the occurrence of these two types of doorways for the entire street grid. Laurence is the first to point out the information inherent in different interior spatial systems lining a segment of a street, and he uses the differences between the wide taberna openings and the fauces entrances to dwellings to pinpoint different categories.

This procedure stresses the uniformity of the ancient urban space and downplays the importance of the dynamic aspect of form and function. My own method of breaking down the public space into convex spaces, and defining the axial spaces cutting through them, focuses instead upon the variation in the town’s character.

I categorize the street doors with a view to what kind of activity they led to, a principle based upon Laurence’s starting point that different types of interior space create different interfaces with the exterior space.

To obtain a tool for the analysis I defined the parameter permeability, the density of the constitutedness of the convex spaces. The permeability of a convex space is the number of street entrances per 10 m wall length, with the width of the entrances included in the wall length. This means that convex spaces of different sizes can be compared with each other in terms of permeability.

**Inhabitant, stranger and visitor in public space**

Constitutedness and permeability tie in with some other key concepts of Space Syntax theory, namely the inhabitants and the strangers/visitors. The person or persons who have the indisputable right to occupy an internal spatial system with its permeable interface towards public space are called inhabitants. Not only is someone actually living in a house an inhabitant, but also the owner and his assistant in a shop or workshop, or the priest in a temple.

The opposite of the inhabitant is termed the stranger, which simply denotes that the person is not an inhabitant. It need not be an unknown person; on the contrary, a stranger may be very well known but lacking the right to use a spatial system uninvited. Strangers are the known or unknown people

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46 Laurence 1994, 89. The analysis is street by street, thereby implicitly using the division into differently named streets, that has its origin in the excavations of the late 19th and early 20th centuries. To get units of a more uniform size he divided the three longest streets into smaller segments.

47 Laurence 1994, 100 ff. This may result in a rough estimate, but it needs to be kept in mind that a fauces entrance does not always lead to a dwelling, and that many different kinds of shops and workshops all had the characteristic wide street door. An example of a domus turned fullonica and kept the fauces entrance is for example VI 14.22. Furthermore, a commercial part of a street often also had smaller dwellings in the upper storeys of the buildings, with streetlevel that do not fit either of Laurence’s categories.

48 The measures were taken on the detailed map in CTP IIIb. For this study a rough measurement of wall length in meters was sufficient.

49 Hillier & Hanson 1984, 122; Grahame 2000, 21.
who pass by the door of a house and are not invited in. When allowed in, the stranger is transformed into a *visitor*.

Exterior public space is by definition open to everybody, but even here we may talk about inhabitants, strangers and visitors, although the categories lack the precision with which they are used for internal space. In a basic sense, of course, everyone living in Pompeii was an inhabitant of the town. On a more precise level there were inhabitants of town regions, or of certain streets. Those who were not living in the same unit were strangers to the town, region or street.

On the most precise level, the people making possible an interaction over the interface between a public convex space and an interior spatial system are thus the inhabitants. They are, of course, the inhabitants of the buildings constituting a particular convex space, and by virtue of this they are also the inhabitants of that particular space. They open a shop, a workshop, or even their dwelling and enable strangers to stop and become interacting visitors. Ultimately the inhabitants decide the intensity of the interaction, as it is controlled by them. They open and close their doors at will, they either try to get a stranger’s attention or indicate that he should move on, and it is they who allow someone to enter a building or forbid it.

Another type of inhabitant does not interact over the interface between public space and interior space, but for different reasons has the right to use a convex space as a basis for interaction with strangers/visitors. Here we find, for instance, the seller at a street market. And of course there is also interaction between the inhabitants themselves.

The stranger is a person moving through convex spaces either looking for interaction or having some other reason for passing through, and he or she may be invited to participate in the interaction offered. Interacting turns the stranger into a visitor in a segment of exterior public space, although this person is still a stranger with regard to the spatial units behind the facades.

### 2.3. Identity – a note on definition

Before continuing with the specific application of method in this study, the use and meaning of the word “identity” in this text should be discussed, since it will recur several times in the analysis of the messages conveyed by the architecture and features of different spaces, and since I initially stated that knowledge of how the urban environment impacted on Pompeian identities was one of the goals of this analysis.

The discussion of identity in archaeology is an enormous field today ranging from the cultural and biological differences in how humans perceive themselves and the world, to whether or not people in various ancient cultures had a sense of individuality, to the differences (or not) between humans...
and other living entities, to the way western ideology was made the norm for describing the relation between man and nature.\textsuperscript{50}

I will state immediately that this discussion is not a field I am especially well acquainted with, but there are some things about the concept of identity and how it is used here that need to be said. First, identity can be seen as psychological identity, as person’s self or inner core if you will. Second, identity can be seen as a sociological entity, whereby a person’s identity is composed of many different strands.\textsuperscript{51} It is this second definition of identity that is of interest here.

Although in the study of another society we might not be aware of any or only of some of the relevant categories of different identities, looking at Pompeii we can still distinguish some parts of the identity make-up with relative certainty: for instance, a person could belong to a certain \textit{familia}, as well as belong to a specific group of religious initiates (like the devotees of Isis in Pompeii), be of a certain ethnic origin (e.g. Roman, or Oscan), and have a specific occupation, such as a baker. All of these separate components of identity, as well as many others and their subdivisions, are parts of this person’s identity. Which part is actively expressed or lived at a given time depends on the circumstances.\textsuperscript{52}

Building an identity is an ongoing process, where this someone moves along in life and due to societal relations forms new aspects of identity or abandons old ones. The complexity of a person’s acquiring, say, the identity of being a member of a \textit{familia} or of being dropped from it is not the subject here – rather, what is central is how the urban environment showed people certain aspects of a possible identity make-up. The urban environment held up a mirror that reflected different identity possibilities for the individual moving in it.

Sometimes this could have been a case of actually building a new component of identity – if the people of Pompeii had not conceived of being really and truly part of the Roman Empire after 80 BC, various monuments dedicated by first Sulla and later the emperor would have caused them to think along these paths. Mostly, I think, the function of various features would rather have been to confirm, strengthen and bolster identity. A patr familias would, of course, be aware of his role and status, but seeing the elaborate entrance to his domus and the perfect, symmetrical view into the house would \textit{remind} him of it emotionally. Someone who was a stranger to him

\textsuperscript{50}See Ingold 2000, for among other things a thorough walk-through of the various sociological, economical and anthropological paradigms of interpretation that have been used to explain man’s relation to the world and his place in it. Cf. also Thomas 2007, 213-215, 217-218, discussing different cultures’ perceptions of “humanness” and “individuality”, mostly in the perspective of sex and gender.

\textsuperscript{51}Rowlands 2007, 61-62.

\textsuperscript{52}Insoll 2007 provides an example of an amalgam of different identities, past and present, and the different and differing expressions of them in a given context.
and his house would also have known that he was a stranger, and seeing the same thing would not have led him to behave as a paterfamilias but instead treat the first man as the important householder he was - thus offering a further reminder of his status and this part of his identity. The identities people already had at a given moment would have led them to internalize some of the identity-bolstering features and not others.

If we ask why exactly this combination of elaborate doorway and view should have this effect in a particular society, while in another society even the status of being a paterfamilias is unknown, we enter a whole variety of other scientific disciplines and leave Pompeii far behind, which is not the purpose here. Nevertheless, we should be aware that the limits of what we know about Pompeii and the conditioning by our own worldview may lead us not to identify things that may have sparked a heightened feeling of identity, to miss important parts of what could be comprised within the identity of a Pompeian and also to interpret things wrongly. Thus, the small “stories” incorporated in my thesis, describing possible experiences at various locations in Pompeii, should be seen only as possibilities, interpretations and an emotional response to archaeology.

2.4. The application of method in the analysis

In the preceding sections of this chapter I explained some of the theories and parameters used in Space Syntax method, and occasionally mentioned how I use and modify these parameters in my analysis. In the following section the link to Pompeii is much more direct. The sorting of interior spatial systems in order to define the interface between them and the convex spaces of the movement axes made necessary a specific approach, where the syntactical results were combined with recent research on Pompeian houses, flats and workshops. Space Syntax is used alongside considerations of status, use, and so forth as a way to access data of the spatial systems that are not immediately possible to perceive by traditional methods.

The first question is, of course, why interior spatial systems should have to be classified and sorted into categories for the purpose of analysing public space. It was said above that the interior spatial units which share an interface with the public space generate different kinds of interaction with the strangers passing by. The shop would draw customers and encourage them to stop and look over its goods, the *caupona* would have people eating and drinking and talking on the sidewalk in front of the large counter, and the

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53 I use the term “caupona” as an equivalent for a street-side eating place or restaurant. I do not make a distinction between establishments that had interior dining rooms (and perhaps rooms to stay the night) and those that did not, or those that served both food and drink and those that served only one of these.
The house of an important citizen was geared to representative uses, like the morning reception when the dependants of the resident patronus came to him to get help, take orders and do him honor. This reception took place in the central space of the house, the atrium, which would have been both grand and relatively public. The atrium was not only a representative space; it was also the space where the family’s history was displayed, for instance by means of the ancestral masks. For both the inhabitants and the visitors, the atrium thus strongly marked the place of the domus’s owner in his family’s history, rendering his family identity visual.55

The proclaiming of identity was not only a feature of the atrium. Other rooms were used for dining with select friends and business partners. These more exclusive reception rooms were often arranged around the atrium or around a garden with a peristyle, which alluded to public architecture and proclaimed the owner as a participant in public life.56

Some representative houses were visited by many clients and some by few. Some may not have been visited by clients at all, if the inhabitants themselves were clients doing the visiting.

Apart from the non-representative simpler domus, living without representational obligations often meant living on the premises of a commercial

55 Hales 2003, 46.
shop or workshop. But there were also flats, generally in the upper storey. Such cenacula can be seen to have existed in Pompeii as there are remnants of separate staircases from the street, leading up to the flats. No flats of this type exist in complete layout today, so discussions about spatial structure must be vague.\textsuperscript{57} We know that these flats differed in spatial arrangement and size, as the ground floor structure was planned and built first, determining what could later be built on top.\textsuperscript{58}

A cenaculum would only have been used for representation as an exception, since it usually was very small and without any kind of courtyard. Production and commerce would have been rather unsuitable pursuits here, as there would have been a great risk of fire in addition to the fact that heavy and voluminous transports up the staircase would have been difficult. On top of this, upper storey flats were not as easily accessible to customers as ground floor establishments, although a doctor or a teacher could of course have worked in a cenaculum.\textsuperscript{59}

On the ground floor of the Pompeiian houses, many workshops and shops line the streets. The smallest workshops/shops are simple one-room units with a broad door opening onto the street, today usually called tabernae (sing. taberna). Pirson’s definition of a taberna is based on this large street door.\textsuperscript{60} It is a clear indication of some kind of commerce or production – in short, “work”. When there is at least one other space aside from the street-front room, perhaps with niches for beds and/or a lararium for the family cult, or if there is evidence of a pergola (a mezzanine floor accessible only from inside the taberna) it is clear that the small unit could be used to live in, as there was enough space. Pirson only ranks such tabernae with side rooms or pergulae as possible living quarters, but it is likely that it almost always was possible for at least one person to live in his shop, even if it consisted only of a single room with a wide shop door.\textsuperscript{61} Larger work establishments are also quite common, and are sometimes found in reused private houses. Of course they provided space also for living, but here living quarters were sometimes distinctly separate from the work areas.

**Representative living – the representative node as a classifying device**

Research leading to a categorisation of the interior spatial systems along the streets of Pompeii with the help of Space Syntax started with Laurence’s analysis of the spatial configurations lining some of these streets, in which he discusses the importance of syntactical depth and the integration of dif-

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\textsuperscript{57} Pirson 1999, 20-21, 55.
\textsuperscript{58} Pirson 1999, 116.
\textsuperscript{59} Pirson 1999, 173.
\textsuperscript{61} Pirson, 1999, 55.
ferent rooms in interior spatial systems. This was followed by Grahame’s thorough analysis of the houses of Pompeii, in which he used most of the classical Space Syntax parameters and developed them in an innovative and groundbreaking way to be able to define the structure of different interior spatial units. What he found was that there was a significant amount of randomness in the spatial arrangement. Randomness, of course, is the absence of local conventions for the arrangement of space (see above, section 2.1.3), a freedom to arrange space as the owner pleased. There were, however, some traits that were not random, the most important of which was the presence of what Grahame termed “courtyards” with certain syntactical qualities.

By far the most usual such courtyard would have been the atrium of the Roman house, see Fig. 5. It was in the atrium that the most distinguishing feature of the representation, the morning reception or salutatio, would take place. This had to happen in a circulation space – a space large enough and with a degree of convexity high enough to accommodate a group of people in social interaction. Not just any large room would do, as this circulation space had to be centrally placed as a distributor in the middle of a star-shaped pattern, giving selective and controlled access to surrounding rooms. The word “atrium” denotes a roofed courtyard central to the domus, and one or more syntactical steps away from the exterior space. This placing alone almost guarantees that the atrium displayed the above syntactical characteristics. It was what may be termed a strong circulation node.

In Pompeii the most usual furnishings of the atrium included an opening in the roof – impluvium – and a basin beneath it – compluvium. Furthermore, the word “atrium” also conjures up a rich décor of wall paintings, central gardens, mosaic floors, columns and the like. These are the status furnishings that were used to turn a strong circulation node into the specific atrium type of space.

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62 Laurence 1994, 115 ff. Laurence calculates the total integration of different spatial systems justified from the carrier and compares them. He uses the RA-value, which makes it difficult to compare systems of different size, which in turn makes the analysis difficult to evaluate.

63 Grahame 2000, 36, where he links Space Syntax parameters to the concept of presence-availability, the possibility of joint presence of several persons; 46-47, where he defines control ratio and 49-50, 54 for a mathematical/statistical identification of the social convention influencing the spatial design of the houses in Pompeii’s Regio VI.

64 According to Grahame 2000, the “courtyard”, which could be an atrium or not but which certainly was a multi-connected circulation space, was an important representation space.

65 The selective access to different areas of the Roman house is stressed by for instance Wallace-Hadrill 1994, 44-47. He differentiates the atrium (general access) from dining rooms and other spaces for invited guests. He interprets Vitruvius’ description of the Roman house as an illustration of the different social classes’ respective need, or lack of it, for different reception areas, cf. Vitruvius 6.5.3. The more select parts of the house were, however, often visible already from the entrance, so it seems that it was important to display them even at a “general reception”.

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Fig. 5. A Pompeian atrium, with a basin (compluvium) on the floor and an opening in the roof (impluvium). The room is large, permitting circulation, and has multiple connections to other rooms in the house.

These strong circulation nodes with special furnishings that we call atria were also used by the Roman family as central living spaces, from which the different adjacent rooms could be used and/or supervised. Grahame has shown that as a house grew larger, this enlargement often took the form of
adding more courtyards/atria with surrounding rooms to the building. Whether an atrium was used for representation or for household activities, it would be decorated in the same style since the décor obviously was a status feature.

Not all spaces used for representation in a house were furnished as atria. In the 3rd century BC the peristyle garden at the back became a usual component of Pompeian houses. It was surrounded by a variety of dining rooms for different seasons and occasions. The peristyle garden was suited to a more private type of representation, but it still exhibited roughly the same syntactical qualities as the atrium and was a strong circulation node. Needless to say, gardens were also for private household purposes. A private garden that was surrounded by a few rooms to make it more useful, and that had some status features, cannot be distinguished clearly from a representational garden in the archaeological remains.

Another aspect of the representation question is highlighted by the organized sightline from the street door of the domus. This sightline can be thought of as a feature midway between marking a domus as a representative dwelling and being a status feature. The view from outside is often shaped to display an unimpeded view across the atrium, the tablinum and the peristyle garden beyond, if indeed there is a garden. The house in itself need not be as symmetrical and ordered as the sightline implies, but the reality behind the view is not perceived until the stranger looking in becomes an invited visitor, privileged to enjoy other, just as carefully arranged, sightlines. What the sightline from the street door implies is that the domus has representative spaces and spaces central to the elite Roman house, a house where clients and amici can be received by an owner who hides nothing away. Since this has to do with impression, and since the person looking in through the open door need not be given access to the interior, the sightline cannot be said to be a strictly spatial feature. The wish to display representation need not be matched with the actual occurrence of representation, and the presence of highly suitable spaces for it in the house, although of course real representation most often would be displayed with a sightline. Therefore, the arranged and symmetrical sightline is here counted among the status features of a domus and not taken as an unequivocal sign of representation.

This somewhat lengthy discussion serves to illustrate that representation cannot be deduced from syntactical properties alone and that the strong cir-

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66 Grahame 2000, 77-80. For a Space Syntax approach to differentiating between a representative atrium and an atrium possibly used for household purposes, see Grahame 1997.
67 Wallace-Hadrill (1994, 155-160) associates lavish decoration (columns, mosaics, paintings, etc.) in all sorts of atria with representative function. If one holds that atria could exist without having a representative function, then the décor in the non-representative atria only had a private luxury or status function.
68 See Dickman 1997 for a discussion on the development of Pompeian peristyles.
69 Hales 2003, 44-45, 107, 111-114.
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culation node is not a sure and certain sign of representation. When status-enhancing furnishing and décor are evident, the room is termed a *character room* in this analysis, in that it exhibits the characteristics that lend prominence to a person in the given society. We may thus have rooms that are strong circulation nodes, rooms that are character rooms, and rooms that are both. The last type, the *representation node*, is the most likely to have seen representative use.

**Identifying representative living**

How is one to identify the domus with representation? The answer seems to lie in numbers, and I have classified the houses according to their number of representation nodes. In order to receive clients in differently sized groups during the day, to entertain with selective dinners in the evening, and to use strong circulation nodes for household purposes, it would have been preferable to have several such spaces. This means that houses with many representation nodes are likelier to have had a representative purpose than houses with one or two.\(^70\)

In this study a fairly minimalistic view of furnishings is taken in order not to exclude rooms that have lost part of their distinctive appurtenances through the millennia. This means that if the spatial system under scrutiny is a living unit (not a workshop, identified as below in section 4.4.2) and if there are some status features which indicate that the strong circulation node was an atrium or a garden suitable for reception, and if nothing speaks against this, then it is considered to be just that.

Accordingly, houses with three or more representation nodes are classed as L3 (Living 3, see *Fig. 6*), with a strong component of representative use. I also think it likely that houses with two such spaces functioned representatively.\(^71\) If, for instance, there is an atrium *and* a peristyle garden at the back of the house, surrounded by rooms, this second circulation space is such an expensive, complicated and evocative arrangement that it most likely will have been used for representative purposes.

In the same way, a double atrium signals the separation between representation and other functions, especially if one atrium is larger or more richly decorated than the other. Houses possessing two representation nodes are placed in the group L2 (Living 2, see *Fig. 7*) and also deemed to be representative dwellings.

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\(^70\) Cf. Grahame 2000, 83. 
\(^71\) Grahame, (2000, 83) sees houses with one or two courtyards as the dwellings of those who visited the larger domuses. These houses could sometimes also be the goal of formal visits, but these visits would have been formally structured in order not to disturb the hierarchical structure of the inhabitant’s household. Thus, Grahame does not interpret the presence of one or two character rooms that also are circulation spaces as an indication of formal reception.
Fig. 6. An example showing a L3-unit. The domus V 1.23,25-27,10 has three or possibly four, large circulation spaces with four or more direct connections to other spaces, of which three are character rooms (atrium basins, planned sightlines, colonnade). These are shaded. V 1.27 and V 1.24 are here treated as a separate taberna units.

Regarding the houses that have only one representation node, speculation about representative use leads us nowhere. It is possible that these houses were not used for representation, but they could have been, if activities were separated in time. In the category L1 (Living 1, see Fig. 8) there are also some houses of varying size that pose a certain problem. These are houses that exhibit two or more large, highly convex spaces furnished as character rooms – but these character rooms are not strong circulation nodes. They do, however, have more than one connection to adjacent rooms. These houses/spatial units are included in category L1, as the number, size, convexity and décor of these character rooms make them somewhat more suitable for representation than they would otherwise be. Thus, L1 is an ambiguous category, but on the whole we may assume it had much less to do with representation than L3 or L2.

It is important to note that the aspect of private luxury is not under scrutiny here, since it has little or no bearing on the interface with public space. A house may be both large in area and have a great many luxurious rooms and still be classed as L1 if, for instance, there is just one strong circulation node atrium.
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Fig. 7. An example showing a L2-unit. The domus I 2.8 has two large circulation spaces with four or more direct connections to other spaces, which are character rooms (atrium basin, planned sightline, colonnade). These are shaded.

Fig. 8. An example showing a L1-unit. The domus I 2.2-3 has one large circulation space with four or more direct connections to other spaces, and which is a character room (atrium basin). This is shaded. The back garden has only three connections to other rooms. I 2.4 was probably not connected to the house (wooden partition), and the connected taberna I 2.2 is treated as a separate unit in this analysis.

Non-representative living
Non-representative living would have had no need of a representation node, although such a node could have existed for intermittent or domestic use, as
in the L1-units described above. Here we find those spatial configurations which Grahame calls “houses without courtyard”. They are small, both as regards the actual floor surface and as regards the number of spaces, and their spatial structure resembles more closely a sequence or a ring of spaces than it does a node-centred pattern. The street door usually leads right in to the complex without a distancing vestibule, thus creating a very direct interface to the public space. Many of these small ground floor-units can be identified as shops and workshops, and are dealt with below, but among them are also found pure living quarters. In Pompeii such small living units are much more numerous than the larger units, both on the ground floor and in the upper storeys.

Often we are dealing with an upper storey flat. I have followed Pirson in identifying where these independent upper storey flats are to be found and have subsequently classed both them and ground floor units as L0 (Living 0, see Fig. 9) if they can be identified as having four rooms or more, and L00 (Living 00) if they are deemed smaller than that. When, as in most cases, size is impossible to determine, they are put in the last group.

![Fig. 9. An example showing a L0-unit. The small unit V 1.28 has a large circulation space which is connected to four other spaces, but there are no signs that this was a character room.](image)

**The shops and workshops**

To class a spatial system as a shop or workshop, something must indicate that it was used as such. I have mentioned the wide street doors several times, and both for large and small establishments these doors are important indications. For this first classification I have used the tools of the trade (Figs. 10 A and B). They include vats for dyeing, fulling and washing cloth; grain mills and ovens; large counters with holes for food containers in street food shops; as well as finds of smaller artefacts indicating what was produced or sold in a specific shop.

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Fig. 10A. Often, there is no evidence for the type of trade pursued in a taberna. One exception is the millstones and ovens of a bakery, which are easy to recognize.

Fig. 10B. The counters of street-side take-away food places often filled the entire broad door opening. They could be painted or inlaid with coloured or white stone and presumably commanded the attention of passers-by.

The workshop would not have needed a representative node (if its owner had representational duties, they would not be performed in the workshop), but large circulation nodes may nonetheless be present. More than one such
node means the workshop is classed as LW2 (Living and Working 2, Fig. 11), and a single circulation node classes it as LW1 (Living and Working 1). Workshops/shops without a circulation node are classed as LW0 if they have four or more spaces, and LW00 (Fig. 12) if they have fewer. There are also a few, very tiny, single-room structures that seem very unlikely living spaces and are classed as W00.

Fig. 11. A fullonica in the category LW2. VI 14.22 is a rebuilt domus, its new destination made clear by the large vats in what was once a garden. In this case the two circulation spaces with many connections have lost their function of character rooms, although the atrium basin is still in place. VI 14.21 is a separate taberna.

Fig. 12. The smallest unit in the category “Living and Working” is usually a taberna with one to three rooms. This three-room unit is called VI 14.24.

The complex interior spatial units with several functions

The above classifications are rather straightforward, but there are many complex interior spatial units that combine specific living quarters of various representative or non-representative type with variously sized workshops/shops. A combination unit cannot be considered as a single unit, since the activity and encounters engendered by its interface will be of different types. The interaction associated with a domus entrance will have been totally different from that associated with a workshop, even if these two entities are linked to each other internally.
These combined units are sometimes separated into their constituent parts in the analysis, for example allowing a small shop with a pergola above to be treated separately from the domus to which it is connected. I use three prerequisites for separating an internally connected system into several parts, and they should all be present at the same time:

1. The different spatial units have at least one street door each.
2. The different units are clearly identifiable as being of different character (artefacts, graffiti/inscription, decor and/or type of street door), so that different types of use can be posited – separate units for living and working, or for different kinds of combined living and working.
3. An analysis of the interior spatial system shows the likelihood of a division into two or more units. Normally this can be ascertained by drawing an access graph, which is a schematic depiction of the spatial dispositions of a given system.\(^\text{74}\)

An example of a complex unit can be seen in Figs. 13A (plan) and 13B (access graph).

Fig. 13A. The Casa di Laocoonte, VI 14. 28, 30-32, is an illustration of a complicated unit. Entrance VI 14.30 leads to a living unit that is classed as L0. The possible circulation space/character room is small and has only three connections to other spaces – the stable VI 14.31 is seen as a separate unit, so this connection does not count. This stable unit is of the Type LW00, deemed as a business separate from the bakery in VI 14.32, which is a LW0-unit and lacks a circulation space (not placed on analysed movement axes). The taberna VI 14.28 is also seen as a separate unit. All in all there are four different units here, although they all are interconnected, and three of them form part of this analysis.

\(^{\text{74}}\text{If the graph is divided into two or more distinct parts with at the most two connections between these parts, the entire complex may be seen as consisting of different units.}\)
Fig. 13B. The access graph for Casa di Laocoonte VI 14.28,30-32. All four subunits have one street door each; they are connected to the rest of the spatial system by only one connection each and different activities can be ascertained for the four units – bakery, stable, a living unit and a dicing caupona. This means they are treated as separate units in syntactical terms in this analysis. To make the graph more intelligible, the exterior carrier space is represented four times, although it generally would only be shown by a single ring with a cross.

2.4.2. The application of method in the analysis of the convex spaces on three movement axes

The object of this analysis is to identify the character, structure and activities in the public space, and more precisely in the separate convex spaces that build up this entirety. The interaction of a given convex space with the interior spatial systems that line it is the subject of the preceding section in this chapter and of the applied study in Chapter 4. There are, however, other aspects that are inherent in the convex space itself and that provide another body of information. They are to a significant degree described in Chapter 5, where they are used, but some aspects should be noted beforehand.

As outlined above there are various Space Syntax parameters that can be analysed for any convex space in any spatial system. Convex integration was ruled out as uninformative for large public space systems (see section 2.2.2). The control value provides information on a space’s role in the local context. A controlling space (with a locally high value) would be a space where information about movement to and from adjacent spaces could be monitored, as well as what happened there. The degree of convexity in turn tells us something about how useful a space is for different stationary activities, since it is a measure of how square a space is. A space that approximates a square is obviously more useful for human interaction than a long and narrow corridor-like space, and this measurement can thus help in pointing out activity spaces. The axial spaces that pass through a convex space can tell us
something about the intensity of movement through this convex space. Leaving Space Syntax aside, we may also look at size and at different features denoting activity in a space, like a fountain or an altar. How clearly a space is identifiable as a separate place depends on all these variables and on its articulation – how clearly it is set off by a measurable difference from the convex spaces that are its neighbours.

**Articulation**

Articulation is a word that can be used to describe the variety between the spaces that follow one another in the convex dimension. When one follows an axial space from one end to the other, the sequence of convex spaces passed can be called very articulated or not very articulated, depending on how the borders of these convex spaces fluctuate.\(^{75}\) If one goes from a very narrow space to a very broad one, then articulation is very marked. The totality of the convex spaces passed may exhibit much variation, which means one passes through a very articulated environment. If articulation is not very marked, then one passes through a less articulated environment. In following the axial space, some individual convex spaces may be very articulated and others may not. The very articulated ones have, of course, a greater chance of being perceived as distinct spaces in the minds of people using them or passing them, other things being equal.

But what is “very marked” or “not very marked” articulation? Here we again come up against a subjective choice that has to be made by the analyst. There has to be a lower limit of articulation. When a potential convex space is articulated under this limit, the articulation is disregarded. Using, for instance, an absolute value of 3 cm for fluctuations in the facades bordering the convex spaces would produce a vast amount of spaces that no one except the meticulous researcher would have been able to perceive. On the other hand, a too large value would produce unhelpfully few convex spaces.\(^{76}\) In my analysis I chose 0.2 m as the limit below which fluctuation is disregarded, as I subjectively found this was a measurement that was perceived as significant by me and my colleague. It is the end result of the whole study that will tell us if this was a correct choice or not.

A convex space that is hemmed in by a wall on the left and the right side, and furthermore is articulated by the fact that the adjacent spaces to the top and the bottom are narrower, also gets some length of wall along its top and bottom borders, see Fig. 14A. This is what I define as articulation proper – the articulation contains the space. A space that is articulated by its adjacent spaces’ top and bottom being broader than itself has negative articulation,

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\(^{75}\) Hillier et al. 1983, describes this quality of convex articulation along the axial space, which makes the urban landscape intelligible and easy to find one’s way in.

\(^{76}\) Another possibility is to specify that the articulation should be defined by a certain proportion of the total border of a convex space, or of that portion of the space’s border that consists of wall length, or perhaps of the border of that side where the articulation is expressed.
see Fig. 14B. It seems to me that the articulated space has a certain advantage when it comes to being perceived as a separate place. This would mean that convexity itself is not the only thing that matters, but also how this convexity is achieved. This has a slight bearing on the study, but is mentioned here mostly as an avenue for further, empirical research into Space Syntax.

Fig. 14A. The street space in the middle is articulated. It is wider than its neighbours and has walls on its long sides as well as some wall length on its short sides.

Fig. 14B. The street space in the middle is negatively articulated. It is narrower than its neighbours and has walls only on its long sides.

Articulation in a broader sense is not only the result of receding and protruding facades. A change in direction along a street also is an articulating factor and much harder to define regarding minimum value. The cases where this impinges on the analysis are very few, so I have been content to use subjective perception of a directional change and have not established an actual measurement in degrees. There are also built-in level differences, fences, colonnades and the like providing articulation. Such obstacles can be disregarded or not – in this analysis colonnades are borders, and level differences that necessitate a conscious effort to negotiate them are also considered borders. Minor differences are disregarded. The sidewalk and the street proper are not separated even if the level difference is considerable, which is
another methodological factor that needs evaluation in the completed analysis.

**Calibrating the degree of convexity**

In section 2.2.1 the degree of convexity for a given convex space was touched upon, and this value is calculated for the public convex spaces in the analysis.

The degree of convexity or “fatness” of a space is dependent on the form of the space, and a space that comes close to being a square has a higher degree of convexity than a long and narrow space. A “fat” or very convex space is a space that lends itself to unplanned and chance interaction, where a number of people can be present in the same space, mingling, seeing each other and being seen, but not engaging in any goal-oriented, focussed interaction – provided of course, that the space is large enough for circulation. Such a space has the potential for co-presence\(^{77}\) of a larger number of people than a smaller space does, or than a space just as large but more elongated, where a person at one end need not necessarily perceive of herself as co-present with someone at the other.

This gathering of people without any special purpose, just happening to mingle in the same place, is an important aspect of the large space with a high degree of convexity. In exterior public space, however, there is also a more exclusive interaction. This is related to stationary activities in the streets and squares, and is less random than simple co-presence. The customers looking over and discussing the merchandise of a shop among themselves are more focused than the general public present – what they discuss may not be private, but it can exclude others by its theme and by how the customers group themselves around the goods. The people eating at a counter exclude non-eaters from their group simply by their action of eating. These interactions stand out from the general mingling by the performance of specific activities and perhaps by postures, tone of voice and suchlike, but there may also be certain spatial characteristics facilitating them, or specific features in a given space. Obviously large size and high degree of convexity would make some types of interactions related to stationary activities easier – an outdoor market would be easier to visit, a religious ceremony could more easily accommodate participants. Other types of interactions might have been facilitated by benches, shelters or a wide sidewalk.

In a spatial system where convex spaces come in all sorts of forms (small and fat, small and elongated, large and fat, large and elongated), picking out the spaces that are both large and have a high degree of convexity would

\(^{77}\)Grahame 2000, 7-11, 20. Grahame defines co-presence as the unfocused interaction of gatherings, where one is seen by and sees other people. The more structured and focused interaction is called an occasion, shielded by architecture against intruders. Exterior space is thus primarily the space for gatherings, and privacy is created only by posture, behaviour and the like.
thus highlight the spaces of the general unfocussed gatherings, which are also the spaces where large-scale interaction of a non-private kind, related to stationary activities, could have taken place. But in analysing a public system of street spaces with a few squares, there is a certain skewing of the degree of convexity. Most of the convex spaces making up the streets will have a roughly rectangular and corridor-like shape – the larger a space is in square meters, the longer it generally is, and the farther away it is from being the most convex space imaginable. Most spaces will have a low degree of convexity. The smaller a space is, the closer it will usually be to the perfect, “fat” square and the value of 1.

In a street system, there is thus a certain dearth of small and elongated spaces and also of large and fat ones. This could easily lead to the conclusion that there are very few spaces useful for general unfocussed mingling or for stationary activity in such a system. We get the “street” and the “square” and some few spaces that are “anomalies”. Very roughly this is true: unfocused interaction and circulation would be more prominent in a “square” than along a section of “street”, and this would probably also apply to certain more excluding and defined stationary activities.

But anyone who has visited a city or town knows that activities of the stationary kind also exist in “street” spaces. How is one to capture this? I think the answer is in a greater emphasis on size. A large space, even one that lacks an extremely high degree of convexity, would be a bit more useful than a small one. Activities would perhaps have to be more or less strung out, but they could fit in better than in a smaller space. While the most useful convex space still would be the large space with a high degree of convexity, the large space with a somewhat lower value would also have seen some use. So, to compensate for the bias of the system, I give the different convex spaces “convex impact points” to indicate their potential impact in the convex dimension (see section 5.3.1).

This entails that a very small but highly convex space may get the same value in convex impact points as a large space with a very low degree of convexity. These spaces are very different, but both types are to some degree unsuitable for interaction based on stationary activities and/or circulation involving many persons. While the small and convex space in an interior spatial unit would have had a high potential for more private interaction involving fewer persons, in a street system this use would not be very marked as long as the space is situated along the main axial space. It is more likely to be a space that is simply passed through, and perhaps seen as marking a transition between areas. And the large, elongated space certainly is more of a “pass-through space” than a similarly large but fatter space.78

78 There is of course a lower limit for a space’s usefulness for interaction – however convex, a space must be large enough to accommodate a minimum of two interacting people. This lower

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Features
Convex spaces exhibit both features that make them stand out as special places to those who see them and that enhance their convex properties. They are perceived as places in their own right, places that might be referred to and recognised by others, such as “the place with the white fountain” or “the big crossroads”.

The use of the term special place is not a scientific term and not quantifiable, but it clearly denotes a place that has something that singles it out, something that is likely to have been a commonplace in the description of the space. Many special criteria may be lost to us in an archaeological context, but in my opinion those that are still retrievable address a common human way of looking for descriptive characteristics. A place that can be described in this way is likely to have more impact in the convex dimension; it will be used as a place to meet, as a guide to specific activities, and so forth. An activity in a space like this is likely to be easier to find and more often visited.

This phenomenon is here called convex boosting, and may for instance be a spectacular monument along the border of the convex space (the tetrapylon of the Holconii in S29 is a good example). There are also different remains of actual use (a street altar, for instance, or a fountain). Both phenomena are discussed in Chapter 5.

2.4.3. Expression of interior units in public space
Interior spatial units may be identifiable from public space. A domus may for instance have a special facade that marks its beginning and its end, or a workshop might be singled out by having a specific kind of paving on the sidewalk in front of it. With an analogy from biology I call this the expression of interior spatial units in public space.

Expression of interior spatial units may not always represent the actual interior state of spatiality – two interior units might give the impression of being a single unit by sharing an expression, or a large unit might come across as several smaller ones.

There may be several reasons for this. That which is expressed may not be the interior spatial units in themselves at all; it may be ownership, a common factor for several units (“this is an insula of high status”) or something we cannot pinpoint from today’s vantage point. It might even be the convex space itself. The expression may also be older than the actual state, since units are bought and sold, connected to each other or sealed off. Even in these cases there is some explanatory power to the concept, since it may tell us either that we no longer can grasp what was expressed, or that expression limit need not be defined in analysing exterior space, since no such very small spaces are present.
in this society could be allowed to mirror an earlier spatial organisation. Unfortunately, most often nothing much can be said about what the expression expressed or even of how it was visibly manifested.

A specialized comparison of specific interior spatial systems and their chronology with expressions in public space is not within the scope of this analysis. The study of colour in public space, *Colour in the Pompeiian cityscape* by Karin Fridell Anter is published together with my analysis in this book, and it addresses this problem from the specific viewpoint of how colour schemes and décor of street facades might be used for expression.\(^79\) Other findings and some tentative results are to be found in my ‘Table of interior spatial units lining the Stabiana, Mercurio and Fauno movement axes in Pompeii’ and in my small article ‘Expression: architectural features delimiting urban space along the Stabiana, Mercurio and Fauno movement axes in Pompeii’.\(^80\)

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\(^79\) Fridell Anter (in this volume).

3. The axial system of Pompeii

3.1. Introduction

In this chapter I will present the axial analysis of Pompeii, which underlies much of the rest of my urban analysis of the town. In the year 2000, Karin Fridell Anter and I jointly established a grid of axial spaces according to Space Syntax theory. We also published a first analysis in 2003, which forms the basis of this reworked chapter.

As Space Syntax was exhaustively presented in the previous chapter, only a short summary of the concepts used is given here.

In this and the following chapters the use of directions is simplified, so that north and south are equated with the direction of the north and south ends of the Via Stabiana, while east and west are equated with the direction of the east and west ends of the Via Marina/Via dell’Abbondanza.

3.1.1. Space Syntax – the spatial system analysed

When carrying out an axial analysis the first decision to make is the area to be included in it. Pompeii presents a well-confined setting within a town wall with seven gates, and although we know there were cemeteries, villas, tabernae and probably even suburbs outside the walls, it is legitimate to say that the intramural district is a natural analysis unit with clear-cut borders (Fig. 15).

In this spatial system there is exterior public space and interior space within buildings. In the definition of public space in this analysis, I decided to include streets and sidewalks as well as open spaces directly connected to streets in the definition of public space. Five large buildings around the Forum, whose functions are seen as extensions of the outdoor public space are also included. On the east side are found the Eumachia hall, the sanctuary for the imperial cult, the so-called lararium, and the Macellum. On the west side there is the covered market. Three temple precincts, namely those of Apollo and of Venus on the Via Marina and the so-called Foro Triangolare in the south of the town are also included in the public space. In each case,

such an included building or area is considered as a single convex space without subdivisions.

Fig. 15. Map of Pompeii’s principal outlines. 1 = Via Stabiana/del Vesuvio, 2 = Via dell’Abbondanza/della Marina, 3 = Via di Nola/della Fortuna/delle Terme, 4 = Via di Mercurio/del Foro/Forum/delle Scuole, 5 = Via Consolare, 6 = Via degli Augustali, Unexcavated areas are marked.

3.1.2. Space syntax - convex and axial space

The entire exterior public space of Pompeii within the walls was broken up into its constituent convex parts. As the convex dimension of the public space is primarily concerned with the form and extension of spaces, it reflects the spaces where the inhabitants of the town live and work. Beside this convex dimension runs the axial dimension, where one looks to define the potential of movement through space.83

The axial dimension is construed by drawing the longest and the fewest lines connecting all the convex spaces in a grid. Each line representing an axial space thus passes through two or more convex spaces. Axiality is primarily the dimension of movement. It reflects spaces as used by the stranger passing through. It should also be remembered that the stranger is not necessarily someone foreign or unacquainted with the town – he or she is simply

83 See section 2.2.1, Axiality.

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3.2. Prerequisites of analysis

3.2.1. The map

The object of analysis, intramural Pompeii, is only partly excavated, and the street structure in the unexcavated area has been reconstructed in various ways on the maps available. The logic of these reconstructions is not always evident when compared to observations made on the spot in Pompeii, or to the large-scale CTP-map. Even the excavated parts of Pompeii are not

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84 See section 2.2.4, Inhabitant, stranger and visitor in public space.
85 Integration, see section 2.2.2. Convex integration for an entire system of public space is seldom calculated. Since the convex dimension is by nature the dimension of activities locked in a specific segment of space, the relation to distant spaces is tenuous. Relations to neighbouring spaces can be explored by other means, e.g. the control value.
86 Reconstructed maps are found on the inside covers of CTP II-V, Richardson 1988 (cover), Laurence 1994, Geertman 1998, Zanker 1998, to mention only a few works on Pompeii. They appear to be based on different hypotheses about the angles of streets and insulae in the unexcavated northeast area. The plans in the CTP show a hypothetical division of the eastern part into one southern and one northern grid, meeting in irregular street intersections over the hypothetical eastern continuation of the Via degli Augustali. On the smaller plans of Laurence and Zanker, the north and south grids seem to allow connections without such irregularities, although this is not made explicit on the plans. The large-scale CTP-map, based on publications, aerial photographs and the observations of a team of architects, also gives evidence for the hypothesis that there was not – or at least need not have been – any systematic irregularity in the unexcavated part of the street net.
consistently rendered as regards street width, angles of the different streets in intersections, and irregularities along the extensions of the streets.\footnote{One example is the Via degli Augustali to the northeast of the Forum. This is generally depicted as a wide and straight street between the insulae VII 4 and VII 2 to the north, and VIII 9 and VIII 12 to the south, for instance in Richardson 1988 (cover) and CTP II-V (covers). In Laurence 1994 and Zanker 1998 the street is still too straight, although it seems slightly less wide than in the other maps. In reality, this street is narrow and winding. The “common plans” of Pompeii are full of these kinds of errors. Note that the plans of Pompeii used in this analysis to illustrate various urban patterns include the same distortions as compared to the real street pattern.} The large and detailed \textit{CTP-map} is larger than any other map of Pompeii, but it is still too small for a detailed study based \textit{only} on this map. For instance, it is not always possible to determine from the map whether an axial space passes or is stopped by a certain feature, such as a house corner. Also, the \textit{CTP-map} does not show any reconstructions of the unexcavated streets.\footnote{The large street map in \textit{EGB} presents the same benefits and problems as the \textit{CTP-map}, and was used as a complement in establishing the axial map.}

3.2.2. The unexcavated area

When it was not possible to sight and walk along an axial space due to unexcavated terrain, we used a compass to determine possible street directions starting from excavated intersections. The assumption used is that streets always continue as straight lines if there is no evidence to contradict this. The pattern of streets and insulae in the unexcavated areas has been assumed to be similar to that of the neighbouring areas. To create a working hypothesis we have not assumed any unknown subdivisions of insulae, side streets or large open spaces.

A special problem was, whether or not there existed a street following the inside of the town wall (an \textit{agger} street, as agger is the name for the town wall) as this area is only partly excavated. We have assumed such a street in areas where there is some evidence of a passage between the town wall and house blocks – that is, in the northeast and southeast parts of Pompeii. The whole of the west and the southwest parts of the town, as well as the area around the amphitheatre, do not possess such a street.

In the northwest an agger street seems to have existed in an epoch prior to the last, but at some point it had been closed off from the rest of the street system. This is indicated by antique walls blocking the north-to-south streets,\footnote{From the west Vicolo di Modesto, Vicolo della Fullonica, Via di Mercurio, Vicolo del Fauno, Vicolo del Narcisso, and possibly Vicolo dei Vettii just west of the Castellum Acquae. Cf. Garzya 2007, describing an excavation looking for a street north of insula VI 2, which failed to turn up conclusive evidence. Anyway, from Sullan times onwards, the area between the wall and the houses was considered a dump.} and by windows and possibly walled up doors facing the subsequently blocked area immediately inside the town wall. Thus, between the
Porta di Ercolano and the Porta del Vesuvio no town wall street is included in the analysis.

3.3. The axial grid of Pompeii

Following the decisions described above, the axial plan of Pompeii was established, comprising 114 axial spaces, as shown in Fig. 16.

Here it is immediately apparent that the west part of Pompeii shows a more variegated pattern than the east part. The west areas of low to medium integration are crossed by highly integrated axial spaces, while the east is almost uniformly of high integration. In the west there also seem to be several segregated/low integration areas hemmed in by very integrated spaces, giving the impression of separate environments. Before discussing these, however, there is a phenomenon called the “spoked” or “deformed wheel” that first needs to be addressed.

![Fig. 16. The axial plan of Pompeii with integrations of axial spaces in fractions of 25%. Red lines = 76-100% most integrated, purple lines = 52-75%, blue lines 26-50% and green lines 0-25%. Arrows mark exits through town gates. Note that for the sake of clarity lines may cross each other distinctly, even if in reality a building would prevent one axial space from continuing on the other side of the intersecting space.]

3.3.1. The “deformed wheel” pattern

When Space Syntax is used as a tool for the analysis of settlements, a specific integration pattern may be identified that is often prevalent in the hap-
hazardly formed settlement as opposed to the planned district.\(^{90}\) This pattern is called a “deformed wheel” and consists of integrated axial spaces encircling an area containing segregated spaces. Other integrated spaces may cross the segregated, enclosed area and/or radiate out from this core or hub. Inside the hub, as well as between the radiating spokes, segregated axial spaces cluster. Ultimately, the spokes connect the encircling ring (the hub) to the settlement’s periphery and to the surrounding countryside.

This segregation of the areas inside the hub and between the radiating spokes must not, however, be taken as a wholesale equivalent of isolation. It was said above in section 2.2.2 that high integration of an axial space indicates a high potential for human movement. This means of course that strangers and visitors are most likely to be found moving along the most integrated spaces, which over time may well lead to the establishment of special activities geared to the flow of people (shops, restaurants, cult places etc.), increasing the flow of people even further. In the segregated areas between these spaces, the districts will often be more residential, or cater to strangers who in effect are turned into visitors. Strangers are thus brought to the rim of the segregated areas by the highly integrated axial spaces, which therefore function as a prime interface between inhabitants and strangers. Leaving the most integrated spaces and going into less integrated areas, strangers would have become the guests of specific inhabitants, or the knowledgeable customers of specific goods. Any segregated area in a spatial system retains this quality, while highly integrated axial spaces cutting through segregated streets guide a more random stream of people along these axial spaces.

The totality of the axial grid of Pompeii does not show us a deformed wheel pattern of the most integrated spaces. Instead the seven most integrated spaces result in the pattern in Fig. 17, faintly reminiscent of this deformed wheel in that there is an enclosed part and spokes radiating outwards and/or crossing the enclosed area. Even this faint pattern emerges only if one picks out the seven most integrated spaces. Adding extra spaces blurs it more with every space. Consequently, if one draws a grid of the 10% or 25% most integrated the axial spaces, this pattern disappears. Nevertheless, this very vague pattern builds up around the northeast part of what is usually called the “Old Town”, held by most researchers to have been the original, unplanned settlement of Pompeii (see below 3.3.2), and two adjoining areas.

This rather large area, completely hemmed in by high integration spaces, is thus encircled by streets with the potential of being an important interface between stranger and inhabitant, and the high integration spokes leaving it.

\(^{90}\) Hillier 1989 deals specifically with this pattern, esp. 10-11. Cf. also Hillier 1985, 174-177. In Hillier & Hanson 1984, 115 the pattern for the French village Gassin is shown, although this specific terminology is not used. The same goes for the thorough description of integration patterns given in Hillier 1996, 149-181, cf. also 366.

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3.3. The axial grid of Pompeii

Fig. 17. The seven most integrated axial spaces in Pompeii encircle the shaded area or cross it, and continue outwards like the “spokes” of a wheel.

are the conveyor belts to and from this interface centre, forming other important interfaces of their own.

In a town where the streets form a regular grid, there would be no such pattern, since most streets would have roughly the same number of connections and the integration values would therefore be regularized. Due to the large grid-plan neighbourhoods in the northwest and the east of Pompeii the pattern we see is not very distinctive. The faint remnant of the “deformed wheel” exists because of the irregularity in the street pattern in the west side of the town. The fact that this irregularity has its focus in the “Old Town” is an old truth, but it merits looking at this area a little closer.

3.3.2. The segregated areas

Areas of the so-called Old Town

A striking characteristic of the Old Town area is that it actually forms its own “deformed wheel” within the larger context of Pompeii.

Looking at the southwest part of the hub discussed above, one can see within it a clearly defined area (A in Fig. 18) of very segregated streets, which are confined by the Forum to the southwest, the Via dell’Abbondanza to the south, the Vicolo del Lupanare to the east, and the Via degli Augustali...
to the north. This area coincides with what is considered the northeast part of the Old town.

On the south side of the Via dell’Abbondanza there is the next segregated Old Town-area (B in \textit{Fig. 18}) extending to the steep cliff in the south. It is bordered by the Via delle Scuole in the west and by the Via dei Teatri in the east. The south side lacks a defined border.

Correspondingly, there is also a southwest segregated area (C in \textit{Fig. 18}) that extends to the south and west cliff faces, and is bordered in the north by the Via Marina and in the east by the Via delle Scuole.

Lastly, the northwest section (D in \textit{Fig. 18}) goes on to the end of a plateau in the west, below which some buildings cling to a steep slope down to the west harbour. The north and the west limits of this area are made up of the Vicolo dei Soprastanti and the Vicolo del Gallo, respectively, while the east side is hemmed in by the Forum and the south side by the Via Marina.

All of these four segregated areas are crossed by the integrated axial space extending along the Via di Mercurio/Via del Foro/Forum/Via delle Scuole from north to south, and the integrated axial spaces following the Via Marina/Via dell’Abbondanza from west to east. Another axial space of high integration crosses the Forum in the direction of southeast to northwest, continuing northwards in the Vicolo delle Terme.

\textbf{Fig. 18.} The hypothetical \textit{deformed wheel} pattern for an earlier Pompeii, when the town consisted of only the “Old Town”. The thick, grey line roughly encircles the hub and the spokes of the remnants of this wheel. The inner, segregated core of the town consists of four areas, A to D.
3.3. The axial grid of Pompeii

The Old Town – an older “deformed wheel”

Now, if these four areas really are the hub of a “deformed wheel” pattern, they have a lower integration level than the seven-line pattern discussed above (Fig. 17). For the encircling rim and the spokes to have had the high integration usual to these phenomena, one would first have to strip away the grid plan neighbourhoods. But as this still would make an incomplete pattern with parts of the south and west sides of the deformed wheel undefined, there are some other things to consider.

The northeast and east parts of the hub seem to show the pattern in its clearest form. The wheel’s rim would be the Via degli Augustali and the Vicolo del Lupanare, continuing in the Via dei Teatri. The “spokes” of this part are represented by the Via del Foro, the Vicolo Storto, the east bit of the Via degli Augustali, the Via dell’Abbondanza and the Via del Tempio d’Iside. All of these are made up of medium to high integration axial spaces.

In the south and west there are sheer cliffs and slopes, and here there is no trace of high integration axial spaces encircling the segregated area – in fact there seem to be no axial spaces encircling them at all. One explanation could be a building programme in the south and west areas. Around 50 BC, a large area in the extreme southwest was extended, built up and given over to the sanctuary of Venus, superseding older buildings. At the same time the Forum was extended to the south across the Via Marina/dell’Abbondanza, and at this new Forum limit three administrative halls were erected at the cost of domestic quarters. The basilica likewise superseded normal insulae. Assuming an earlier, mostly non-official, urban fabric in this area would probably mean that there was at least one east – west street and two or three now obliterated north – south streets here. There is a possibility that the Vicolo del Gallo had continued south-eastwards over the Via Marina to join up with some other street, possibly the Vicolo della Regina, and thereby actually creating an integrated rim.

Anyway, the early southwest area must have been accessible from the Via Marina in some way, which would cause the integration of the Vicolo del

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91 Carroll 2008, 1. Carroll’s team places the start of construction of the temple platform in the period after 89 BC, since the town walls would not have been demolished before that date, and bases the actual dating on pottery found in the terrace deposits.
92 Dobbins & Ball (2005, 68) date the south colonnade of the Forum to the 80s BC. Richardson (1988, 145-146, 263) dates the south colonnade to between the end of the 2nd century BC and about 60 BC; Zanker (1998, 55-56), gives a date between 89 BC and 80 BC, when Pompeii became a Roman colony.
93 Ohr 1991, 4-6: when the basilica was built, it caused some small streets in the area to the south and southwest of the Forum to be either cut off or obliterated. The basilica is dated to 150-100 BC by Ohr (1991, 1), but is seen as an integral part of the Sullan Forum programme by Dobbins & Ball 2005, 72.
94 Eschebach & Eschebach 1995, 35 and figs. 8:1, 8:2. The harbour gate in the west (predecessor of the Porta Marina) had earlier been situated on top of the steep incline to the city. It had been moved down towards the harbour later, as the town walls were rebuilt. This fits in with the Vicolo del Gallo being part of a road just inside or outside an ancient boundary.
Gallo – whether continuing southwards or not – to rise, creating a perfect wheel rim at least in the northwest, complete with a spoke (the Vicolo del Farmacista).95

This permits us to reconstruct more than half of a spoked wheel and to hypothesize its remaining part. And in AD 79 the Via degli Augustali was still dense with shops, and the Vicolo del Lupanare had its brothel – reminders of the streets’ role as “hub interfaces” earlier on.

These remnants of an old “deformed wheel” are in themselves a strong indication of the development of Pompeii from an ancient nucleus. The form of the early town may have been that of a small settlement within a large area already encircled by town walls, as suggested by Geertman.96 The streets encircling the “hub” would then have been an important interface between the small town’s inhabitants and the visitors that passed the outer ramparts. If the small nucleus also had its own town wall, as suggested by Eschebach,97 hub streets would have followed these walls either on the outside or on the inside, later perhaps merging with the empty space created as these walls were obliterated. Of course the possibility of an early, unwalled settlement is also possible.

This segregated ancient core or “hub” is cut through south to north and east to west by integrated spaces, emphasizing the existence of the Forum. Thinking of a time when neither the northwest part of Pompeii (Regio VI) nor the large east part beyond the Via del Vesuvio/Via Stabiana was yet in existence, admittedly the integration values of the then shorter and less connected dividing spaces would be lower in absolute terms.98 The rebuilding of the Forum area at different times would also have changed integration patterns, but the division lines and the axial spaces encircling the hub would still have stood out with high integration. Thus, here we have interfaces that allow strangers and inhabitants to meet spontaneously in the heart of the town and at the edge of its segregated areas.

We may conclude that we can see the outlines of a deformed wheel pattern – underlying and influencing the later, less clear pattern – in the southwest part of Pompeii. In syntactical terms this strengthens the hypothesis of the Old Town as some kind of original settlement, and the idea that this original settlement to a significant part was not a planned urban grid.

The area of the “spokes”
Eschebach has suggested that the large insulae intermediate between the ancient core and the planned town are remains of a pomerium, a sacred zone

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95 Integration rises with the number of connections to other axial spaces, more so if these in their turn are well connected.
96 Geertman 2007, 84, 87.
97 See, for instance, Eschebach & Eschebach 1995, 36, 43, 103-104, fig. 7.
98 Geertman 2007, 87-88 sees Regio VI as Forum-oriented, with the Via di Mercurio belonging to it as an axis.
outside the town, left empty even when planned areas grew up further away, and only filled in with houses later. Geertman also thinks that these areas were built upon late in the growth process of Pompeii. It seems likely to me that these areas were once irregularly built upon, and that what structures there were had clustered along the spokes conveying people to the prime interface of the settlement.

The amphitheatre area
In the southeast of Pompeii the amphitheatre is situated in an area that is more segregated than the rather highly integrated east part of the grid plan. This popular place could be disruptive for the town’s tranquillity, as evidenced by the famous wall painting depicting a brawl between the Pompeians and the visiting inhabitants of Nocera. A segregated area minimised the risks of such a brawl spilling out into the town. For further good measure the segregation could be made almost total: streets leading to the area from the integrated thoroughfares had portals possible to close with heavy doors. Thus, here we find segregation as part of conscious planning.

The area northeast of the Porta di Stabia
Northeast of the Porta di Stabia, there is a small area with low integration values. It is characterised by some irregular insulae and small dead-end lanes, which are not part of the eastern grid plan and are only partly made to conform with the belt of regular square insulae on the east side of the Via Stabiana. A neighbourhood like this either indicates that planning schemes were adapted to pre-existing buildings or land use, or that the schemes were invalidated by undoing or changing them later on. Either way this is an indication of a special, self-contained area, perhaps to do with a specific productive/commercial activity.

3.3.3. The axial integration of the grid-planned areas
A grid plan with regular blocks creates large areas of roughly identical integration (cf. above 3.3.1). Only where the grid connects to irregularly formed areas or to the outside of the system is there significant variation. The most typical example of this is the east half of Pompeii.

East of the Via del Vesuvio/Stabiana
In the east there is a significant grid plan section with uniform, oblong insulae surrounded by streets. Here the northwest-to-southeast axial spaces show

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100 Geertman 2007, 88.
101 A reproduction can easily be found on the Internet, see for instance http://en.wikipedia.org/wiki/Amphitheatre_of_Pompeii.
a uniform high integration, while the southeast-to-northwest axial spaces either have an even higher integration or a slightly lower. An assumption that the northwest-southeast streets also were important traffic routes would be mistaken – the regularity here skews the values positively. The phenomenon can be seen as the regularity masking differences and equalising the relative importance of a set of axial spaces to the totality of the system. If one focuses on the southwest-northeast spaces, we still can see a high integration framework encircling more segregated areas.

The northwest – Regio VI

The phenomenon of uniform integration values recurs in Regio VI in the northwest, but here the uniformity is on the segregated side of the scale. This is due to the absence of an intramural street in the north, creating a series of dead-end alleys, dominated by residential insulae. This area is cut by the highly integrated axial space following the Via di Mercurio/Via del Foro/Forum/Via delle Scuole, which poses a problem of its own and will be addressed below.

3.3.4. The most integrated axial spaces

Above (section 2.2.2) I discussed the high integration values of those axial spaces which are directly connected to many intersecting spaces and indirectly connected to many more. All integrated spaces per definition share this characteristic. Beyond and behind this connectedness, there lie various reasons – different societies and different urban environments create integrated axial spaces in certain circumstances.

This need not be a conscious process, although it may be (Bill Hillier planning a cityscape would certainly be conscious of the parameter, but it is unlikely that Hippodamos from Miletos was), but it is not a mysterious quality. There are circumstances in which a planner, a city council or simply a group of people building a village might think it is preferable to let a street be well connected at different levels, or they may seek some other quality that entails this connectedness – they may, for instance, wish to connect all later streets to the original street along which their settlement originated. The question that may be asked of an urban environment is thus not why a street

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102 On integration, see section 2.2.2.
103 In terms of intelligibility – another Space syntax parameter (number of connecting spaces /integration value) – these streets would also get high values, which denote the good visibility along them and the easy understanding of the grid plan structure.
104 In Fig. 4 it can be seen that there is an “extra” axial space linking the Vicolo dei Vettii to the Castellum Acquae square. If one leaves this axial space out because the Vicolo is connected to the grid further south this would put the Vicolo dei Vettii on a par with the dead-end alleys further west, making it an “artificial dead end”. To avoid this problem when establishing the axial plan, an extra, linking axial space was added in situations such as this.
is integrated since this depends on mathematics, but rather *how integrated streets are placed and used* in their context.

In Pompeii very long streets with highly integrated axial spaces and good visibility along them are usually directly connected to the carrier (except the anomalous grid-plan streets to the east) by their longest axial space or by a shorter axial space that runs parallel to this for some distance before passing out through the gate. This is true for the Via del Vesuvio/Via Stabiana, the Via Marina/Via dell’Abbondanza, the Via di Nola, and the Via di Porta Nocera. The axial spaces of these streets connect with other highly integrated axial spaces and are easy to use both as direct thoroughfares and thoroughfares in two syntactic steps.

Two of these long, highly integrated streets with good visibility stand out as anomalous in this context. They are the Vicolo di Mercurio and the Via di Mercurio/Via del Foro/Forum/Via delle Scuole (hereafter called Via di Mercurio), which both lack a direct carrier connection or a carrier connection by a shorter parallel axial space.\(^{105}\)

Of these two spaces the Via di Mercurio crosses the Forum, but to the north it cuts through the segregated Regio VI and ends up blindly against a tower of the town wall. In the south it again passes through a segregated neighbourhood and ends in the corner of a small alley. The axial space is spectacularly emphasized. Situated along it are two arches, one at the northern perimeter of the Forum and one in the intersection with the Via delle Terme. As it crosses the Forum, it is flanked by the east Forum colonnade and its décor, as well as by the temple of Jupiter to the west. The view along the axial space from the south ends with the imposing backdrop of the tower in the town wall, giving the illusion of a vast cityscape with a great deal of important architecture and bearing a likeness to imperial Rome.\(^{106}\) Why has this street, leading from nowhere to nowhere, been invested with the connectedness that gives it one of the highest integration values in Pompeii, and why has it been so emphasized by architecture?

The potential inherent in the integration value creates an important movement axis, and it draws the stranger into it, creating an interface with the surrounding segregated areas. Had this effect at least sometimes been undesirable in the Via di Mercurio, it could have been cancelled out by a periodical breaking up of the axial space – portals that can be closed are a measure already encountered in Pompeii (see above 3.3.2). Instead, however, this axial space is enhanced by the creation of important vistas, so we may conclude that the quality was appreciated.

\(^{105}\) There are also a few shorter highly integrated axial spaces, some of which are east of the Via Stabiana and may owe their integration to the adjacent grid plan. The others are a space crossing the Forum and linking up with the Via Consolare and a space along the Via dei Teatri and the south part of the Vicolo del Lupanare.

\(^{106}\) Zanker 1998, 103, fig. 54 p. 106.
Drawing strangers/visitors to the Forum and letting them leave it as smoothly as possible would have been an obvious goal of ancient Pompeii, and the high integration of the axial space comprising the Via di Mercurio would have helped to accomplish just that, but not with the same efficiency as a street connected to the carrier would have done. Moving along the interface of the street, people would inevitably have ended up in Regio VI or in the Via delle Scuole. No intense commercial areas catered to needs (although there were some tabernae, as there always are in Pompeii), and there was no way for people to exit the town by a gate – in fact, in the north they would have made a detour and then probably gone back in their tracks, and the same applies to the south, unless they braved the maze of staircases and tunnels leading to the extramural quarters clinging to the south cliff face.

A tentative explanation for the existence of an integrated street here is that there was once at least a pedestrian gate in the north. Even if this small town gate was later closed, a traditional importance for this route as an access to the Forum area might still have been perceived. Another explanation, not precluding the previous one, is that there in fact was an important interface between inhabitant and stranger along the Via di Mercurio outside the Forum, albeit an interface that was not commercial – maybe this was the town’s showcase, where the lifestyle of the rich was on display. Or was the street designed with some other special purpose in mind? This aspect will be explored in Chapters 4, 5 and 6 below.

What about the Vicolo di Mercurio? It has been suggested that the Vicolo di Mercurio once led directly to a town gate in the west, accessing the west harbour, and this carrier connection would have made it conform to pattern. But after this gate was walled up and built over, we actually do not know if high integration was seen as a desirable quality.

It should be noted that the Vicolo di Mercurio, continuing east as the Vicolo delle Nozze d’Argento, traverses unexcavated areas, which means our knowledge about the street has a severe lacuna. There is a possibility that, in the unexcavated area, integration and concomitant flow of traffic could have been lessened periodically by closing off intersections, decreasing a traffic flow northwards from the Via di Nola and the Via dell’Abbondanza. Alternatively, the characteristics that made high integration desirable could still be hidden here.

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107 Pesando 1990b, 218-220; Eschebach & Eschebach 1995, 47-48, 103-104, fig. 7. Pesando gives a summary of the results of the excavations by A. Maiuri, regarding the town walls with their different building phases and dates. An early north gate at the end of the Via di Mercurio, at the place of tower XI in the later wall circuit, has been identified. It existed in the city walls built in the 5th century BC, but was later closed. It may have been only a pedestrian gate.

108 Eschebach & Eschebach (1995, 83, 89, 96) discusses a possible town gate on the west side, at the site of VII 16.17,20-22, which once led down to the circuit road outside the walls.
3.4. Summing up the axial analysis

The axial analysis highlights a contrast between grid-planned areas and more irregular insulae, the latter forming a pattern of the “deformed wheel” type in the area of what is called the Old Town. This pattern is obscured by a vaguely similar but much less clear pattern if the whole of Pompeii in AD 79 is taken into account. This suggests that there actually was an earlier, more irregular, town nucleus, in spite of some researchers having a different opinion.\(^{109}\)

The planned, regular areas in the north-west and the entire east part of the town create large areas with similar integration values. This obscures patterns on a lower level, but it also exhibits differences between the planned areas, the northwest planned section being more segregated in the interior than the east.

The extremely segregated area around the amphitheatre was a planned feature, part of the grid plan town areas. Another small segregated area may be due to an unravelling of the town plan over time.

An interesting feature is the high integration and the singling out in architectural terms of the Via di Mercurio, although this axial space has large non-commercial stretches and no direct access to a town gate, which otherwise is part of a pattern for long, highly integrated streets. This axial space will be thoroughly discussed in the following chapters.

3.4.1. Choice of axial spaces for further analysis

In choosing axial spaces for further investigation, I opted for the axial space along the Via di Mercurio since it is an anomaly in Pompeii and should be able to tell us more about the use of exterior space.

I also wanted to include a very highly integrated axial space and therefore chose the Via del Vesuvio/Via Stabiana for this. Along this street there are several axial spaces which together will compose part of the study in the form of what I call a movement axis (see section 2.2.1: Axiality as used in this analysis).

Lastly, a segregated axial space should also be included for purposes of comparison, and this is the Vicolo del Fauno.

\(^{109}\) Laurence 1994, 16.
4. The interface between buildings and public space: constitutedness, permeability, and type of interface between interior and public space along three movement axes

In this chapter I will present a study of the types of buildings lining public space along three streets in Pompeii. As stated in the previous chapter, the Via del Vesuvio/Via Stabiana (henceforth Via Stabiana), the Via di Mercurio/Via del Foro/Forum/Via delle Scuole (henceforth Via di Mercurio), and the Vicolo del Fauno (see Fig. 19) were chosen for this investigation because they showed up as interesting in the axial analysis.

4.1. Theoretical and methodological starting points

4.1.1. Aim and main questions

The aim of this chapter is to investigate the potential for human interaction between the public space of the street and the interior space behind the doorways bordering it. Furthermore, the possible existence of zones dominated by different types of activities will be explored (for instance, blocks or streets dominated by certain kinds of dwellings, shops and/or manufacturing establishments).

The investigation concentrates on the following questions, dealt with in subsequent sections:

- How dense was the distribution of doorways facing the convex spaces along the three chosen streets? The activity in a street is to a large extent determined by the number of doorways opening into this street, allowing people to pass in and out and generating both movement and stationary activities. Measuring this density of doorways along the street, and comparing different streets and sections of the same street, is thus a key feature in this chapter.
- What was there behind the doorways? They could lead to spatial units used for living, commerce, manufacturing or various public activities. The units could be small or large, representative or simply domestic. I
group interior spatial units according to their type, to find out what kind of activity might have dominated a certain area.

The Space Syntax method is used both for the segmentation of the three streets analysed and for the classification of the buildings lining these streets and sharing an interface with public space.

The key concepts and definitions of Space Syntax, as well as the way in which I use the method, are more thoroughly discussed in Chapter 2. Here, I will provide only a short summary with references to the sections where there are more thorough discussions.

4.1.2. Basic concepts and considerations for spatial analysis

The differentiation of exterior public space and interior space is, of course, the most basic analytical tool. Public space is in this analysis equated with exterior space, accessible to basically everyone. Interior space is the term used for everything situated behind doorways. Usually this is private space, but the occasional public building is also classed as interior space.

On the next level, the most important entities in a Space Syntax analysis of an urban setting are the concepts of convex space and axial space. These concepts can be used to analyse either the public or the interior space.110 Thus, the open, public space of a town or a city, as well as the layout of a building, can be broken down into its constituent spatial segments, its convex spaces. The convex spaces making up the three different Pompeiian streets studied – Via Stabiana, Via di Mercurio and Vicolo del Fauno – are at the focus of this discussion.

Alongside the convex dimension there exists a dimension of axiality, showing the potential for movement within the public space. Axial spaces string together the convex spaces into a net encompassing the entirety of the system analysed, in this case Pompeii inside the walls. People thus move from convex space to convex space in their journey through the axial dimension, passing through specific areas of public space. Along the way houses and shops have their openings, people come out into the street or leave the street and move indoors. Sometimes activities, either across the open doorways or outside in exterior space, attempt to draw in the person passing by, but at other times they exclude him, letting him be a mere spectator.

For these axial spaces a value denoting integration is calculated, which may be defined as a way to describe how important a certain axial space is for the totality of the investigated structure of open space. One aspect of the different character of various areas is the interaction between the convex spaces and the differently integrated axial spaces.

110 See sections 2.2.1 and 2.2.2 for Space Syntax theory about axial and convex spaces. The axial analysis of Pompeii is presented in Chapter 3.
The choice of streets or movement axes for analysis

When constructing the axial grid of Pompeii, it was clear that the Via Stabiana was a well-defined north – south street, where one specific axial space crossed nearly all the convex spaces. This axial space also had a high integration value and thus a high potential for movement and traffic. This is not surprising, as the Via Stabiana connects two town gates, Porta del Vesuvio in the north and Porta di Stabia in the south, and intersects with the important east – west arteries of the Via dell’Abbondanza and the Via di Nola/Via della Fortuna and the axial spaces running along them. Along the Via Stabiana there are also other parallel axial spaces, and the last part of the street to the north has its own, separate axial space. Since the analysis concerns one street, but several parallel and consecutive axial spaces, I chose the term *movement axis*\textsuperscript{111} for the area analysed – this is thus the *Stabiana movement axis* or *Stabiana MA*.

In contrast to this, there are no consecutive axial spaces along the Via di Mercurio, although here too the main axial space is paralleled by another space in the south part. A small and segregated axial space connecting the convex space in front of a marble workshop is also included. The Via di Mercurio has no direct access to the town’s extramural environment but still gets a high integration value. Exploring the differences and the similarities between the Via Stabiana and this street is thus of special interest. The spatial environment of the Via di Mercurio is called the *Mercurio movement axis* or *Mercurio MA*.

To highlight additional differences and similarities between different kinds of public space, I also chose the Vicolo del Fauno, a so-called back alley with a low integration value and thus a segregated part of the public space. This is called the *Fauno movement axis* or *Fauno MA*.

The movement axes chosen are shown in Fig. 19.

\textsuperscript{111} Parallel axial spaces are a result of the articulation along the street. When the street is broken down into separate segments (convex spaces) some of these spaces can only be linked to the axial grid by axial spaces being parallel to one another, see section 2.2.1: Axiality as used in this analysis.
4.1.3. Main sources of the survey

4.2. The three chosen movement axes and their permeability

4.2.1. Permeability as a means for understanding the interface between public and interior space

A convex space with many doorways to interior spatial systems offers a more extensive interface between public and interior space, and concomitant with this a more intense interaction over the interface. To characterise this interface between outdoors and indoors, one often uses the measure of constitutedness\textsuperscript{113} (number of doorways/convex space) in Space Syntax. Constitutedness, however, does not capture the density of doorways in the interface, and thus it says nothing about how permeable a convex space was in comparison with another. To be able to compare spaces of different sizes, the measure of permeability was developed, defined as the number of doorways/10 m wall length in a specific convex space.\textsuperscript{114}

Why is the permeability of the interface important? Even without knowing exactly what lies behind the doorways, it is clear that a higher number of interior spatial units can be accessed from a very permeable convex space than from a less permeable one. This means that more people will be headed to this space to pass into the interior units behind the walls – these people are the inhabitants of the interior spaces and they are the specific strangers that will eventually be invited in as visitors.\textsuperscript{115} The same people will also leave the interior spaces through the doors in this convex space. This coming and going means that there are more inhabitants and visitors frequenting a convex space with high permeability than a space with low permeability.

The number of strangers that are not invited into the interior spatial units, the passers-by, will not increase merely because there is high permeability,

\textsuperscript{112} Table of interior units, http://urn.kb.se/resolve?urn=urn:nbn:se:uu:diva-153180.
\textsuperscript{113} See section 2.2.4: Constitutedness.
\textsuperscript{114} See section 2.2.4: Permeability.
\textsuperscript{115} For definition of inhabitants, strangers and visitors, see section 2.2.4: Inhabitant, stranger and visitor in public space.
though it might increase as a response to a specific permeability attractive to them. What increases the potential for passing strangers is axial integration, and the more highly integrated axial spaces that cross a convex space, the stronger the traffic will be. This increase in traffic should, of course, be thought of as pedestrian movement, as carts were prohibited in Roman towns during daytime.116

The simultaneous existence of a high permeability and highly integrated axial spaces that cross a convex space would thus make for a space where there was a strong presence of both inhabitants and strangers and thereby the chance of many different types of interaction between people.

4.2.2. The Stabiana movement axis and its permeability

The Stabiana movement axis traverses Pompeii in a north – south direction, from the town gate of Porta del Vesuvio in the north to the Porta di Stabia in the south. It inclines southwards along the entire stretch and forms a communication artery from the cultivated land on the slopes of Vesuvius to the main harbour, primarily reached by the Porta di Stabia.117

Most of the convex spaces along the Stabiana MA are threaded onto a single, long axial space, extending between the Porta di Stabia and a point on a structure just to the east of the actual opening of the Porta del Vesuvio. This is the most important axial space of the Stabiana axis, and the third most integrated axial space of Pompeii. It intersects with 16 other axial spaces. An intersection with an axial space does not always coincide with an intersection with another street, but a total of 12 streets intersect with the Stabiana MA.118

Figure 20 shows the convex and the axial spaces along the Stabiana MA. As can be seen, the long axial space presented above does not reach all the way up to the Porta del Vesuvio. The northernmost axial spaces of the Stabiana MA are instead found on a low integration axial space that exits the Porta del Vesuvio and runs parallel to the main axial space for a short distance. There is also a third, roughly parallel, axial space, which links the terrace in front of the theatre to the MA. The convex spaces along these two axial spaces are included in the analysis of the Stabiana movement axis.

116 Chapter 6, section 6.5.
117 Eschebach & Eschebach 1995, 2-4. See also Eschebach 1989, fig. 3, p. 41. A short summary of theories concerning changes in the coastline outside Pompeii is found in Stefani 2002, 11-12.
118 A small axial space along an “angiportus” (I 3.8) was not included in the axial map and analysis, and can thus not be seen in my figures. Its existence as a public space or not does not influence the analysis in any significant way. If included, it would have been a very segregated space.
4.2. The three chosen movement axes and their permeability

Fig. 20. Diagram (not to scale) showing the convex and the axial spaces along the Via Stabiana. Each section in the diagram starts in the north on the left side and goes southwards to the right. Grey spaces are inside the town gate structures and not part of further analysis. Percentages below refer to 25% fractions of the values of axial integration in Pompeii, and are shown as lines with decreasing thickness.

- = axial space with integration in the top 25%
- = axial space with integration in the second highest 25% group
- = axial space with integration in the second lowest 25% group
- = axial space with integration in the lowest 25%
In this analysis the Stabiana movement axis consists of 47 convex spaces, defined as described in section 2.2.1. The spaces are numbered from the north to the south, starting with S1 to the north (the first assessment was in some instances modified, resulting in labels like 10a, 10b and 10c). In the analysis I work my way from north (low numbers) to south (high numbers) when discussing different characteristics of the convex spaces. The analysis includes every convex space threaded onto the three axial spaces mentioned above. This entails that some convex spaces within the Stabiana MA are parallel with each other. In Figs. 20 and 21 such spaces are schematically shown as adjacent to convex spaces threaded onto the main, long axial space.

Five of the convex spaces along the Stabiana MA are placed within the vaults of a town gate and therefore cannot have an interface with the interior spaces bordering the street. These spaces are not included in the analysis. Other spaces incorporate street intersections and are either spread out along the intersecting street, or consist of a spatial segment that comprises the intersection proper and has almost no confining walls. But most of the convex spaces are placed one after the other along the street, like beads on a string. They are bordered by walls with or without doorways to interior spaces or by open boundaries to other convex spaces.

The permeability of the Stabiana axis is detailed in Fig. 21 below. Spaces were sorted into quartiles according to their permeability. These quartiles were determined on the basis of the Stabiana movement axis, and were not adjusted for the other two axes, in order for the numbers to be comparable with one another. This resulted in the following permeability groups shown in the figure:

1st group = 0 – 1.38 doorways/10 m wall length (yellow)
2nd group = 1.39 – 1.67 doorways/10 m wall length (orange)
3rd group = 1.68 – 2.32 doorways/10 m wall length (red)
4th group = 2.33 – 2.94 doorways/10 m wall length (brown)

Looking at Fig. 21, we can see that permeability shows a great deal of fluctuation. Permeability increases generally from north to south, so that the area south of the Porta del Vesuvio has a much lower permeability than the part of the street preceding the Porta di Stabia. Between the two town gates permeability does not rise uniformly, rather, there are a lot of fluctuations. A long stretch of uniformly high permeability covers the convex spaces S16 to S25.
4.2. The three chosen movement axes and their permeability

Fig. 21. Convex spaces and their permeability along the Stabiana movement axis, north to south. The figure is roughly to scale regarding the length of convex spaces, but not to scale regarding width.
Sharp rises or falls in permeability (i.e. two or three “steps”) are to be found in several places along the movement axis (between S10c/S11, S13/S14, S17/S18, S22/S23, S31/S32, S35/S36, and S36/S37) and will be discussed below.

What can be said already at this point, though, is that the highly permeable spaces had a high potential for interaction between people – they had the movement of strangers, since almost the entire Stabiana MA is situated along highly integrated axial spaces, and they had a large share of the inhabitants, who passed through the interface with interior space together with their visitors.

**Analysis of permeability on the Stabiana movement axis**

Most of the marked permeability shifts, seen above, are associated with street intersections. This does not mean that they always comprise intersections (like S10c/S11 or S31/S32), but they occur immediately before or after an intersection (S17/S18 or S35/S36, S36/S37). An intersection *per se* does not explain this: an intersection does not contribute walls with doorways, and thus it adds nothing and takes nothing away from the constitutedness or permeability of a convex space.

But a crossroads is also a place where axial spaces intersect. Here there exists the possibility for the flow of traffic along one axial space to increase/be increased by traffic flow from another axial space. It is important to note that such an influence is not a rule – depending on the character of the intersecting axial spaces an increase in traffic flow may or may not occur. Permeability fluctuation is, however, not confined to spaces near intersections, and even in intersections there may be other factors at work. Specific buildings may break up the convex structure of public space, and semi-private lanes may have a greater influence on permeability than is indicated by their “doorways”. The stretches of low permeability through spaces S26-S29 and S32-S35 thus also merit a closer inspection.

4.2.3. The Mercurio movement axis and its permeability

A single axial space extends along the whole of the Mercurio movement axis, threading convex spaces onto itself from Tower XI in the north town wall to the crossing of the Via delle Scuole and the Via Regina in the south, passing the Forum area on its way. In *Fig. 22* a diagram shows the convex and the axial spaces along the Mercurio MA. Just as for the Stabiana MA, there are some adjacent convex spaces included in the analysis, positioned parallel to the spaces threaded onto the main axial space in *Figs. 22* and *23*.

The axial space of the Mercurio MA is one of the most integrated in Pompeii and is interesting for several reasons. It does not connect directly with any of the town gates and in fact extends between the northern town wall and an insula façade in the south – but at the same time its high integra-
4.2. The three chosen movement axes and their permeability

The three chosen movement axes and their permeability singles it out. I have discussed this phenomenon earlier, as well as the possibility that this reflects an earlier town plan where there actually was a gate, at least to the north, and possibly at least some kind of pedestrian exit to the south. Furthermore, the axial space passes the Forum, the town’s official centre and also an important market area. Here, the convex spaces lie adjacent to several other convex spaces with wholly permeable borders in between. These parallel spaces in their turn share a border with interior public or semi-public spaces (the Eumachia building, the Macellum etc.), creating a massive, interwoven interface between different exterior public spaces, between exterior public and interior public spaces, and between exterior public spaces and interior private spaces of various kinds. This area is excluded from the analysis, as it makes up a difficult and unique environment in Pompeii, the study of which is far beyond the scope of this chapter.

The Mercurio movement axis breaks up into four larger parts: the north section, commonly called the Via di Mercurio (spaces M1-M6), the commercial section of Via del Foro (spaces M10- M12), the Forum proper and the Via delle Scuole in the south (spaces M25 and M26). All these special conditions also make for an interesting comparison with the Stabiana axis.

![Diagram of the Via di Mercurio](image).

**North**
- Vicolo di Mercurio intersection
- Forum area, not analysed

**South**
- Via della Fortuna/delle Terme intersection
- M10, M11, M12 commercial center
- Via degli Augustali intersection
- Main axial space on the Mercurio MA, goes from M1 in the north to M24 in the south. The parallel axial space originates in the convex spaces of the Forum.
- Forum area, not analysed

Fig. 22. Diagram, not to scale, showing the convex and the axial spaces along the Via di Mercurio. Each section in the diagram starts in the north on the left side and goes southwards to the right. Legend, see Fig. 20.

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119 Section 3.3.4.
The interface between buildings and public space

Analysis of permeability along the Mercurio movement axis

Eleven of the 26 convex spaces along the axis belong to the Forum area and are thus unique. Cult, recreation and civic buildings dominate the interface, but these Forum spaces also open onto two large commercial complexes, the Macellum and a covered market on the west side of the Forum. A second storey above the ground floor activities may have been used as living quarters in the vicinity of the Apollo temple.

Except for the Forum area, the permeability of the interface between public and interior space was investigated in the same way and with the same groupings as for the Stabiana axis.\(^{120}\)

On the Mercurio MA, long, consistent stretches share a similar permeability. Both the north part and the south part of the Mercurio MA consist of convex spaces with low permeability, and the north part has the lowest permeability. Just to the north of the Forum there is a dense area of high per-

\(^{120}\) See section 4.2.2 above.

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meability. The two street intersections to the north of the Forum area do not seem to be connected to any shifts in permeability at all. If one for instance looks at space M4, it has just as low a permeability as the spaces to the north or south of it. There are, however, three interesting phenomena on this movement axis that will be discussed below and compared with the permeability on the Stabiana MA.

4.2.4. The Fauno movement axis and its permeability

The ten investigated convex spaces are strung along Vicolo del Fauno, on an axial space extending between the earth bank on the inside of the town wall to the north and the far side of the intersection with Via di Nola to the south. The axial space is segregated, and it follows a back street with mainly rear entrances to houses and businesses. In Fig. 24 a schematic diagram shows the convex and the axial spaces along the Fauno axis.

![Diagram of the convex and the axial spaces along the Vicolo del Fauno.](image)

Fig. 24. Diagram of the convex and the axial spaces along the Vicolo del Fauno. Each section in the diagram starts in the north on the left side and goes southwards to the right. Legend, see Fig. 20.

The permeability of the interface between public and interior space on the Fauno movement axis was again investigated in the same way as for the Stabiana and Mercurio movement axes. The entire movement axis had a permeability in the lowest two groups, except for the convex space incorporating the intersection with the Via di Nola. This space has its largest extension along the cross street, and therefore does not primarily belong to the Fauno MA. The high permeability in this space does not spill over into the vicolo.
4.2.5. Summary of permeability along the three axes

There are significant differences among the three investigated movement axes. The Stabiana MA is on the average very highly permeable, but it also varies in permeability along its stretch. Its permeability is influenced by cross streets/axes to a high degree.\textsuperscript{121} Permeability in a general way increases towards the south on the Stabiana MA. It is a main thoroughfare, but nevertheless different areas of it will have seen a difference in interaction potential and interaction intensity. Most obvious is the increased permeability towards the south.

The Mercurio MA on the other hand is partitioned into distinct segments, with low permeability to the north and south hemming in the activities of the Via del Foro and the Forum proper. Cross axes are few outside the Forum area, and neither the Vicolo di Mercurio nor the Vicolo della Regina has a discernible impact. The axial integration of the Mercurio MA is obviously generated by the huge network of interrelated Forum spaces. The unique Forum area centres activities on itself, without them spilling over into neighbouring areas along the axis, except for the spaces M10 and M11 where there is a commercial, permeable area along the Via del Foro part. But even for the Mercurio MA it can be seen that overall permeability increases slightly to the south, showing a subtle difference in the city structure in the north – south direction.

\textsuperscript{121} The importance of intersecting streets, see, for instance, Eschebach & Eschebach 1995, 54 and Geertman 2007, fig. 4.7, pp. 86, 87.

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The Fauno MA is the least surprising, presenting the low permeability expected in a side alley, and with no impact from a cross axis, even if it is as busy as the Via dells Fortuna/Via di Nola.

It is tempting and interesting to formulate some hypotheses for further investigation of Pompeii, although they cannot be pursued in this study. Since both the Stabiana MA and the Mercurio MA show this increase of southwards permeability, the results suggest that in the rest of Pompeii highly integrated axes should show the Stabiana pattern – not many parallel spaces, and a permeability that is linked to crossing axial spaces and that increases in the southward direction. A very important activity centre like the Forum could create the Mercurio effect, attracting permeability to a specific part of a highly integrated axial space, but since the Forum is one of a kind, this pattern cannot be expected to recur.

The Stabiana pattern would become less significant with decreasing axial integration, dwindling to non-existence on axes with low axial integration, like the Fauno MA.

4.3. The activities behind the doorways

4.3.1. The interface between public and interior space

Up to this point, I have talked about the permeability of the interface between public and interior space, how it intensifies and thins out, and how it is possible to capture these fluctuations. But that is not enough – it generates the question of which kind of interface we are dealing with. In other words, what kind of activity is going on? It is easy to understand that commerce differs from a formal visit, and that unloading necessities for daily life is different from eating together at a take-away shop, but how is it possible to order and categorise all the possible kinds of interaction?

I have chosen to address the problem by analysing which types of interior spatial complexes have an interface with the convex spaces along the investigated axes.¹²²

The Roman world of Pompeii had different social conventions than our own society with regard to regarding living and working, and private and public, and furthermore much of what once was contained in the buildings (tools, furnishings etc.) has been lost. This means that classification of interior spatial units to a large extent will have to be based on the information inherent in the spatiality of the buildings and in the spatial requirements posed by Roman society on the representative domus.

¹²² For the number of doorways in a given convex space, i.e. constitutedness, and for the number of doorways per 10 m wall length, i.e. permeability, see section 2.4.
The theoretical reasoning for assigning spatial complexes to different categories is given in full extent in section 2.4.1. It underpins the analysis of the character of the different axes presented here. It is also an important prerequisite for the discussion on the functions of the different convex spaces, and how to capture the different qualities of space in Pompeii, which is the subject of the next chapter.

4.3.2. Categorisation of interior spatial units

The buildings that border the public convex spaces are here analysed as interior spatial configurations. Spaces (rooms, corridors, courtyards etc.) that are interconnected and that can be reached through one or several street doors are seen as belonging together and forming one interior spatial configuration. Such configurations are not analysed here according to their architecture, construction technique, their ownership or other juridical status, or their history, but strictly according to their spatial qualities and interconnections, and according to indications of use. The definitions used for different types of spatial configurations are used in order to simplify the analysis of exterior public space and do not go into detail regarding the interior spatial configurations themselves. What I want to achieve are definitions of simple versus complex, rich versus poor, living versus working, with the aim of using them in the categorisation of exterior space – not primarily to study the spatial features of each separate interior unit.

The classification is not about how richly and luxuriously a certain unit was furnished. It is rather about how certain spatial structures made representation possible, and how we can see that this possibility was turned into reality by status furnishings. Spatial suitability and representative (fine or even luxurious) furnishings must thus come together in order to be able to say that a domus saw representative use. This means that a finely decorated spatial unit, such VI 16.15.17, may still be classed as of doubtful representative use, since it does not fulfil the spatial demands that are judged as a prerequisite of such representation. Private luxury is not the goal of the study.

Spatial conventions – the circulation node as an important marker in Pompeii

I use a simplified version of several of the parameters defined by Grahame in his analysis of the Pompeiian houses, and discuss this more comprehensively in Chapter 2, section 2.4.1. One of the main points made there, was that interior spatial organisation in Pompeii incorporated a large amount of randomness, resulting in spatial configurations that differed significantly from one another in spite of unifying characteristics.\textsuperscript{123}

\textsuperscript{123} Grahame 2000, 45-49.

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This spatial randomness may come as a strong surprise for anyone studying the plan of Pompeii, since even a quick glance shows a glaring amount of similarities — indeed, there are many communal traits in the Pompeiian houses.

To avoid any possible misunderstandings it is important to state that these communal traits are often not spatial traits and do not have significance for the spatial configuration per se. A room equipped with certain features — such as a richly decorated fountain niche or an atrium complete with a roof opening and floor basin for rain water — is of course similar to another room equipped in the same way. But it may not be spatially similar — it may be connected to several other rooms, or it may be quite secluded, it may be entered immediately upon entering the house, or it may be reached in a round-about way deep inside the structure. The practical and aesthetic criteria of similarity are not less important than the spatial ones, but my ordering of spatial configurations into categories depends primarily on spatial criteria.

Grahame has shown that the guiding principle in Pompeiian buildings was the creation of central, distributing spaces, nodes, placed at some depth from the exterior.¹²⁴ Such nodes can be suitable for social activities and meeting other people, on account of their size and the character of the spaces that are directly connected to them, or they can be just passage spaces, distributors from which one may reach other rooms.

For my purposes it is sufficient to identify the number of nodes in a building to assess its complexity, and also to arrive at a first classification of houses into different structurally defined types. The node in an interior spatial configuration is here defined as a room with direct connections to four other rooms in the system, and is called a strong node.¹²⁵ Strong nodes that are highly convex and larger than surrounding spaces, and that are thus suitable for circulation and intrapersonal relations, are called circulation nodes.

Character rooms and representation nodes
To analyse the interface between public and interior space, it is also important to be able to distinguish between entities primarily used for work and entities primarily used for living.

The kind of “living” most easily distinguished is the representative lifestyle, based on a large domus equipped and decorated for the reception of visitors.¹²⁶ To be able to identify spaces with a representative character, I look for spaces defined as representation nodes: spaces that are strong

¹²⁴ Grahame 2000, 49-54.
¹²⁵ For an explanation of the use of the node concept, see section 2.4.1: Representative living – the representative node as a classifying device.
¹²⁶ The representative lifestyle in the Roman world is discussed in Chapter 2, section 2.4.1.
nodes, circulation spaces and character rooms at the same time. Such spaces made reception according to Roman cultural norms possible.127

To classify a domus according to its representative potential, it thus becomes important to see how many representation nodes there are in it. The possibility of actual use for representation of course increases with the number of representation nodes present in a domus.

To get a grip on different dwellings, interior spatial units are grouped into different categories. The letter L denotes living, and a number indicates the representative potential and thus the status.128

Different categories of living

Houses with more than two representation nodes make up the category of dwellings of the highest status, L3. Houses with two representation nodes make up the following group, L2, and houses with one representation node room belong to group L1. Houses in category L1 are not considered as representative.129 Interior spatial units that actually do have a circulation node, but one that is not a character room, are classified as LW2 and LW1 if some kind of commercial/industrial activity can be discerned. LW means “Living and Working” and expresses the fact that living and working were not separated into different spatial units.130

In the same way, small spatial units/flats without a circulation space are classed here as LW0 if they have at least four rooms, including a pergola, and if there is some indication of commerce or production. Those even smaller are classed as LW00.

Among the very small spatial configurations, we also find Pompeii’s upper storey flats.131 Not much remains of these today, but it is probable that upper storey flats were dominated by non-representative living, not coupled to other activities. Cenacula are classed as L0 or L00 in analogy with LW0 and LW00, but when there are no grounds for a specific assessment, the cenaculum is classed as L00. Ground floor units, with no indication of commercial or production activity, and without representation nodes and/or character rooms are also classed as L0 or L00 according to their size.132 Some-

127 See section 2.4.1: Identifying representative living.
128 Private houses often also had upper floors, of which little is extant today. If these were linked to an interior spatial unit which also had spaces on the ground floor, it would seem unlikely that the upper rooms incorporated representative spaces. Upper floors were often transformed from belonging to a domus to becoming independent rental flats, see, for instance, Pirson 1999, 36-40 for the Casa di Pansa. Private luxury is indicated by upper floor decoration, see Wallace-Hadrill 1994, 151-152.
129 See detailed discussion in section 2.4.1: Identifying representative living.
130 Wallace-Hadrill (1994, 137-141) discusses the elite houses’ association with commerce and production, sometimes even using the same spaces for these different activities.
131 Pirson 1999, 20-21, 55, 116
132 In cases where a classification as L- or LW-unit is complicated, the reasoning is detailed in Table of interior units.

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times it is necessary to split a single interior spatial configuration into two or more analysis units, each having a separate type of interaction over the interface with public space. A simple case in point is that shops/workshops are defined as separate units in LW-category, even if they are connected to a larger house. Such tabernae may very well have functioned as independent units, and they would in any case have generated a different kind interaction over the interface between exterior and interior space than the entrance to the house they “belonged” to.

When a spatial configuration has several street doors but shows no differentiated use, the configuration is treated as one. The main entrance in a L-category unit is identified by status signals (height, décor, benches for visitors, a well-planned sightline if the street door is open, etc. The main entrance for a shop/workshop is the entrance most clearly signalling the type of activity. All other entrances are classed as side doors.

4.3.3. Activities along the axes

Representing the distribution of interior spatial units

A graphic representation is the best way to see how the commercial, representative and other living units, as well as temples, recreation facilities and administrative units, distribute themselves along the movement axes, and to see whether the different convex spaces are dominated by an interface to a particular type of unit rather than another. Figures 26, 27, and 29 show the respective movement axes from north to south, with vertical sections representing the borders between the different convex spaces. The breadth of a segment represents the number of doorways in the convex space (the number of doorways is also given below), while the height sections represent different categories expressed as percentages. All segments have the same height, representing 100% of their doorways. This immediately shows the constitutedness of a space – the longer the space, the more constituted it is. This does not, however, capture the permeability or actual size of a convex space.

To mark the different categories of internal spatial units, different colours were used. The categories L3 and L2 (representative living) were grouped together as large representative units, but in a discussion of specific convex spaces the actual category of a unit may need to be discussed. Likewise, non-representative living units L0 and L00 were grouped together with L1 (ambiguous, but unlikely to have been representatively used). This captures the main difference between representative living and non-representative living

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133 See section 2.4.1: The complex interior spatial units with several functions.
134 Pirson 1999, 55.
135 Laurence 1994, 100-101, fauces entrance contra taberna door; 88-89, side doors.
without too much detail obscuring the picture. Side entrances (subordinated interfaces) to all kinds of living units are shown as a specific category.

The LW-units are treated in the same way, with LW2 and LW1 subsumed in one group of “large establishments” that are distinguished by having one or more circulation nodes. It is precisely the circulation node that sets these units apart from the rest, meaning that one or more large controlling spaces/rooms existed to monitor work and other activities. This monitoring and information centre with a high control value means that these units had a greater likelihood of housing more complex and thus commercially more important activities. The interior units without such a space, LW0 and LW00, are grouped together, and if there are small units labelled only with a “W”, they are entered here, too. Again, in discussing specific convex spaces the more detailed categories may have to be used. Side entrances (subordinated interfaces) to all kinds of living and working units are shown as a specific category.

Entrances to temples and cult areas, to recreation facilities, and to civic buildings are listed in their own categories and not differentiated according to spatial characteristics. These buildings are relatively few, but their impact on the interface between public and interior space, and on the organization of public space, may be huge. In these cases, this impact is discussed in detail below and need not be specified in the figures. Side entrances to all of these buildings are in a single category.

4.4. Living and working along the Stabiana movement axis

Looking at Fig. 26, it is clear that the Stabiana axis in its entirety is dominated by commercial and productive activities, mainly of the small-scale type. Pure living units without representation are mixed in with these activities, and there are some instances of the representative domus. If one disregards the convex spaces that lack an interface with interior space (inside the structures of the town gates, and S10c), there are 41 convex spaces along the Stabiana MA. Fifteen (36.6%) of these are spaces entirely dominated by commercial/productive activities, and no purely domestic units can be identified facing them. In 23 spaces (56%), 80 % or more of the entrances belong to commercial/productive activities, and nowhere does the purely domestic interface exceed 50%. Larger commercial/productive establishments (LW1 or larger) are found in only 15 spaces (36.6%).

The Stabiana MA is thus an intensely commercial part of town. There is also a significant amount of non representative living here, spatially separate from the commercial/productive activities. Large enterprises and representa-
4.4. Living and working along the Stabiana movement axis

tive houses are fewer, but nonetheless there is a sprinkling of them, and the representative houses coexist with all kinds of other interior spatial units.

North

South

Fig. 26. Distribution of doorways/activities along the Stabiana movement axis, north to south.
4.4.1. The representative houses along the Stabiana axis

Representative houses (L2-L3) exist in 21% of the convex spaces on the Stabiana axis. In Fig. 26 it can be seen that these houses never dominate any convex space but instead always coexist with other types of spatial configurations, and in every case the convex space is shared by small businesses.

This is an important point: social stratification does not manifest itself in the built environment along the Stabiana movement axis. It has sometimes been said that Pompeii exhibits special districts for the rich and noble, or that there is a difference inherent in the insula structure (the noble at the front, the poor or deviant in the alley), and though this may well be true, there is also the mixed pattern, where there seems to be no shame for the rich patronus to be directly associated with his clients.136 There is, however, one zoning factor for these noble houses that should be noted – they are not found in the areas near the gates, where other domestic units can be found in significant numbers.137

An area that is extremely commercially active encompasses the intersections with the Via di Nola and the Via dell’Abbondanza, stressing the importance of these streets for the creation of a lively commercial interface. While there are hardly any purely domestic units in the commercial hotspots from S15 to S30, it can be noted that the representative houses with few exceptions are placed immediately on the outskirts of this area, which may indicate that the involvement of their occupants with the commerce was not immediate and perhaps had more of a supervisory function.

A representative domus often is singled out in the street by special markers (special kerbstones etc.). The entrance itself usually stands out by a high and often decorated fauces doorway: there may be steps, a special threshold, benches, and suchlike. This makes the domus stand apart from the convex space and appear as a specific entity, either on its own or together with adjacent units.138

Thus we can see that the domus mingle with all kinds of other units, but it avoids the town gate areas and the stretch of the most intensely commercial convex spaces. It also is singled out as special in the convex space where it is situated, and its presence is marked so as not to go unnoticed.

137 The buildings along the northeast part of the Via Stabiana are unexcavated. All that can be seen today are remnants of facades. Large, representational houses thus could conceivably have existed in this area.
138 It is difficult to say which of the interior units that can be subsumed under a unified expression on the street front, how this expression was created and how and if it related to the convex structure of public space, but there are some examples of a domus expressing itself together with other units, see Weilguni 2011. Facts about different interior spatial units are found in Table of interior units. Cf. Pirson 1999, 57-59, 63-67.
4.4.2. Larger workshops along the Stabiana axis

Shops and workshops of the type LW1 and larger are few along the Stabiana axis, although certain activities may have taken place in atrium houses without needing to change the houses to accommodate these activities, as exemplified by the house of Cecilius Jucundus (V 1.26, the total spatial unit is V 1.23,25-27,10) where the owner had a legal practice and by IX 1.7 in S27 where a jeweller worked.

A clustering of large establishments is found in S11 to S20, thus partly in the top commercial spaces (S15 to S30) but also extending towards the north part of the Stabiana MA.

Larger commercial activities never manifest themselves as specific entities in the convex spaces by means of special doorways or other architectural devices that give the message “large business”. Facade decoration and painted facades that may have been used for this purpose are not recoverable today. In cases where these commercial activities are situated inside a rebuilt domus, the expression of gracious living may well have been kept up in the interface with public space (cf. the fullonica in S19), but sometimes this expression has been changed or destroyed without being substituted by a new, specific and activity-related expression, as far as can be discerned today.139

Of the 17 larger activities found along the Stabiana MA, six are located in rebuilt atrium houses, one is being pursued in an atrium house that needed no changes, and one is possibly located in another kind of previously domestic dwelling. Nine commercial/productive activities (over 50 %) are housed in other types of buildings. None of these shows any still discernible special expression on the street front. The size of the enterprise thus does not determine the outward appearance in strictly architectural terms – the large shop/workshop door is sufficient to signal that activity is present, and usually the view through this door also would also reveal the type of business. Among other things, facade painting and décor, displays of goods, and signs etc. may have served the purpose of announcing the importance of the business in question.

4.4.3. Specific environments along the Stabiana MA

Looking at Fig. 21, one can get a rather vague impression that permeability is somehow linked to street intersections. There is no easy connection, since sometimes the spaces where two axial spaces cross have high permeability and sometimes low, and shifts in permeability can either occur in a crossroad space proper or immediately adjacent to it. If we work from the hypothesis that there is an intersection pattern and that it may be related to the type of

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139 See for instance Table if interior units, entrance VIII 4, 27 in space S31.
axial spaces crossing the Stabiana MA, a closer look at intersections gives us Table 1. Here, the colours marking the space north of the intersection, the intersection space proper and the space south of the intersection denote the permeability in the same way as in Fig. 21. In column 6 the axial spaces passing through the convex space containing the intersection are listed, type 1 being the most integrated type and type 4 the most segregated type.

A preliminary pattern can be seen: when highly integrated axial spaces intersect, permeability increases south of the intersection in the north part of the Stabiana MA. From the Vicolo del Panettiere southwards, the pattern is not prominent, although the intersection with the Via dell’Abbondanza complies with it. When one or more of the intersecting axial spaces is segregated, the usual pattern is that permeability either does not change or it decreases – this happens in four instances, while an increasing permeability can be seen in two instances.

Table 1. Permeability in intersections on the Stabiana MA.

<table>
<thead>
<tr>
<th>Intersection with</th>
<th>Intersec- tion space</th>
<th>Permeability north of intersection</th>
<th>Permeability in intersection space</th>
<th>Permeability south of intersection</th>
<th>Axial spaces crossing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agger street</td>
<td>S4 (5)</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>type 2 (x II) + type 4 + type 1</td>
</tr>
<tr>
<td>Vic. Merc.</td>
<td>S10c</td>
<td>Low</td>
<td>Low</td>
<td>Medium to high</td>
<td>type 1 (x II)</td>
</tr>
<tr>
<td>Via di Nola</td>
<td>S15</td>
<td>Low</td>
<td>Medium to low</td>
<td>Medium to high</td>
<td>type 1 (x III)</td>
</tr>
<tr>
<td>Vic. Panett.</td>
<td>S17</td>
<td>Medium to high</td>
<td>Medium to low</td>
<td>High</td>
<td>type 1 + type 2</td>
</tr>
<tr>
<td>Vic. Panett. cont.</td>
<td>S19</td>
<td>High</td>
<td>Medium to high</td>
<td>Medium to high</td>
<td>type 1 + type 3</td>
</tr>
<tr>
<td>Via August.</td>
<td>S20</td>
<td>Medium to high</td>
<td>Medium to high</td>
<td>Medium to low</td>
<td>type 1 (x II)</td>
</tr>
<tr>
<td>Vic. Balbo</td>
<td>S25</td>
<td>High</td>
<td>Medium to high</td>
<td>Medium to low</td>
<td>type 1 + type 3</td>
</tr>
<tr>
<td>Via Abbon.</td>
<td>S29</td>
<td>Medium to low</td>
<td>Medium to low</td>
<td>Medium to high</td>
<td>type 1 (x III)</td>
</tr>
<tr>
<td>Via Iside/Menan</td>
<td>S31</td>
<td>Medium to high</td>
<td>High</td>
<td>Medium to low</td>
<td>type 1 (x II)</td>
</tr>
<tr>
<td>Vicolo</td>
<td>S35</td>
<td>Low</td>
<td>Low</td>
<td>Medium to high</td>
<td>type 1 + type 3</td>
</tr>
<tr>
<td>Vicolo</td>
<td>S36</td>
<td>Low</td>
<td>High</td>
<td>Medium to high</td>
<td>type 1 + type 3?</td>
</tr>
<tr>
<td>Vic. Conc.</td>
<td>S40</td>
<td>Medium to high</td>
<td>High</td>
<td>High</td>
<td>type 1 + type 3</td>
</tr>
</tbody>
</table>

A closer look at some specific environments on the Stabiana MA may help to clarify matters. The environments chosen are the intersection spaces

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and other instances where permeability either shifts two or more steps either upwards or downwards.

**Castellum Acquae square and intersection with agger street in S4, S5**
S4 is the first constituted space in the north, and the first intersection on the Stabiana MA is between a segregated axial space, the agger street, and the main, highly integrated axial line along the Stabiana MA. Two other segregated axial spaces are also present. This intersection is not linked to a permeability change.

**Permeability shift S10c/S11 (up) after intersection with Vicolo di Mercurio/delle Nozze d’Argento; permeability shift S13/S14 (down)**
The first shift from low to high permeability happens directly to the south of the intersection with the highly integrated axial space along the Vicolo di Mercurio. In this shift, one can see the earlier mentioned pattern of an increase in permeability south of an intersection with a highly integrated axial space.

In section 4.2.1, above, the combination of highly integrated axial spaces that cross each other and high permeability in a convex space was mentioned as indicating high potential for interaction between inhabitants and strangers. This combination is not present here. Instead, the crossing of two highly integrated axial spaces takes place in one space (S10c) with low permeability, and is then followed by three highly permeable spaces, S11 – S13, where the permeability rises consecutively. Thereafter permeability decreases sharply, in S14.

Is the specific quality of permeability here important? *Figure 26* shows that spaces S10c, S11 and S12 are intensely commercial, and that non-representative living is found only to some extent in S11. This turns out to be one small L0-unit on the ground floor, probably living quarters connected with a bakery stable (also in S11) and a bakery (outside of analysis, situated on Vicolo di Mercurio), and is thus tied in with commercial activity.

Commerce dominates, of course, on the Stabiana MA, but with regard to space S13 the picture is more varied, with one representative main entrance and several rear entrances to living units. In S14 the varied picture is repeated with, among other things, two large representative houses (L3 and L2) and back doors. The shifts in permeability thus cannot be attributed to a different type of activity behind the doorways in the high permeability spaces S11, S12 and S13 when compared with the low permeability in space S14.

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140 When looking at S13 on a plan, it is clear that permeability is centred to its north part. This north part, however, is also the area where a large representative house is found, so permeability is truly mixed already where S13 begins to the north.
The intersection with Via di Nola (S15), and the permeability shift S17/S18 (up); the intersection with the Vicolo del Panettiere

The intersection with the Via di Nola/della Fortuna, where again highly integrated axial spaces cross (three spaces, as there are parallel spaces on the Via di Nola/della Fortuna), is situated in a low to medium permeable space, and permeability then increases in space S16 but only one single step. After this, the generally very high permeability continues southwards until space S25, although there are some marked shifts inside of this stretch.

Both S15 with its comparatively low permeability and S16 with its rather high permeability, as well as S17 where the first downward shift inside the high permeability stretch occurs, are purely commercial spaces. Space S18, which has very high permeability, has one non-representative living unit, a L1-domus.

Now, in space S17 the axial space of the Vicolo del Panettiere, which is of type 2 (among the 50-75% most integrated axial spaces), intersects with the very integrated axial space of the Stabiana MA. This is not an intersection of the highest order of axial integration, but it is still important – and here we find that the intersection space itself has a lower permeability, while after the intersection the permeability rises. Both the intersections with the Via di Nola and the Vicolo del Panettiere are thus followed southwards by spaces with increasing permeability, although the drop in permeability in S17 is at first puzzling.

There is, however, one other factor that must be taken into account. When calculating permeability, I have included the width of the doorways in the calculated wall length of a space. A space with tiny openings and extensive wall lengths between them thus gets the same permeability value as a similar space with large openings and almost no closed walls. But the latter space evidently has a more intense interface between public and interior.

Door widths in a convex space are almost always varied and do not impact on the analysis. S17, however, is a convex space with five exceptionally wide shop/workshop openings and very little actual wall. S17 thus has a somewhat more intense interface and greater permeability than one would expect of a space in the second permeability group.

The next intersection, with the unnamed continuation of the Vicolo del Panettiere eastwards (in S19), is less important in axial terms and is not associated with either rising or falling permeability to the south.

The intersection with the Via degli Augustali and the permeability shift S22/S23 (up)

Two of the most integrated axial spaces cross in S20, and the pattern discerned for such intersections could be expected to lead to a rise in permeability in S21. Here, however, permeability drops sharply.

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The spaces S21, S22 and S23 south of the intersection are, however, the result of public space being fragmented by a lararium, the vaulted roof of which covers the sidewalk just south of the intersection with the Via degli Augustali. This vault makes up S22, while the rest of the street in front of it is S21. The “full street width” then forms the small space S23. Should one disregard this fragmentation, the three small spaces S21, S22 and S23 would be a single convex space in the 4th permeability group, and there would then be a rise in permeability south of the intersection, although not a sharp rise.

The intersection with the Vicolo di Balbo
In S26 a low permeability stretch begins. The intersection with the Vicolo di Balbo in S25 involves a more segregated axial space and does not conform to the pattern with rising permeability after an intersection. Instead, permeability drops.

The intersection with the Via dell’Abbondanza
The low permeability ends in S29, where we have the intersection with the Via dell’Abbondanza, after which permeability rises again in S30. It is easy to see that the closed facade of the Stabian baths accounts for the low permeability in S26-S28. After this, the intersection space S29 is broken up by a deliberately built level difference. On the higher ground of the convex space belonging to the Via dell’Abbondanza, and bordering the west side of S29, there is the monument called the tetrapylon of the Holconii.\footnote{141} In analogy with the lararium colonnade above, the level difference and the monument break up space and result in lower permeability values. The permeability of the intersection with the Via dell’Abbondanza would be two entrances per 10 m, which means it would belong in the 3rd group if these spaces are seen as one. This would mean that at this intersection, in axial terms equaling the importance of the Nola/Fortuna intersection, permeability would be consistently high both in the intersection and after it.

The permeability shift S31/S32 (down) and the intersection with the Vicolo del Menandro
In S32 we have the last stretch with low permeability values, beginning with a sharp decline. One of the openings in the street facade in S32 is a small, semi-private, dead-end lane, I 3.8, from which several doorways lead to interior space. If these doorways are counted as belonging to the Stabiana MA, the onset of low permeability would not begin before a sharp drop in S33, and then continue southwards to S36. This means that the axially important

\footnote{141} Regarding the Holconii, cf. Zanker 1998, 109-112. The tetrapylon serves as a limit between the east and west parts of Pompeii if travelling along the Via dell’Abbondanza, and it marked a widening of the latter street, a place that supplemented the Forum commercially (possibly gaining in importance after the earthquake in AD 62, cf. Eschebach & Eschebach 1995, 51).
Vicolo del Menandro intersection is placed in the middle of high permeability, just as the previous intersection was.

The low permeability following it may be influenced by the character of insula VIII 7 in its entirety: on the west side of the street the interface leads to the theatre, the odeion, and two temples dedicated to Isis and Zeus, respectively. Doorways on the west side of the Stabiana axis all access different levels of the so-called Casa del Scultore, with the main entrance VIII 7.24. I suggest that it is at least possible that this was not a private domus, but instead had some connection to the official character of the other buildings in the insula.

The permeability shifts S35/S36 (up), S36/S37 (down), and intersections with unnamed small streets
Permeability rises sharply in S36, a space made up of the road on the east side of the theatre and odeion. S37 is a space adjacent to the road, in front of the theatre wall – a raised platform with a low permeability value that breaks up the spatial pattern. Without taking account of the break-up, and by regarding S36/S37 as a joint space, this would be a space with very high permeability and nonetheless an anomaly – here again we have the disruptive effect of non private buildings. How the axially segregated small streets intersecting with the Stabiana MA fit into a pattern is therefore difficult to assess.

The intersection with the Vicolo del Conciapelle
This intersection with a segregated street is placed within a stretch of high permeability extending towards the Stabia gate, but dropping continuously, so that the gate space S43 itself has low to medium permeability.

4.4.4. Summing up permeability fluctuation along the Stabiana axis
Public buildings and permeability
It is clear that buildings of a non-private character affect the form of the convex spaces and disrupt the segmentation originating in the normal fabric of buildings for living and working: we have the lararium in the intersection between the Stabiana MA and the Via degli Augustali, the Stabian baths, the tetrapylon of the Holconii, and the theatre and odeion to the south of the intersection with the Via del Tempio d’Iside. Public and official buildings thus create a convex pattern of their own and thereby also a specific permeability structure, by which they lower permeability.

References in Table of interior units, S32. Richardson (1988, 82) thought that VII 7.24 was originally built for the priest of Jupiter. The later sculpture workshop could have been connected to both the temple and the theatres in the vicinity.
The Castellum Acquae, which is inside the walls just to the west of the Porta del Vesuvio, and the two town gates at both ends of the Stabiana movement axis also are public structures, but because they are at the ends of the axis the permeability pattern in their spaces cannot be analysed in the same way as for the others. The convex spaces where they form part of the interface, however, do exhibit low permeability, and the spatial pattern is broken up due to the public structures. The break-up between S4 and S5 in the north due to the gate construction is obvious, but in the south the Porta di Stabia also breaks up space, since its structure actually blocks the street running inside the town wall on the east side. Thus, we can conclude that public buildings generally create a spatial pattern of their own, and that this overrides the basic pattern, creating fluctuations in permeability along the Stabiana movement axis. 143

Crossroads and permeability

Intersections with highly integrated axial lines are also associated with permeability changes, whereby permeability rises south of the intersection. This is the case in the intersections with the Vicolo di Mercurio, the Via Di Nola, the Vicolo del Panettiere (though less marked), and it would be the case with the Via degli Augustali were the convex structure not broken up by the lararium.

It is also the case with the Via dell’Abbondanza, although in this instance it results from the broken-up space. Otherwise here we would have an intersection inside of a high permeability stretch. The intersection with the Vicolo del Menandro is also inside a space with a high permeability, followed by low permeability due to public buildings.

The instances where permeability rises south of an intersection are thus in the north of the axis, and the instances where permeability is high in the intersection proper are in the south. We could see above (Fig. 21) that permeability in a general way increased in the southwards direction, which probably is linked to this phenomenon. Before this phenomenon is evaluated, however, I will examine the other two movement axes to see what patterns can be discerned there.

4.5. Living and working along the Mercurio movement axis

Among the 15 convex spaces along the Mercurio movement axis – the Forum spaces are excluded – there are three that do not have an interface to the interior space. They are small spatial units created by two triumphal arches.

143 The temple of Zeus does not impact on permeability and convex break-up, although the entire insula VIII 7 with its public buildings has a disruptive effect on urban structure.
placed in the street, one as a northern entrance to the Forum and the other as a limit between Via di Mercurio and Via del Foro. Of the 12 “normal” convex spaces along the axis (i.e. spaces where the interface primarily involves living and working), representative living is present in five, that is, about 42% of the convex spaces. Activity entrances compose 80 % or more of the interface in five spaces, that is, in 42 % of them. Thus, convex spaces related to commerce and production form a substantial part, and it is more than would be expected as the north part of this axis is seen as the location of Pompeii’s nobility.144

As one can see in Fig. 27 the commercial and productive activities are primarily small, but the larger complexes (in three different convex spaces) are placed on the Via Mercurio proper in the north, in the same spaces as representative living.

Fig. 27. Distribution of doorways/activities along the Mercurio movement axis, north to south. Legend, see Fig. 26.

Fig. 27 shows that representative and non-representative living is clustered to the south and north of the axis, and that there is a massive agglomeration of small commercial entities on the Via del Foro (M8 to M11), with a certain amount of non-representative living as well.

Here, one could speak of a certain zone partition, where representative living is clearly localised into two areas. But even in these areas there are smaller businesses and simpler living quarters, so there is no clear-cut division between the “noble quarters” and “poor quarters”.

The south part of the axis, the Via delle Scuole, has a similar character as the north part, the Via di Mercurio. In both instances there is a high percentage of both representative and non-representative living. This is worth noting

and has not been dealt with in research on Pompeii, where the noble residential quarters in the north are mentioned as a matter of course, and the south quarters are mainly discussed in relation to the bath and flats complex that covers the south slope of the town perimeter (built out over the former town wall) and is accessed from the south end of the Via delle Scuole and from the Vicolo della Regina. This area hangs on a steep cliff and cannot be visited today, as there is risk of collapse. Through this complex it was still possible in AD 79 to reach the outside world south of Pompeii by means of tunnels, corridors and staircases, though this possibility may not have been open to everyone. In this complex both representative and more humble living could be found, as well as recreational facilities and shops.\footnote{Koloski-Ostrow (1990) details several flats on five levels, see esp. 19-26, 84 for ground level, 28-35, 85 for first level below ground, 41-45 for bath and lower complexes. Cf. also Pirson 1999, 133-136, who thinks, however, the number of flats is difficult to discern.}

4.5.1. Public activities on the Mercurio axis

The public activities in the Forum will not be analysed in detail here, but a short summary is needed as the Forum affects the character of the convex spaces that are adjacent to it on the Mercurio axis.\footnote{See nn. 187-189 in Chapter 6 for further references to the Forum and its development.} In Fig. 28 the different convex spaces of the Forum and their numbers can be seen.

Starting with space M14, its west side is totally dominated by the east facade of the temple of Jupiter, while its east side is adjacent to a space with an interface of shops and workshops. Probably the commercial activity in the Macellum dominated this space as well.\footnote{Macellum: \textit{EGB} 309-310; Richardson 1988, 198-200; Zanker 1998, 84-85. Tabernae in front of Macellum: Pirson 1999, Kat. Aussentreppen nr. 39.} Commerce is also active in the covered market in the northwest and will have influenced the north part of the west Forum colonnade, M24c, and some other spaces that are not part of this analysis and that are situated between the colonnade and the temple of Jupiter.\footnote{Covered market: \textit{EGB}, 304-305.} The colonnade opens onto a complex that may have been a school, and in the south it borders the east facade of the Apollo temple, closed here but architecturally structured. Its only opening is the Mensa Ponderaria, with the templates for measurements and weights – this illustrates nicely both the importance of commerce and the role of the Forum as the official town centre.
Cult activity in the Forum is focused on the Jupiter temple\textsuperscript{149} to the north and on the sanctuary of the Lares,\textsuperscript{150} as well as on the temple for the imperial cult\textsuperscript{151} along the west side. The open areas in front of these two buildings, M17b and M18, will have seen a certain amount of cult activity as well.

\textsuperscript{150} Sanctuary of the Lares: \textit{EGB}, 309; Richardson 1988, 273-275; Zanker 1998, 85-87.
\textsuperscript{151} Temple for the imperial cult: \textit{EGB}, 308-309; Richardson 1988, 191-194, 266; Zanker, 1998, 87, 90-91.
Administrative/civic buildings are placed outside the south Forum colonnade M23, and also outside M22 in the southeast, where the supposed Comitium, the assembly place, was situated.\textsuperscript{152} The small speaker’s platforms that are placed as separate entities in the outer hall of the building of Eu-machia and to the east side of the small space 15b do not change the picture of administration centred to the south.

Recreational activity in the Forum is represented by the building of Eu-machia, a meeting place and garden, possibly with some commerce.\textsuperscript{153} The space in front of the Eu-machia building, M20, is an exterior convex space adjacent to the Mercurio axis and totally dominated by a strongly marked facade with niches, two speaker’s platforms and a large entrance.

The large, open, Forum area itself, M24a, thus lies in the middle of all kinds of public activities. All these activities would have imparted their own special quality on this space, although the representative aspect given by processions, political campaigns, and so forth would have dominated. If one were to identify different zones in the forum, the north could be said to be characterised by commerce and cult, the east by recreation and cult, and the south by administration.

The west and east sides of the Forum are closed towards the town, except for the Via Marina entering the Forum in the southwest and exiting as the Via dell’Abbondanza to the east. Both the Via Marina and the Via dell’Abbondanza pass between closed walls of buildings before they enter the Forum, the normal urban fabric taking over at a certain distance. The mixed activity of the Forum thus has adjoining convex spaces with low constitutedness to spill over into, both in the southeast and the southwest. This limits the interaction between the Forum and the urban structure in the vicinity.

To the north of the Forum there is no such buffer area of low constitution between the Forum and the rest of the town, and commerce continues with rows of tabernae in the spaces M10 and M11. In M10 there is also the entrance to the Forum baths, VII 5.24. The bath entrance is placed on the west side of the Via del Foro, flanked by large shops. On the other side of the street is a colonnade in front of a row of shops, creating a separate space between these shops and the bath entrance and its flanking tabernae. In space M8 the Fortuna Augusta temple juts out into the street and breaks up space by its large staircase, dominating the space entirely.

Public activities along the Mercurio axis are focussed on the Forum area and its northern extension, the Via del Foro. On the Forum proper these activities are found in specific, defined and planned convex spaces. On the Via del Foro, however, the public buildings break up space. Coming from the

\textsuperscript{152} Comitium: \textit{EGB}, 362.

\textsuperscript{153} Richardson 194-198; Zanker 1998, 93-102. \textit{EGB}, 307-308 identifies this building as a wool market and has references to this, earlier interpretation. For discussion about and pictures of the facade, see \textit{PPM} VII, 313-315.

\textit{Boreas} 33
north, permeability continues at a low value past Fortuna Augusta, and rises sharply in the Via del Foro in spite of this convex space being broken up by a colonnade, but these two instances are too few to permit speculations on permeability patterns.

The baths on the southwest slope of the town, which could be reached from the Via delle Scuole, did not have an impact on convex space.\textsuperscript{154}

4.5.2. The representative houses along the Mercurio MA

On the Mercurio movement axis, there is a clear dominance of representative houses in the convex spaces. Nevertheless, the representative houses coexist with other types of units and are made conspicuous by special markers, also subsuming other spatial units in a unity shown towards the street. The facades around the entrances VI 10.6 and VI 10.7 in M4 have, for instance, been given a similar appearance, in spite of belonging to different construction units. The fullonica VI 8.20-20A with the domestic part behind VI 8.21 looks as if it might belong together with the domus that has the entrance VI 8.22.\textsuperscript{155} It is possible that high-class living was coupled to owning a large shop or workshop, and that this connection was something one was proud to show. There is not enough evidence, however, for a similar discussion of facades of the south part of the Mercurio axis, the Via delle Scuole.

4.5.3. Larger workshops along the Mercurio MA

It seems that representative living and large commercial establishments existed together in the convex spaces of the Mercurio movement axis, which suggests a zoning that was due to size and not to a separation between representation and commerce.

As on the Stabiana MA, the large businesses do not show themselves as specific units on the street front. When they are located in rebuilt atrium houses the street front may be maintained (see for example the hospitium and the undefined activity in M1), but businesses may also be subsumed in some larger entity like the fullonica behind VI 8.20, 20A, 21 in space M4.

Of the five larger commercial/productive units, four are situated in a rebuilt domus, and one in another kind of building.\textsuperscript{156} Large businesses on the Mercurio axis thus do not manifest themselves with a large taberna door – they keep the domestic street front, or they lack any specific, identifiable facade or marker indicating the large business. Smaller shops/workshops

\textsuperscript{154} These baths may have been somewhat more private in character, perhaps belonging with the rental flats on the south slope of Pompeii, and therefore they may not have impacted on the convex break-up of space; however, there may be other explanations inherent in the structure of the south slope "suburbs" that are not possible to explore today. See n. 146 above.

\textsuperscript{155} Fridell Anter 2011 (in this volume), Table 3, M4; see also Table of interior units, M4.

\textsuperscript{156} See Table of interior units, spaces M1 to M5.

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usually do have the specific wide door. This tells us that at least some larger establishments had been established in this environment, when some of the representative houses were no longer in use as such, while small units had existed all along.\textsuperscript{157}

4.5.4. Specific environments along the Mercurio MA

There are basically no fluctuations in permeability associated with the different convex spaces related to intersections on the Mercurio MA. As regards the crossroads with the Vicolo di Mercurio and with the Via delle Terme/della Fortuna, permeability is low both in the intersection space proper and to the north and to the south of it. In the intersection with the Via degli Augustali permeability is medium to high, both to the north of the crossroads and in the convex space containing the intersection. To the south the Forum area takes its start, and the conditions there would have been different from what pertained at a “normal” intersection.

The main permeability shift occurs between spaces M8 and M10/M11 south of the intersection with the Via della Fortuna/delle Terme, and this shift is discussed below.

The intersection with the Via della Fortuna/delle Terme (M7) and the shift in permeability (up) in M10/M11

The T-intersection with the Via della Fortuna/delle Terme is situated in a space with low permeability, the original segmentation being influenced by the temple of Fortuna Augusta which juts out into the street and dominates M8. South of M8, the hitherto very low permeability rises dramatically.

Before the temple was built, the space comprising the area south of the intersection, or the intersection space itself, may have been very much larger and more permeable (if there were living quarters and shops in the space subsequently occupied by the temple), so that the shift between low and high permeability occurred farther to the north. Thus, the phenomenon of a public building impacting on spatial break-up and permeability is a feature found on this movement axis, just as it was on the Stabiana MA.

4.5.5. Summing up permeability fluctuation along the Mercurio axis and comparing it with the Stabiana MA

Public buildings and permeability

The buildings of a non-private character on the Via di Mercurio are centred on the Forum and the Via del Foro to the north of it. Disregarding the Fo-

\textsuperscript{157} See section 6.3.3 for a discussion of the social structure of Pompeii in AD 79.
rum, the only official buildings are the Temple of Fortuna Augusta and the arch in M6, both of them breaking up convex space.

The most monumental alteration of convex space is, of course, caused by the Forum itself and all of its interlinked spaces.

**Crossroads and permeability**

All intersections along the Mercurio MA are with highly integrated axial lines. The intersection with the Vicolo di Mercurio is not associated with permeability fluctuations at all, although its counterpart on the Stabiana axis is followed by a rise in permeability southwards.

It can also be seen that there is a small rise in permeability on the Stabiana axis already very near the Porta del Vesuvio, in space S7. On the Mercurio axis this does not happen.

The intersection with the Via della Fortuna/delle Terme has a distorted pattern due to the Fortuna Augusta temple, but it seems likely that we would have found the pattern identified for the Stabiana MA, with the intersection of integrated axial spaces placed in a less permeable convex space, followed by high permeability southwards, or possibly a situation with high permeability already in the intersection and then continuing to the south. After the temple was built, M11 became the north starting point for an extremely dense commercial area adjoining the Forum.

High permeability south of or in an intersection was most likely present on the Mercurio MA, but it was a much less noticeable phenomenon than the pattern in the Stabiana MA.

Regarding the intersection with the Via degli Augustali, not much can be said due to the distorting effect of the Forum.

### 4.6. Living and working on the Fauno movement axis

If one looks at the nine spaces that make up the Vicolo del Fauno proper, five of them have an interface that consists of 50% or more of rear or side entrances to domestic units, one space has 20% back doors and in two spaces they are missing. There are also rear entrances to shops/workshops in two of the spaces. All this suggests the common notion of a back alley, but this is not the whole story.

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158 The southernmost space, which actually is an east – west space on the Via di Nola/della Fortuna/delle Terme, is not included. Space F3b lacks an interface with interior space.
4.6. Living and working on the Fauno movement axis

North                                                                                 South

Fig. 29. Distribution of doorways/activities along the Mercurio movement axis, north to south. Legend, see Fig. 26.

In Fig. 29 we find that in F1, the northernmost space, the activities behind the doorways consist of 70 % commercial/productive units. Another three spaces on the axis proper also have entrances to such units. In addition, in three spaces non-representative living quarters are accessed. Only three spaces are entirely dominated by rear or side entrances. Thus, for the Fauno MA the most interesting aspect is which kind of activities had a primary interface with public space in this area.

Commercial units on the Fauno MA seem to be related to growing, processing and selling agricultural products. This may be due to a reuse of space, where buildings had been destroyed during the earthquake of AD 62, but this cannot be ascertained. The one large commercial unit in F1 is of this agricultural type. Other than that, we also find an establishment for producing “seamen’s articles”\(^ {159} \) (or alternatively some other activity necessitating basins and water, of which there is evidence). The fairly large amount of main doors, as opposed to side doors or back doors, implies that even a back alley could expect a certain amount of business and visitors.

Since there are no public buildings, no main entrances to representative units, and the one large commercial establishment is an exception, I will now move on directly to crossroads and permeability fluctuations.

4.6.1. Specific environments along the Fauno MA

The single intersection on the Fauno MA proper (with the Vicolo di Mercurio) is not associated with any permeability change. This intersection, between one integrated and one segregated axial space, does not affect permeability on the Fauno MA. The only environment that needs discussion is the intersection with the Via della Fortuna/delle Terme.

\(^ {159} \text{EGB, 198.} \)
The intersection with the Via della Fortuna/delle Terme (F8)

This intersection is situated in a convex space extending along the intersecting street. The intersecting axial space that passes through it is the most integrated in Pompeii, and F8 also has a very mixed permeability. Neither of this is, however, associated with a permeability change of the Fauno axis proper. As F8 is the last space on the Fauno axis, subsequent changes cannot be discussed. It seems likely that this space functioned in relation to other convex spaces on the crossing axial space, rather than in relation to the Fauno axis.

So, for this small street there is low permeability throughout and no fluctuations that can be linked either to specific environments or the type of permeability.

4.7. Discussion of the interface between public and interior space on the Stabiana, Mercurio and Fauno movement axes

To sum up, there are twice as many convex spaces with representative living making up part of the interface between public and interior space on the Mercurio MA as on the Stabiana MA, and while commercial and productive activities dominate 52% of the convex spaces on the Stabiana axis, only 42% of the Mercurio MA spaces are dominated by such activities (excluding the Forum area).

Both movement axes had in fact an important commercial interface with interior space, and on both of them representative living was a significant part of the interface as well. On both movement axes the representative living coexisted with other types of interior units, but it stood out by special markers in the public space, sometimes including other types of interior units as well. Large businesses tended not to use special architectural markers to advertise their size, and instead either exhibited the large taberna door that simply signified “business” or were content to keep the genteel markers of the atrium house they had moved into.

On the Mercurio MA, commercial activity is centred on the Forum proper and the Via del Foro, creating a dense and intense midsection for the axis. Likewise, the Stabiana axis has a commercially hot area between its middle and southern part. The interface of the Stabiana axis was greatly influenced by east-west streets crossing it, while on the Mercurio axis this phenomenon is blurred by the presence of the Forum. The difference in the type of interface between public and interior space on the two movement axes is thus in nearly all aspects a difference in quantity, not in quality. The Fauno MA is not comparable to these two axes and preserves the character of a back street.
4.7. Discussion of the interface between public and interior space

3. Conclusions on permeability shifts and public buildings

Above, it was noted that public buildings on the Stabiana MA override the basic pattern of convex spaces, breaking up space. This creates fluctuations in permeability along the Stabiana axis with sequences of convex spaces with low permeability. While there is too little evidence to be absolutely certain, it seems this is also the case on the Mercurio axis.

When public buildings were situated along a convex space, their use was not dependent on this space being full of inhabitants. Of course, the public buildings may or may not have functioned in a specific interaction with activities going on in the convex space itself; they may have needed other, specific, kinds of other interior spatial units in their near vicinity, or have caused such units to be established. It is, however, clear that public buildings did not need high permeability, and that they filled their function perfectly well in spatial environments where the number of other interior spatial systems was fewer than in the neighbouring spaces.

The public buildings we have encountered were built for global use – they were there for strangers, who could enter them, use them and become their visitors. This fits well with the types of buildings we have encountered: town gates, theatres, temples, baths, shading monuments and Pompeii’s central lararium. These were places visited by people from other parts of the town or from outside Pompeii. One could certainly imagine other, local types of public buildings, for instance a local shrine or a shelter used by local people, but this is not what was situated along the three movement axes, or at least, it is not identifiable as such today.

That such globally important public buildings are a prominent feature of both the Stabiana and Mercurio MA tells us that the importance of the axial dimension in both cases must not be underestimated. Local life in the convex dimension would have played out against a constant backdrop of strangers moving along.

4.7.2. Conclusions on permeability shifts and commerce

The permeability patterns also should be set into the context of the finding that permeability increases southwards in Pompeii. This is obvious on the Stabiana MA; and even on the Mercurio MA, the part south of the Forum is more permeable than the part north of it.

What the doorways of the interface led into does not change drastically in character southwards – there is roughly the same, very commercial mix, all along the Stabiana MA, and roughly the same more residential, but still heavily commercial, mix along all of the Mercurio MA. However, the ingredients of the mix shift somewhat.

When permeability increases from one convex space to the next, what does it mean? On the Stabiana MA it meant *more* shops/workshops and
more non-representative living. It did not mean more representative houses, since there is one main domus entrance per convex space whenever there is one at all. Non-representative living was often tied to shops, being the living quarters of the owners, so what increases is basically commercial activity, drawing with it the living quarters of commercially active people. On the Mercurio MA the trend is weak, but it is the same trend – shops and non-representative living are more prevalent in the south than in the north, especially if we assume that most of the rental flats accessed through corridors in the extreme south were not luxurious, representative units. The discussion, however, will have to centre on the Stabiana MA.

Commerce is of course for local people: the inhabitants of the interior spatial units would have used the bakery in “their” convex space. But even more, commerce is for strangers, for people passing by. There is no simple cause and effect here – where many strangers pass, many shops will be established, and where many shops are established many strangers will pass, both reinforcing each other. The bottom line, however, is that there were more commercial establishments and more strangers passing along the axial spaces in the south part of the Stabiana MA. The main attraction of the south part is obvious – the harbour of Pompeii, where goods came in and left on a daily basis. Shops/workshops in the south would have had shorter distances to haul goods either to export them or to import them. People on their way to or from the harbour would have left or entered town by the Stabia gate.

And if intense commerce means a more permeable interface, then we may draw some very interesting conclusions about the movement of people on, to and from the Stabiana MA.

4.7.3. Conclusions on permeability shifts and the movement of people

Going back to the intersections, we may for instance see that an intersection between the Stabiana axial space and another highly integrated axial space produces an increased permeability in the convex space south of the intersection. This happens south of the Vicolo di Mercurio, the Via di Nola, the Vicolo del Panettiere and the Via degli Augustali (after the lararium). These are areas of increased commerce/non-representative living, dependent on passers-by, which means there would be more passers-by here than in less permeable spaces.

Looking at the above intersections we can now make some deductions about the movement of people. When permeability rises southwards of any intersection along the Stabiana MA, there would have been more traffic to the south of it than to the north of it. Some of the traffic flow on the intersecting street will have changed direction, and in doing so will have preferred to go south rather than to go north. Some of the people moving north-
wards on the Stabiana MA will also have turned into the intersection street, causing the convex spaces north of the intersection to become less permeable. This phenomenon will be most clearly discernible in the form of increased permeability where the Stabiana MA intersects with other highly integrated axial spaces, since these had a stronger traffic flow than segregated axial spaces.

As the Vicolo di Mercurio has one highly integrated axial space and thus a high movement potential, the increased permeability after the intersection seems to indicate that a new flow of traffic indeed increased the flow on the Stabiana axis southwards in this intersection and/or that traffic thinned northwards. But here an additional phenomenon is visible: the permeability decreases again in S14, and this indicates that the stronger flow of people was limited to certain spaces. This might happen if part of the flow on the Vicolo di Mercurio made a detour southwards, and then regained it. By establishing a shop south of the intersection, the owner thus captured three different categories of strangers:

- the people walking along the Via Stabiana in either direction and simply passing the intersection, or turning into the Vicolo di Mercurio when coming from the south
- the people who could be induced to detour from their east – west or west – east trajectory on the Vicolo di Mercurio, and lastly
- the people who actually turned south to follow the Via Stabiana to their eventual destination. To leave a distinct mark on permeability, the detouring flow must have been a significantly sized group.

After the Via di Nola/della Fortuna intersects the Stabiana MA, the interface again becomes more permeable, and this time permeability does not sink back to the lowest level further south, though it does drop one level. The detouring phenomenon thus would still have been a fact, but the permeability continuing on a higher level also means that a significant stream of strangers made their way continuously southwards now, and/or left the Via Stabiana for a west or east direction in this intersection if they were going northwards, especially since the drop in S17 may be less than what is indicated by the permeability values.

After the lararium break-up in S21 to S23, permeability rises to the highest level, suggesting that the Via degli Augustali contributed significantly to the flow southwards and/or took up a significant part of the flow northwards. The subsequent drop in permeability in S 25 will have been partly due to the bath facade.

Thereafter, the intersection with the Via dell’Abbondanza again shows the familiar pattern of increased permeability south of an important intersection.

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160 Section 4.4.3: The intersection with Via di Nola.
This is, however, not indicative of a detouring traffic flow, but rather is due to the Holconian tetrapylon breaking up space (see 4.4.3: The intersection with the Via dell’Abbondanza, also Table 1). Without the tetrapylon, permeability would have continued in the highest range. It is likely that permeability along the Stabiana MA after the Via degli Augustali intersection would have been high all the way, right through to the gate space S43 and past all remaining intersections, provided no public buildings had intervened. But instead we have the tetrapylon and the theatre insula breaking up convex space, and therefore permeability decreases, although the strong traffic flow of strangers would have remained the same. In fact, both the intersections with the Vicolo del Menandro and the Vicolo del Conciapelle show high permeability that is indicative of this.

What we have is thus a bi-directional traffic flow steadily increasing to the south. A smaller part of it was fed into and/or siphoned off the system by the Vesuvio gate in the north, while all important intersections southwards contributed to it by feeding their own stream of southwards going people into the Stabiana MA and/or draining off a part of the northwards flow. The significant difference in permeability can be located to the intersection with the Via di Nola/della Fortuna/delle Terme, which is not surprising as it has the highest integrated axial space of the entire system. The low permeability in the north part of the Stabiana axis tells us that the Vesuvio gate was clearly less important for traffic and activity in the public space than was the Stabia gate.

This entire pattern can also be weakly discerned also along the Mercurio MA, where the traffic flow onto or from the Via di Nola/della Fortuna/delle Terme generated a highly permeable interface at south of the temple of Fortuna Augusta, in M10, M11 and M12.

4.7.4 How would it feel to be there? An interpretation

Lastly, we can ask how a passer-by might have experienced this increase in permeability towards the south on the Via Stabiana, or how she would have perceived the importance of integrated axial spaces intersecting in crossroads. If we imagine that this passer-by is from out of town and enters Pompeii through the Nola gate, and that she wishes to stock up on necessities for her home in some village, she would already have been moving along the most integrated axial space of Pompeii. She would not have been alone – the flow of people moving in either direction would have been substantial. If we assume that axiality on the Via di Nola functioned in the same way as on the Via Stabiana and was associated with high permeability and lots of shops and workshops, then perhaps she never even arrived in the centre of the town but instead shopped along the Via di Nola and then went back home – but perhaps she wanted to look over more goods, and went on until she came to the intersection with the Via Stabiana.
Looking south from the intersection, our traveler would have seen crowded sidewalks and people on the move, some going south and others coming from the south. Those that came from the south would often turn into the Via di Nola eastwards or the Via della Fortuna westwards, and only some of them would go on northwards. Perhaps she would have immediately chosen to go south, too, or perhaps she would have continued west or stopped in the small largo (S15) and looked about.

It is possible that she would have noticed that there were more people than she first thought thronging about on the sidewalks near the next intersection northwards (Vicolo di Mercurio), but that few of them went on to the place where she stood looking.

Where would she decide to go? She might of course sigh and think this was all too much and head back the way she came, but let us assume that she thought of heading south or west into the crowds or that she was curious to see why people seemed to walk southwards from the north and then stop and go back. In that case she might have gone and checked out if there were some really nice shops or food places one block to the north. If she chose north or south, she would have been one more stranger attracted to the highly commercial and very permeable interfaces of the Stabiana MA. She and her fellow travelers and customers might even have contributed to the positive decision of a rich man who had come here to see if it was worthwhile to purchase a room that could serve as a small dried fruit shop for his client, further increasing commerce and perhaps even permeability (a lady was willing to rent out a room, but in that case a door to the street would have to be built).
5. Urban activity in the convex spaces along the Stabiana, Mercurio and Fauno movement axes

5.1. Introduction and aims
After the analyses in the previous chapters, we are now ready to ask questions about some of the uses of and activities in exterior urban space in Pompeii. It goes without saying that many aspects are impossible to capture as millennia have passed since the actual use of space, but glimpses of understanding can be acquired from the remaining facts.

I will start by briefly discussing the categories of people who used the exterior public space, and the kinds of encounters (whether fleeting or more enduring) they were likely to have. A more detailed theoretical description can be found in Chapter 2, section 2.2.4. After this I will discuss both the spatial and non-spatial characteristics of convex spaces, and how these are quantified and used in the analysis. I will then describe interesting microcosms along each of the three movement axes, with special attention to their different attributes, before I sum up the principal defining properties of the three movement axes.

5.2. Interactions in urban space
5.2.1. Inhabitants, strangers and visitors in public space
In Space Syntax theory the person or persons who have the right to occupy an interior spatial system whenever they want are called *inhabitants*. The *stranger* need not be an unknown person; on the contrary, a stranger may be very well known but lack the right to use a spatial system uninvited. When allowed in, the stranger is transformed into a *visitor*. When it comes to public space we may also speak about inhabitants, strangers and visitors, although with less precision than for interior space.

Thus, people who enable interaction across the interface between exterior and interior space can be thought of as the inhabitants of the convex space in question. A shop owner – the inhabitant of a shop or workshop and of the

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161 See section 2.2.4.
convex space it opens onto – enables strangers to stop and become interacting visitors in public space, and ultimately decides who may enter the shop and who may not. The inhabitant cannot stop someone from passing by and looking, but the fact that there is something to look at to begin with is the inhabitant’s doing, as he extends his influence from the interior space across the interface to public space. In the same way, a patronus opening his domus for the morning visits of his clients is an inhabitant both of his domus and of a section of public space. There is another type of inhabitant who does not interact over the interface between public space and interior space, but for different reasons has the inhabitant’s right to use a convex space. The seller at a street market is a good example of this. And there is, of course, also interaction between the inhabitants themselves.

5.2.2. Interaction in the public space and across the interface between public and interior space

Just as there are encounters and interactions between people in the different spaces/rooms inside a building, there are encounters and interactions in the exterior public space.

In a building, the architectural limits define the context for social interaction. Inside a clearly delimited room, for instance a room with just one door to a central courtyard, the chance encounter between people is restricted. This may be called an enclosing space; it gives a degree of privacy to its occupants as people will not just “happen to pass by” inside such a room. This means the possibility of maintaining a focused interactive contact for a longer period of time is facilitated. An enclosing space thus is suited to the intense and more private social encounter.

In contrast, a space from which multiple other spaces can be accessed in different ways (directly and/or indirectly), for instance a central courtyard, has a greater potential for random, transient encounters. This type of space is more “public” in the context of which it is part, and it may be called a non-enclosing space as it serves the social encounters that do not need the focused interaction of the enclosing spaces.\(^\text{162}\)

The exterior public space is less structured than interior space as boundaries between convex spaces are only partly made up of walls. An intensive, focused and time-consuming interaction is thus prone to being watched and interrupted. The potential for chance encounters of a more fleeting nature is correspondingly increased. Therefore, we should pay attention to the types of encounters possible in public space:

\(^{162}\) Grahame 2000, 11.
• Interaction between strangers/visitors and inhabitants
  a. Fleeting interaction while the stranger passes: looking in through an open door and getting an impression of private space, glancing at the goods for sale, watching the activities of others.
  b. Gradually more time-intense and time-consuming interaction, such as buying something from a street vendor or watching some activity (ceremony, procession, work etc.)
  c. Interaction that turns the stranger into a visitor, such as eating at the counter of a food shop, stopping to discuss merchandise, spending time in a hotel or a brothel. This interaction often passes the interface between public and interior space.

• Interaction between the inhabitants themselves can either be fleeting encounters or more time-consuming non-private meetings of varying intensity. Collective neighbourhood interaction such as work, chatting and religious ceremonies create a sense of belonging together.\(^{163}\)

• Interaction between strangers is also possible and of different kinds, although likely to be limited to situations where some strangers are engaged in more long-term activities that turn them into visitors (e.g. getting to know each other while eating or drinking.)

None of the above could be called private and secluded. It would be fair to say that everything is happening out in the open, creating a collective identity rather than a personal one. A person is part of a group, such as “the spectators”, the “neighbours”, “the vendors” or “the customers”. The kind of interaction that comes closest to being private is both time consuming and limited to a few participants, and often it also exhibits a planned trait. The shopkeeper expects to meet customers and readies his display for them, and the customers expect to be able to look over the goods of a shop. Likewise, inhabitants engaged in a specific task together enjoy a more private relationship.

5.3. The spatial properties of convex spaces

Many of the functions that once were present in the exterior spatial system of Pompeii are impossible to capture from the archaeological remains, but the

\(^{163}\) Interactive relations between people who reside geographically near each other are usually called “spatial” in Space Syntax method, while a relation that hinges upon some common interests and transcends spatial distances is called “transspatial”. The feeling of belonging to a neighbourhood or a special part of the town is a spatial phenomenon, while for instance the client’s link to his patronus is a transspatial relationship. See Grahame 2000, 75, 83; Hillier & Hanson 1984, 42.
spatial arrangement in itself can tell us something about use and function. To find out what happened in a local part of an urban context, the spatial system is examined in terms of its constituent parts, the convex spaces. These are segments of public space defined by articulation, and they can be investigated with regard to their size, their degree of convexity and their articulation, all of which helps to discern whether a particular convex space had a particular function and was put to a particular use. The segments of public space can also be looked at from another angle to give an indication of how they were once perceived. Perception of a micro-environment as an independent, special place has to do with specific features in this environment, like a fountain (the water place) or several shops of the same kind (the bakery place). This perception may, or may not, be limited by the syntactical borders of the convex space, and possibly also enhanced by them.

Different ways of analysing these characteristics and what they can reveal about use and perception will first be presented for the Stabiana MA, enabling the reader to follow a detailed investigation of this most important of the three movement axes as well as the reasoning behind the methods applied. The Mercurio and Fauno MA will then be treated in a comparison of these results.

5.3.1 Size and degree of convexity, articulation

A convex space which has certain facilities or properties and is clearly articulated may well have been perceived as a special place – but if it is very small in absolute terms, it may not have been very useful for interaction between people, and it may only have been used in very limited or specific ways. Size thus matters, when assessing whether a convex space stood out as a separate entity. The degree of convexity (how “fat” a convex space is) is important as well. This parameter varies between 0 and 1 and is calculated by dividing the shortest side with the longest. A space with maximum convexity (a perfect square) gets the value 1.

A long, corridor-like space has a low degree of convexity. With regard to stationary activities and meetings (for example using it as a small marketplace, or stopping at the fountain and talking to neighbours) this space would have seemed less inviting than a small largo with a high degree of convexity.

Below, the convex spaces of the Stabiana MA are divided into quartiles according to their area. The resulting four size groups are then used as a basis for different investigations of the convex spaces along the Via Stabiana.

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164 See section 2.4.1.
165 See section 2.4.2: Features.
166 See section 2.4.1: Degree of convexity.

_Boreas 33_
(see below Table 3 and section 5.3) and subsequently on the other movement axes to enable comparison of the values.167

1st size group = spaces up to 44.5 m² (10 spaces)
2nd size group = spaces from 45 m² up to 114.5 m² (11 spaces)
3rd size group = spaces from 115 m² up to 200.5 m² (10 spaces)
4th size group = spaces from 201 m² and upwards (11 spaces)

In a street there is a direct relation between the size of a space and its convexity. A small section of the street will be more likely to approach maximum convexity with all four sides equal and a degree of convexity of 1. Larger sections of the street tend to be longer than they are wide, and are therefore further removed from this convex perfection – but the larger the space, the more usable it is for different activities in spite of its having low convexity.

As can be seen in Table 2, the relation between size and degree of convexity on the Stabiana MA conforms to expectation.

Table 2. Size groups and degree of convexity on the Stabiana MA.

<table>
<thead>
<tr>
<th>Size group, total number of spaces</th>
<th>Degree of convexity 0.75 to 1</th>
<th>Degree of convexity 0.50 to 0.74</th>
<th>Degree of convexity 0 to 0.49</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size group 1, 10 spaces</td>
<td>6</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Size group 2, 11 spaces</td>
<td>1</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Size group 3, 10 spaces</td>
<td>1</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Size group 4, 11 spaces</td>
<td>1</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

These results demand a way of distinguishing which spaces have a combination of size and convexity that can tell us something more than that they are small and fat, or large and narrow. One way of doing this is to rate the spaces by giving them points for size and convexity, respectively, and adding up the points the spaces get. These points are an indication of how useful a given space may have been for stationary activities, and are called convex impact points.

167 Quartiles were utilised because they take account of reality by using median values rather than the more abstract average values. The size groups could be calculated again for the other movement axes, but this would not bring out the differences between the axes in the same way.
Each space with a degree of convexity of 0.75 or more is awarded 4 points; each space with a degree of convexity between 0.50 and 0.74 gets 3 points; each space between 0.25 and 0.49 gets 2 points; and spaces with a degree of convexity lower than this get 1 point. Likewise, spaces get 4 points for being in size group 4, 3 for being in size group 3, and so on.

Thus a small space in size group 1, with a concomitant high degree of convexity of 0.76 gets 5 points – exactly the same as a large space in size group 4 with a very low degree of convexity, such as 0.11. The intention is to identify the spaces that are large enough to be important for activity and interaction without being extremely convex, or that are small enough to need convexity to make them useful. The outliers – spaces that are large and convex or small and not very convex – can of course readily be picked out without any points.

In Table 3, which sums up the convex spaces for the Stabiana movement axis, the space number, the approximate size and size group, the degree of convexity and the convex rating by points occupy the first four columns.

5.3.2. Articulation and definition of a convex space

Looking at a series of convex spaces, for instance along one of the movement axes, the fluctuating border along the east or west side of the street is the convex articulation, the form of the exterior space. The most important aspect of convex articulation is that it separates the various convex spaces from one another. A clearly articulated convex space lends itself to a specific use. A not so clearly articulated convex space may need additional markers and boundaries or even rebuilding if it is to be used for a defined activity. Convex articulation also creates a variegated and more interesting public space than long, not very articulated stretches or a perfectly square open area. It has been shown that it is easier for people to remember a road taken for the first time much better if it is well articulated.\footnote{Hillier 1983, 53. For convex articulation to have a guiding function, it has to coexist with long axial spaces. If a fragmented axial structure with many short axial spaces is combined with strong convex articulation, the result is likely to be confusion and unused urban spaces.}

The articulation taken into account in a Space Syntax analysis is not self-evident – the analyst must determine how much of it is to be recognised. Every time the building facades draw back from the street front or jut out into it, every time the street makes a turn and every time something blocks the free expanse of space, spatial unity breaks up to form more convex spaces. Whatever the degree of convex segmentation acknowledged, it is always true that the more perceivable and unambiguous the articulation is, the more likely a convex space will be seen as a special place.

As stated above, I took account of all instances where the borders of the convex spaces (i.e. generally the facades on the west and the east side of the
5.3. The spatial properties of convex spaces

movement axis) either narrowed or widened the street with more than 0.2 m compared with the borders of the adjacent spaces.\(^{169}\) It is, however possible, that larger differences are needed in order for a person to actually experience articulation. Therefore, the spaces defined by the larger articulation of 0.5 m are marked in Table 3, column 5, below. Whether the space is defined by articulation (A) or by negative articulation (NA) is also entered in the same column.\(^{170}\)

A space with a strong positive articulation is more likely to be regarded by people as a special place, since the articulation emphasises the space’s convexity, while the negatively articulated space is more likely to be perceived as a “passage” since the negative articulation emphasises axiality. Spaces may of course have both types of articulation, which means they partake of both characteristics. Articulation is not analysed in depth in this study, but it sometimes leads to additional information and in that case will be mentioned below when the different environments called “microcosms” are discussed (section 5.5).

5.3.3 Three additional spatial characteristics

With regard to determining whether a convex space was useful for interaction between people, I have already touched upon the size of the space in absolute terms as well as the degree of convexity, that is, how nearly the space approaches a perfect square and thus makes circulation inside the space easy, as well as on the size of the space in absolute terms. Together with the parameter of strong articulation/strong negative articulation, these are the most important purely spatial signs of the potential importance of a space in the convex dimension. In addition there are three further factors that need consideration.

First, there are the uncommonly enclosing spaces and the uncommonly open ones. A convex space that is not hemmed in by facades on two sides, but instead has an extra open border (a space parallel to the convex spaces on the main axial space), is more permeable than usual; it is less defined vis-à-vis its neighbours. Activities in the surrounding spaces will spill over into neighbouring spaces if there is an open border – the more open borders, the more spilling over. An uncommonly open space could therefore have been seen as in some sense belonging together with one or several other spaces, and it could have been used for certain activities together with them. The degree of open borders is given in Table 3, column 6, and for the analysis it will suffice to pick out the spaces that have extreme values.

\(^{169}\) See section 2.4.2: Articulation

\(^{170}\) In an analysis of modern, inhabited surroundings, the choice of articulation could be much better grounded by interviewing both inhabitants and strangers as to what they consider a “space”, but for Pompeii this can only be a guess.
Second, highly integrated axial spaces have a stronger potential for the movement of people than segregated axial spaces do (see Chapter 2, section 2.2.2), but every axial space carries with it the potential for a flow of people. Therefore, the more axial spaces that cross a convex space, and the more integrated these axial spaces are, the more passers-by are likely to have traversed this convex space. It is important to identify the convex spaces where many and/or highly integrated axial spaces indicate the presence of one group of people that populates public space and partakes in all sorts of human interactions, namely the strangers. In column 7 of Table 3 the number of axial spaces crossing a convex space is noted. Axial spaces were sorted in 25%-groups according to their integration in Chapter 3, and in Table 3 the most integrated axial spaces are called t1 (type 1), followed by t2 (type 2) and so on.

Finally, the control value indicates how spaces functioned in relation to their neighbours in the local context. A convex space with a high control value would have been the information hub of its local context. Here, an inhabitant, or even a stranger stopping and making him- or herself a visitor, would have gathered knowledge about traffic in different directions, activities in adjacent spaces, and who went where and participated in what and who did not. The control value is listed in column 8, while columns 9 and 10 feature criteria that are not specifically spatial and that consequently will be discussed when used in the analysis later on.

5.3.4 Quantifying spatial characteristics

In Table 3 below, the convex spaces of the Stabiana movement axis are detailed. The spaces are sorted according to the size-calibrated degree of convexity (see 5.3.1), which means that spaces are grouped according to an increasing number of convex impact points.171

To get a clearer impression of the usability points of the different spaces, and of how spaces with different numbers of points alternate on the Stabiana movement axis, a diagram of the street is shown in Fig. 30. The convexity calibrated according to size can be seen, with darker spaces representing an increasing amount of points.

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171 Detailed information about the spaces is contained in Table of interior units.
Table 3. The convex spaces of the Stabiana movement axis.

Column 1: space name and size group (see grouping according to quartiles on the Stabiana axis above, 5.3.1). The colour of column 1 is according to permeability (see Fig. 21). All other columns for a particular space are coloured from white to blue to black according to how many convex impact points they get.

Column 2: approximate size
Column 3: degree of convexity
Column 4: convex impact points
Column 5: articulation (A) and negative articulation (NA)
Column 6: approximate percentage of open border
Column 7: axial spaces crossing convex space (the axial spaces are sorted from t1 to t4 with decreasing integration)
Column 8: control value
Column 9: enhancing or boosting of a convex space, type of boosting feature, strength graded from + to +++
Column 10: functional indications including clusters of specific interface

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<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
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<tbody>
<tr>
<td>S10c</td>
<td>74</td>
<td>0.19</td>
<td>2+1 = 3</td>
<td>Articulation e-w</td>
<td>39.6</td>
<td>2 x t4</td>
<td>2</td>
<td>not boosted</td>
<td>2 full.</td>
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<tr>
<td>gr. 2</td>
<td></td>
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<tr>
<td>S22</td>
<td>10</td>
<td>0.4</td>
<td>1+2 = 3</td>
<td>A Structure surrounds</td>
<td>69</td>
<td>1 x t2</td>
<td>1.33</td>
<td>space on sidewalk, arcade surrounding +++</td>
<td>altar</td>
<td></td>
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<tr>
<td>gr. 1</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>S32</td>
<td>195</td>
<td>0.18</td>
<td>3+1 = 3</td>
<td>NA north</td>
<td>18.8</td>
<td>2 x t4</td>
<td>(1 x t 1)</td>
<td>0.75</td>
<td>stepping stones no border +</td>
<td>1 caup.</td>
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<tr>
<td>gr. 3</td>
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<tr>
<td>S10b</td>
<td>28</td>
<td>0.72</td>
<td>1+3 = 4</td>
<td>NA north (angle)</td>
<td>59.5</td>
<td>1 x t4</td>
<td>0.83</td>
<td>not boosted</td>
<td>well</td>
<td></td>
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<tr>
<td>gr. 1</td>
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<tr>
<td>S11</td>
<td>71</td>
<td>0.41</td>
<td>2+2 = 4</td>
<td>A south NA north</td>
<td>27.6</td>
<td>1 x t4</td>
<td>0.83</td>
<td>not boosted</td>
<td>3 bake. 1 caup</td>
<td></td>
</tr>
<tr>
<td>gr. 2</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>S13</td>
<td>149</td>
<td>0.25</td>
<td>3+1 = 4</td>
<td>A north NA south</td>
<td>18</td>
<td>1 x t4</td>
<td>1</td>
<td>not boosted</td>
<td>altar 1 caup.</td>
<td></td>
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<tr>
<td>gr. 3</td>
<td></td>
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</tr>
<tr>
<td>S19</td>
<td>93</td>
<td>0.46</td>
<td>2+2 = 4</td>
<td>A north</td>
<td>36.7</td>
<td>1 x t4</td>
<td>1.25</td>
<td>not boosted</td>
<td>3 full. ent.</td>
<td></td>
</tr>
<tr>
<td>gr. 2</td>
<td></td>
<td></td>
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<tr>
<td>S23</td>
<td>41</td>
<td>0.61</td>
<td>1+3 = 4</td>
<td>A north</td>
<td>63.4</td>
<td>1 x t4</td>
<td>1.16</td>
<td>not boosted</td>
<td>well 1caup?</td>
<td></td>
</tr>
<tr>
<td>gr. 1</td>
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</tr>
<tr>
<td>S34</td>
<td>98</td>
<td>0.46</td>
<td>2+2 = 4</td>
<td>A north NA south</td>
<td>30.6</td>
<td>2 x t4</td>
<td>0.75</td>
<td>not boosted</td>
<td></td>
<td></td>
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<tr>
<td>gr. 2</td>
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<td></td>
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</tr>
<tr>
<td>S36</td>
<td>93</td>
<td>0.34</td>
<td>2+2 = 4</td>
<td>A south, ambiguous</td>
<td>50</td>
<td>1 x t4</td>
<td>0.68</td>
<td>monumental theatre wall west +++</td>
<td></td>
<td></td>
</tr>
<tr>
<td>gr. 2</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>S37</td>
<td>110</td>
<td>0.44</td>
<td>2+2 = 4</td>
<td>A south, ambiguous</td>
<td>62</td>
<td>1 x t4</td>
<td>1.25</td>
<td>open border with S36, shares monum. w side S 36 +++</td>
<td>2 caup</td>
<td></td>
</tr>
</tbody>
</table>

*Boreas* 33
Table 3. The convex spaces of the Stabiana movement axis, continued.

<p>| | | | | | | | | | |</p>
<table>
<thead>
<tr>
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<tr>
<td>S39 gr. 2</td>
<td>103</td>
<td>0.35</td>
<td>2+2= 4</td>
<td>NA south</td>
<td>26</td>
<td>1 x t4</td>
<td>0.83</td>
<td>not boosted</td>
<td>1 caup</td>
</tr>
<tr>
<td>S5 gr. 1</td>
<td>40</td>
<td>0.88</td>
<td>1+4= 5</td>
<td>A north (angle &amp; protrusion)</td>
<td>68</td>
<td>1 x t1</td>
<td>2 x t2</td>
<td>1 x t4</td>
<td>1.33</td>
</tr>
<tr>
<td>S6 gr. 4</td>
<td>348</td>
<td>0.19</td>
<td>4+1= 5</td>
<td>---</td>
<td>16.2</td>
<td>1 x t1</td>
<td>1 x t4</td>
<td>1</td>
<td>not boosted</td>
</tr>
<tr>
<td>S8 gr. 4</td>
<td>279</td>
<td>0.22</td>
<td>4+1= 5</td>
<td>NA south (angle)</td>
<td>17.6</td>
<td>1 x t4</td>
<td>1</td>
<td>not boosted</td>
<td></td>
</tr>
<tr>
<td>S10a gr. 1</td>
<td>37</td>
<td>0.88</td>
<td>1+4= 5</td>
<td>A south (angle)</td>
<td>NA north</td>
<td>53</td>
<td>1 x t4</td>
<td>1</td>
<td>not boosted</td>
</tr>
<tr>
<td>S12 gr. 1</td>
<td>22</td>
<td>0.81</td>
<td>1+4= 5</td>
<td>NA north &amp; south</td>
<td>55.3</td>
<td>1 x t4</td>
<td>1</td>
<td>not boosted</td>
<td>ent. bake. S11 1 caup</td>
</tr>
<tr>
<td>S14 gr. 4</td>
<td>201</td>
<td>0.24</td>
<td>4+1= 5</td>
<td>A north NA south</td>
<td>18.6</td>
<td>1 x t4</td>
<td>1</td>
<td>not boosted</td>
<td></td>
</tr>
<tr>
<td>S16 gr. 4</td>
<td>215</td>
<td>0.19</td>
<td>4+1= 5</td>
<td>NA north</td>
<td>24.5</td>
<td>1 x t4</td>
<td>0.58</td>
<td>not boosted</td>
<td></td>
</tr>
<tr>
<td>S17 gr. 3</td>
<td>119</td>
<td>0.41</td>
<td>3+2= 5</td>
<td>A south</td>
<td>34</td>
<td>1 x t4</td>
<td>1 x t3</td>
<td>1.5</td>
<td>step. stones in middle ++</td>
</tr>
<tr>
<td>S18 gr. 2</td>
<td>48</td>
<td>0.69</td>
<td>2+3= 5</td>
<td>NA north and south</td>
<td>53.6</td>
<td>1 x t4</td>
<td>0.66</td>
<td>step. stones in small space ++</td>
<td>1 caup</td>
</tr>
<tr>
<td>S20 gr. 4</td>
<td>278</td>
<td>0.15</td>
<td>4+1= 5</td>
<td>A south as border to arcade S22</td>
<td>19.9</td>
<td>2 x t4</td>
<td>1.66</td>
<td>step. stones in middle, no border ++</td>
<td>2 large bake. 1 caup</td>
</tr>
<tr>
<td>S21 gr. 1</td>
<td>33</td>
<td>0.91</td>
<td>1+4= 5</td>
<td>NA south</td>
<td>79.2</td>
<td>1 x t4</td>
<td>1 x t2</td>
<td>0.86</td>
<td>shared mon. border S22 +++</td>
</tr>
<tr>
<td>S24 gr. 4</td>
<td>352</td>
<td>0.16</td>
<td>4+1= 5</td>
<td>A north*</td>
<td>27</td>
<td>1 x t4</td>
<td>0.66</td>
<td>not boosted</td>
<td></td>
</tr>
<tr>
<td>S40 gr. 1</td>
<td>41</td>
<td>0.62</td>
<td>1+3= 4</td>
<td>A north</td>
<td>69.2</td>
<td>1 x t4</td>
<td>1 x t2</td>
<td>1.33</td>
<td>not boosted</td>
</tr>
<tr>
<td>S25 gr. 3</td>
<td>124</td>
<td>0.41</td>
<td>3+2= 5</td>
<td>NA south</td>
<td>35</td>
<td>1 x t4</td>
<td>1 x t2</td>
<td>1.16</td>
<td>stepping stones in middle ++</td>
</tr>
<tr>
<td>S27 gr. 2</td>
<td>82</td>
<td>0.62</td>
<td>2+3= 5</td>
<td>NA north &amp; south</td>
<td>35.1</td>
<td>2 x t4</td>
<td>1</td>
<td>no sidekerb &amp; doors w, enhances east side +</td>
<td>2 caup</td>
</tr>
<tr>
<td>S29 gr. 2</td>
<td>93</td>
<td>0.53</td>
<td>2+3= 5</td>
<td>A north, NA north &amp; south</td>
<td>85.5</td>
<td>3 x t4</td>
<td>1.86</td>
<td>monument &amp; level difference west +++</td>
<td>well 1 bake-shop, bake.in S30</td>
</tr>
</tbody>
</table>
Table 3. The convex spaces of the Stabiana movement axis, continued.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>S30</td>
<td>167</td>
<td>0.34</td>
<td>3+2=5</td>
<td>A north</td>
<td>25</td>
<td>2 x t4</td>
<td>0.5</td>
<td>not boosted</td>
<td>south part 4 bake. 1 caup.</td>
<td></td>
</tr>
<tr>
<td>S31</td>
<td>273</td>
<td>0.18</td>
<td>4+1=5</td>
<td>A south</td>
<td>24.5</td>
<td>3 x t4</td>
<td>2</td>
<td>stepping stones in middle ++</td>
<td>south part 3 bake. 1 caup.</td>
<td></td>
</tr>
<tr>
<td>S33</td>
<td>26</td>
<td>0.78</td>
<td>1+4=5</td>
<td>NA south*</td>
<td>54.8</td>
<td>2 x t4</td>
<td>0.86</td>
<td>not boosted</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S38</td>
<td>30</td>
<td>0.82</td>
<td>1+4=5</td>
<td>NA north</td>
<td>54.5</td>
<td>1 x t4</td>
<td>0.83</td>
<td>not boosted</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S41</td>
<td>128</td>
<td>0.5</td>
<td>3+2=5</td>
<td>NA south</td>
<td>33.3</td>
<td>1 x t4</td>
<td>0.83</td>
<td>east sidew-k very large &amp; specific ++ 1 hosp. east side 1 caup</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S7</td>
<td>206</td>
<td>0.5</td>
<td>4+2=6</td>
<td>---</td>
<td>25</td>
<td>1 x t4</td>
<td>1</td>
<td>not boosted</td>
<td>3 ent. hosp. ?</td>
<td></td>
</tr>
<tr>
<td>S9</td>
<td>150</td>
<td>0.68</td>
<td>3+3=6</td>
<td>A north (angle) &amp; south</td>
<td>28.4</td>
<td>1 x t4</td>
<td>1</td>
<td>sidewalk widens to “largo” west +++</td>
<td>3 ent. to 3 (or 2) full.</td>
<td></td>
</tr>
<tr>
<td>S15</td>
<td>261</td>
<td>0.49</td>
<td>4+2=6</td>
<td>A north &amp; south</td>
<td>35.5</td>
<td>3 x t4</td>
<td>2</td>
<td>sidewalk widens to “largo” west +++</td>
<td>well altar</td>
<td></td>
</tr>
<tr>
<td>S26</td>
<td>64</td>
<td>1</td>
<td>2+4=6</td>
<td>A north &amp; south</td>
<td>40.6</td>
<td>2 x t4</td>
<td>0.86</td>
<td>not boosted</td>
<td>2 metal.</td>
<td></td>
</tr>
<tr>
<td>S28</td>
<td>214</td>
<td>0.26</td>
<td>4+2=6</td>
<td>A north &amp; south, NA south</td>
<td>20.3</td>
<td>2 x t4</td>
<td>0.75</td>
<td>elongated space, stepping stones n. border, bath facade w. +</td>
<td>2 caup. 2 metal.</td>
<td></td>
</tr>
<tr>
<td>S35</td>
<td>279</td>
<td>0.40</td>
<td>4+2=6</td>
<td>A north</td>
<td>28.4</td>
<td>2 x t4</td>
<td>1 x t2</td>
<td>1.58</td>
<td>theatre facade west, extr. wide sidewalk +++</td>
<td>3 caup. entr. and a bakery</td>
</tr>
<tr>
<td>S42</td>
<td>131</td>
<td>0.69</td>
<td>3+3=6</td>
<td>A north</td>
<td>34.3</td>
<td>1 x t4</td>
<td>1</td>
<td>not boosted</td>
<td>1 hosp. 1 caup.</td>
<td></td>
</tr>
<tr>
<td>S43</td>
<td>138</td>
<td>0.66</td>
<td>3+3=6</td>
<td>A south</td>
<td>25.5</td>
<td>1 x t4</td>
<td>1 x t2</td>
<td>1.25</td>
<td>gate, contact to carrier boosting +++</td>
<td>well 1 hosp. &amp; caup</td>
</tr>
<tr>
<td>S4</td>
<td>190</td>
<td>0.76</td>
<td>3+4=7</td>
<td>A north &amp; south</td>
<td>33.3</td>
<td>1 x t1</td>
<td>1 x t2</td>
<td>1 x t3</td>
<td>1.33</td>
<td>no sidewalk n &amp; s, gate, carrier connection. castellum aq. facade. +++</td>
</tr>
</tbody>
</table>

Boreas 33
5. Urban activity in the convex spaces along the movement axes

Fig. 30. The convex spaces on the Stabiana movement axis, convexity graded according to size.
5.4. Interpreting the spatial attributes

It is now time to look for patterns in the spatial and non-spatial attributes of the spaces along the Stabiana movement axis. The convex impact points of spaces vary, as can be seen in Fig. 30 above, but do they vary in the same way as permeability – is a space with a high number of points also thus a space with many doorways across the interface between public and interior space? Or is the opposite true? And do the spaces with a stronger convex impact have some kind of specific interface, perhaps trade of a specific kind?

5.4.1. Degree of convexity and permeability

If we start out with the spaces that receive many convex impact points, we can see that some of them incorporate an intersection, although not all crossroads are incorporated in such a space. Of these intersection-incorporating spaces, S4 has the highest number of convex impact points (7), and a low permeability. The spaces S15, S35 and S43, with 6 convex impact points each, have medium and low permeability. These spaces may thus form a group and be characterised as intersection spaces with high convex impact and low permeability.

Between the intersections on the Stabiana movement axis we find S7, S9, S26, S28 and S42 (all have 6 points). The first four all have medium to low permeability, while S42 has medium to high permeability. The first four are road spaces with high convex impact and low permeability. So far, it would seem there is a trend whereby permeability relates negatively to convex impact. Spaces that are suitable for stationary activity by a combination of a high degree of convexity and a large area, and that are thus likely to be perceived as special places, are spaces with a fairly low permeability between public and interior spaces. It is also clear that these spaces could either incorporate an intersection or be road spaces without intersections.

Intersections are of course interesting in their own right, as this is where axial spaces cross and flows of traffic change direction, intermingle, thin out or get larger. A closer look at them reveals that those intersection spaces that do not form part of the above group with high convex impact and low permeability have a widely varying permeability. Of those spaces, S10c, S19, S32, S37 and S40 have a very low points rate, while S17, S20, S25 and S29 are in the medium range. This means we have a group of intersection spaces with no great convex impact and varied permeability to interior space.

Finally, there is also a group of road spaces with no great convex impact and varied permeability to interior space.

It should also be noted that there are no similarities between the patterns of permeability shifts (discussed in sections 4.4.3 and 4.5.4) and shifts in the...
number of convex points. The conclusion to be drawn from this evaluation is that spaces with high convex impact tend to have low permeability, whether they are in a crossroads or not, while spaces with a lower score in points have mixed permeability. It is thus safe to say that permeability is not related to the size and degree of convexity as expressed by convex impact points – except with regard to spaces with a high score of points, which have a low permeability.

5.4.2 Convex impact and type of interface

The Stabiana movement axis is a highly commercial thoroughfare, and both large and small shops and businesses make up most of the interior spaces along the interface with public space. Some of the large spaces with a high degree of convexity are among the top commercial spaces, but others are not, and spaces with a low as well as a high score of convex impact points may be among the top commercial spaces. We have already seen that permeability increased south of certain intersections, and it would seem that permeability is generally linked to the axial dimension, the dimension of movement along the axis. This is important since it tells us that spaces that had a high permeability with interior space actually could have any kind of convex impact.

Convex impact, we may conclude, was not something that was perceived as necessary for a permeable, commercial interface and its concomitant street activity – neither a very large space nor a very fat one, nor even a space both large and fat, automatically engendered more commerce than any other space, and convex impact did not trigger a heightened permeability. It also means that many spaces that do not seem to have much going for them as exterior activity spaces would nevertheless have seen a lot of activity, since a permeable interface of course generates all sorts of exterior activity related to it.

There are other comparisons that may be made between spaces. What about upper class living? In Fig. 26 the percentages of upper class living turn out to represent one domus each per convex space, and this domus can be placed in all kinds of convex spaces with a varying degree of permeability. More modest living is present in every type of convex space as well, and

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172 The first permeability shift is S10c/S11 (up), which is mirrored, though rather weakly, by an increased convex impact. The next shift S13/S14 (down) is inverted, as convex impact rises, and the shift S17/S18 (up) occurs between two spaces in the same point group. The shift in permeability between S22 and S23 (up) is again weakly mirrored and the low permeability stretch S26 to S29 comprises spaces of varying convex impact. The other low permeability stretch S32 to S36 includes the crossroads space S35 with its high number of convex points, but is otherwise mirrored by low convex impact. The shift that precedes it in S31/S32 (down) is mirrored. The shift in S35/S36 (up) is inverted and the shift in S36/S37 (down) occurs between two spaces in the same points group.

173 See Chapter 4, section 4.7.
seems to be attracted to spaces with a high permeability rather than with high convex impact. Thus, neither low nor high class living seems to be drawn to the most conspicuous convex spaces, but neither do they avoid them.

All this tells us that a clear-cut convex space, with a good potential for being perceived as a special space and a special place, does not function as a magnet for specific kinds of interface and the concomitant interaction across the interface between public and interior space. It is an indifferent place for locating humble or high living and for commerce in general. The convex dimension is not operative in a major way in the generating of a permeable interface or in the locating of different types of permeability. The importance of convex impact lies in another sphere of the urban life.

5.5. The non-spatial attributes defining a convex space

To go further, we have to move from the spatial layout of convexity and look for non-spatial factors that render a convex space more useful for stationary activity, or that strengthen the impact of the convexity of a given space.

The features that can enhance or boost the convex impact of a space and that are still recoverable in the archaeological material today are monumental borders (decorated facades with specific architectural features, specific public building fronts etc.), sharp level differences along the open border of a space, wide sidewalks, and stepping stones linking the sidewalks across the general direction of movement.

Any space that is in some way enhanced must have come across as “more spatially present” than if it had not received this enhancement. What we need to look at are the kinds of spaces that are enhanced in this way. Did the already clearly spatially marked-out spaces receive an extra boost from non-spatial enhancing, or did the convexly more unimportant spaces get enhancing features to help them achieve convex impact?

5.5.1. Enhanced convexity

In Pompeii, the feature that most often makes convex spaces more useful is the wide sidewalk, enabling stationary pedestrian activities as well as pedestrian movement. This is at the same time the weakest enhancing feature, since the sidewalk extends along the axial dimension and also may pass from one space to the other or break off in the middle of a space. This feature is thus disregarded in discussing the convex definition and enhancement of the spaces, except concerning very specific sidewalks that are unique in width and form for their specific space. Such a sidewalk is rare on the Stabiana MA. More common are the transverse stepping stones that knit the space together across the movement axis, making the space more useful and also
easier to perceive as a place in its own right. Other features, like the monumental border, are present in a minority of spaces.

In Table 3, column 9, the convexity-enhancing features for all the spaces along the Stabiana MA are both listed and rated.

Assessing the enhancing features to try to understand the impact of a convex space presents some difficulties. How is one to rate, for instance, a large and conspicuous monumental border as opposed to a set of stepping stones? And do stepping stones influence a long and not particularly “fat space” as much as they influence a small space with a high degree of convexity? Here the analysis must depend on subjective assessment. Each space with an enhancement receives of course a boost in the convex dimension and becomes more specific and more noticeable. The amount of boosting is rated from + to ++++, and the feature that is rated is noted in Table 3.

Some spaces have distinguishing features that cannot be considered as boosting, like the absence of a permeable interface on one or both sides. These features are not listed and rated, but in some cases they will be discussed later.

What does this boosting do? If the spaces with a high boosting rate were to correspond to the spaces with many convex impact points, the enhancement would intensify the differences already observed between spaces (see the diagram in Fig. 30), but it would not alter the pattern per se. A space with a lower convex impact than its neighbour will still have a lower convex impact, though the difference between the two spaces may be clearer. If, however, the spaces with a high boosting rate were to correspond to the spaces with few convex impact points, this would tend to even out the differences between the spaces.

In Table 3, we can see that boosting seems to become more frequent in spaces with more convex impact points. The correlation is made explicit in Table 4. Except for the three spaces with the lowest number of convex impact points, the percentage of boosting increases with the number of convex impact points. The boosted spaces are more often than not intersection spaces, but intersection spaces may also lack boosting.

Thus, the degree of convexity calibrated by size (the convex impact points) relates to boosting – which in turn means that the degree of convexity and size taken together did have an impact on the perception of space. Spaces that were perceived as important urban places received boosting, or boosted spaces were laid out so that they had convex importance – it may have worked in both ways, but the connection is there.
Table 4. Boosting in spaces with different numbers of convex impact points.

<table>
<thead>
<tr>
<th>Convex impact points</th>
<th>Number of spaces</th>
<th>Number of boosted spaces</th>
<th>Percentage of boosted spaces</th>
<th>Intersection spaces boosted</th>
<th>Intersection spaces not boosted</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>3</td>
<td>2</td>
<td>75</td>
<td>0</td>
<td>1</td>
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<tr>
<td>4</td>
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<td>8</td>
<td>5</td>
<td>62.5</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>1</td>
<td>100</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

5.5.2. The activities in the convex spaces

Specific activities in convex spaces can be denoted, for instance, by graffiti or dipinti, by a water fountain or some other water-supplying facility, or a street altar. The presence of a caupona also has bearings on the convex space, as food was served at the large door with its counter and eating most often took place in the immediate vicinity. Other types of specific activities may have clustered together, for example forming a “bakery space”, which would have served as a goal for specific customers in the convex grid. Much of this clustering is lost to us due to the fragmentary state of finds and the difficulty of interpreting them: finds of metal objects could be from a shop selling household goods, from a smithy, from private rooms above the shop with no bearing on the activity downstairs, or from a workshop using metal implements. In some cases, however, there is conclusive evidence, for instance in the form of the mills and ovens of a bakery or the vats for processing fabric in a fullonica.

There may also be some unique features in a convex space telling us about specific functions and actions. These indications of activity are listed in column 10 of Table 3.

Here, there seems to be no pattern that links the spaces with many convex points with different activity indicators in the convex spaces. The different attributes are spread over spaces with a high score of convex impact points and those with a low score, as well as over “boosted” spaces and those that are not “boosted”, and large spaces as well as small. This may well be due to the fragmentary state of the remains left to us, and it should not be concluded that public space was used for exterior activities without first considering the spatial realities – it is important to realize that we cannot grasp today how these activities were located or grouped.

5.6. Microcosms on the Stabiana movement axis

So far, what we know of the Stabiana MA in general is that the permeability pattern is broken up by official buildings (see section 4.7.1), and that perme-
ability and commerce are primarily related to the axial dimension and influenced by important axial spaces crossing each other (see section 4.7.3). We also know that there exist some important convex spaces that exhibit a low permeability, but that generally connections between convex impact and permeability are lacking. These important convex spaces may or may not be placed in street intersections. However, important convex spaces were more often boosted than other spaces.

There seem to be no easy rules governing what a space with convex importance would be used for or where we would find it in the urban grid. To pinpoint what actually may have happened in different spaces, it is necessary to look at spatial microcosms and what they tell us when we examine them in total.

I thus propose a closer look at the spatial configurations where there are spaces of convex importance and boosting, and also at intersections in general since these often (but not always) are important convex spaces.

The contexts are analysed in their order of location moving north to south along the Stabiana movement axis. After the analysis of these microcosms, a short “story” is presented that serves as an illustration of how these abstract spatial qualities could have been experienced follows.

5.6.1. Space S4 and its neighbours – the area of the Castellum Acquae

Space S4 (Figs. 31A and B) is important in that it gets the highest degree of convexity calibrated to size along the Stabiana axis. This very strongly articulated space has an entirely open border with S5. S5 in turn owes its convex existence to a small change in the alignment of the facade on the east side of the Via Stabiana, just north of V 6.18 – had this not been so, S5 would instead have been part of S6. The open border with S4 and the low degree of articulation vis-à-vis S6 show that S5 is a kind of “transition space” between these two spaces and that it can be seen in some degree as part of S4.
Fig. 31A. The Castellum Acquae square just inside the Porta del Vesuvio, where the aqueduct reached Pompeii. The Castellum was a decorated piece of public architecture.

Fig. 31 B. Diagram of the gate area in the north part of the Stabiana MA (not to scale).
What do we find in S4/S5? The two spaces form a node in the convex dimension, and branching off from this node are S6 along the Via Stabiana, the first space on the agger street to the east, the first space on the Vicolo dei Vettii, and the first space inside the gate itself, leading to the carrier. The control value of S4 as well as S5 is 1.33, and taken together they would have had the value 2. This measurement reflects the local importance of these spaces. Here we also find an axial intersection between one axial space of the highest integration (t1), one of the second highest (t2), two of the second lowest (t3), and one of the lowest (t4). S4 and S5 are thus axially important as a traffic hub, and S4 also has great convex importance. Together S4 and S5 control (which here means monitors, “oversees”, gets information from) passage through the gate, traffic entering and leaving other intersecting streets and cult activities at the lararium in the next space along the agger street. From here, one was able to see who saw and honoured (or did not honour) the lararium.

The space is geared to hospitality and large-scale commerce, but these are indoor activities that certainly would have drawn strangers/visitors but not posited their activities in the public realm.

The Castellum Acquae area also strongly proclaims Pompeian identity: the aqueduct, a major communal undertaking, enters town here, and the Castellum Acquae is a decorated piece of public architecture. The lararium painting emphasises location as it depicts Vesuvius as well as local production (Dionysos, god of wine).

The possibility of chance encounters between people (both inhabitants and strangers) would have been high, but there would also have been a certain amount of more intense encounters, primarily at the so-called “grape gatherers post” VI 16.22. Official identity proclaiming and identity building, as well as a certain measure of traffic, encounters of the more fleeting kind and more intense encounters are thus all features of this space. Permeability is low.

We saw in sections 4.4.3 and 4.7.1, that when there is low permeability in a convex space with public structures, and when this convex spaces is crossed by integrated axial spaces, this can imply that the convex space had global importance (for the entire town) and that it attracted strangers from both inside and outside of Pompeii.

S4 and S5 functioned as a goal for movement in the axial dimension and a transition place for movement into and out of the town, and would have been a place where social roles were proclaimed, enacted and negotiated. Below, a fictitious grape gatherer will help us understand these abstract spatial qualities.

174 See Table of interior units, S4, S5.
175 Della Corte 1954, 70-71.
Experiencing the Castellum Acquae space

Marcus is a hard-working and rather poor man who lives in the east part of Pompeii, near the Porta di Nola. He usually seeks employment as a grape gatherer in season, and is now making his way to the place where he is most likely to find someone willing to hire him. On his way there, some people give him pitying glances – he looks every bit a manual labourer on a very hot morning. He feels a little uncomfortable at this, but this feeling disappears once he arrives at the Castellum Acquae. Here he is at home, this is his place, and here he knows exactly what to expect. He joins the other grape gatherers in the south part of the small square.

As usual, he admires the Castellum. It is beautiful, and it serves the whole town with fresh drinking water. It feels good to live in Pompeii, where his wife never has to go very far to fetch water and where there are many baths. Today, Marcus remembers, bathing is free at the Forum baths, so he will take his children there in the evening. He may be poor, but he would rather be poor in this town than in some of the hamlets he has seen on the way to some rich man’s vineyard. Actually, he suddenly feels quite proud of being a Pompeian.

People are pouring in through the town gate – well, perhaps not pouring, but there is a steady flow of people. Marcus likes to watch them, he feels he knows a lot about them while they know almost nothing about him. The lady, for instance, who is picking up her skirts and talking to her slave in an irritated voice – Marcus can see she is very self-sufficient, as she urges the slave girl to hurry along and not spend time at the small shrine to Dionysos. Marcus takes an instant dislike to the lady, and when she comes and asks him to work for her today, he feels cannot do that. If she doesn’t honour the god that commands her crops, then anything might happen to him. The other grape gatherers react in the same way, and the lady is left to make her way southward.

But now a man enters the gate, and goes to the altar in the east to lay down a handful of raisins. A strange offering, Marcus thinks, but why not? He steps out from the group and shouts to the man that he is an experienced picker and a strong worker. The man grins and promptly comes to offer him a job for the day. They discuss wages for a while, and although the man, who happens to be called Fabius Tranquillus, cannot pay much he will provide food during the day and a basket of grapes to take home. Marcus accepts, especially as Fabius says there will be work for several days if he does well. They walk out through the gate talking about wine production and the harvest.
5.6.2 Space S9 and the intersection south of it – a fullonica space near a crossroads

In S9 (Fig. 32) the west sidewalk forms a small largo and offers access to two or possibly three fullonicae, a distinct business area with stepping stones tying it together transversely (due to the east side not being excavated we cannot say if the fullonica character extended to this side). The control value is the neutral 1, which means the space is not a node strongly dominating other spaces. Further, it has no intersecting axial spaces passing through it and permeability also is low, so there is no great traffic importance to S9. This seems to have been a space devoted to specific interaction of a more intense and slightly more private kind – fullonica-related business between inhabitants and specific strangers/visitors.

South of this, S10a is a small, highly convex space without passage to the interior. The control value is 0.75, so this is a controlled space, through which passage is monitored from S9 and S10b. This is a negatively articulated pass-through space, most likely perceived as a limit or portal between S9 and S10b.

S10b is difficult to define in terms of convexity. When constructing the convex map, one seeks to establish the fewest and the fattest spaces possible – and in this case, by opting to let the fattest space extend as far as possible in constructing the convex map, S10b would cover the intersection to the south of it. If opting to create the largest spaces, however, the intersection would instead go to S10c, which is what I have chosen. Neither solution creates fewer spaces, which would otherwise clinch the matter as far as choosing one solution above the other. This ambiguity argues in itself for S10b and S10c functioning jointly in some respects.

Neither S10b nor S10c displays a high potential for use in the convex dimension. S10c is a distinct business space along the Vicolo di Mercurio, again with two fullonicae (joined in the north-south direction by stepping stones roughly between doors), and S10b provides the necessary water with its fountain.

The control value of S10c is 2, and this makes S10b, S11 and adjoining spaces on the Vicolo di Mercurio controlled spaces. Obviously, to make use of this control there had to be activity – and it makes sense that the users of a fullonica business space like S9 or S10c would be interested in control being vested to an adjacent space with a water facility. Spaces unimportant in terms of convexity may thus also have high control values, and the same kinds of spaces may also exhibit specific use and interaction.

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Experiencing a fullonica environment near an intersection

The stench from the fullonicae is noticeable already halfway there, a woman thinks to herself as she lugs a basket with two of her master’s togas. She comes from the east on the Vicolo di Mercurio and has sensed the odour of the fulling and washing basins for some time now, due to the wind. The basket is heavy and she is glad to be nearing the crossroads.

She stops for a while by the fountain to drink water, and immediately the fat little man who owns the large fullonica just southwest of the intersection steps out in the street and urges her to come in with the basket. What a pity he saw her! She has strict orders not to deliver the togas to him, as he did a bad job last time in getting some wine stains out. She shakes her head and all but runs into the shade between two blank walls – it’s like a portal leading from the vulgar little man into a higher class environment with a large sidewalk where she can put down the heavy basket. Here, she is treated with respect; the people know her master has used the other fullonica before, and want to make sure they will keep this new customer. A slave takes her basket and comes out again immediately with a small folding chair and a beaker of grape juice, telling her to rest while the boss looks over the togas. She leans against the red walls and rests her back, chatting with some other customers waiting on the sidewalk.
5. Urban activity in the convex spaces along the movement axes

The slave comes back and tells her the togas will be in perfect condition already tomorrow morning. Now there is nothing to do but go home. As she passes into the crossroads the fat little man spies her from his doorway and snorts. She has a sinking feeling he will do this every time she passes the crossroads...

5.6.3. The alleged poultry market S15 and the intersection with Via di Nola

In S15 (Figs. 33A and B) we find a large, highly convex and highly articulated largo on the intersection with the Via di Nola, where two of the most integrated axial spaces intersect. The west sidewalk forms a large, usable space on its own, and has both a well and an altar. Transverse stepping stones tie the space together in the convex dimension. It gets a control value of 2, controlling four convex spaces, three of which (S16, as well as the east and the west space on the Via di Nola) are almost exclusively commercial. S15 would be an ideal place to keep up with happenings in and around the intersection and to keep tabs on the traffic flow, the space drawing interaction to itself. A crossroads altar is a strong signal of local identity.

Fig. 33A. The large space S15 at the intersection with the Via di Nola was possibly the place of a poultry market.

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A dipinto marks this space as a poultry market. This space thus offers interaction between strangers and inhabitants by open-air buying and selling, though this interaction is not of the most intense kind. Cult is incorporated and thus directly controlled. S15 resembles S4 and S5, but the global identity dimension is much less marked.

5.6.4. S17 to S19, a stretch with two T-intersections by the Central Baths

This sequence of spaces is located in the highly permeable and very commercial part of the Stabiana MA. In S17, the Vicolo del Panettiere (axial space t2) intersects with the Stabiana MA, and in S19 the unnamed continuation of this street (axial space t3) leads east. Sandwiched between the intersections is the negatively articulated S18. S17 has low to medium permeability but ranks rather high in convex points, while S19 has high permeability and ranks low in convex points. S18 is high on both accounts. S17 and S18 (as well as S16 to the north) are commercially important spaces related to the Central Baths on the east side.

The highest control value is found in S17, and with 1.5 it controls both the adjacent spaces on the Stabiana MA, and the first space on the Vicolo del Panettiere. Incidentally, this makes S16 a very controlled space, as access and passage are monitored from the convexly important S15 and from S17 – this is interesting as it means that access to the new Central Baths would have been very closely scrutinized, had they ever been completed.

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176 Della Corte 1954, 103.
This provides the clue to the convex importance of S17 and S18: both these spaces lie opposite the baths’ row of shops row and are united to it with a set of stepping stones each. These two spaces were meant to cater to bath visitors, designed for “walking about and shopping”, together with S16 to the north. Of these spaces, S17 provided control of where the traffic flow from the Vicolo del Panettiere went, as well as a monitoring of the intense interaction in the caupona of S18, where the very broad sidewalk rather indicates the intensity possible. The negative articulation of S18 may possibly have emphasised the end of the bath area and passage to another environment.

In this environment both the casual encounter typical of a space with important convex impact, and the more focussed interaction of shops and street side eating places comes together.

S19 controls the small vicolo leading east, but is itself controlled from S20 to the south. It has a specific fullonica interface, once again showing that a specific interface is independent of convex points.

5.6.5. S20 and the lararium spaces south of it

S20 scores 5 convex impact points in spite of being a long and narrow space. It is clearly articulated to the south and has a strong control value of 1.66. It incorporates the crossroads with the Via degli Augustali and thus controls the traffic flow from this street into the high permeability area of the Stabiana MA. S21 and S22 to the south of the intersection are also controlled; they consist of the largest lararium in Pompeii (Fig.34) with an arcade over the east sidewalk (S22), and a small street space in front of it (S21).

S20 is an example of a space that actually needed some boosting features in order to become a special place. The two sets of transverse stepping stones hold the space together, and the south provides direct access to a caupona on the east side, just opposite the lararium. This facilitates intense interaction.

The arcade extending between S21 and S22 enhances them both, and there are stepping stones crossing S21 and leading directly to S22, linking the spaces to each other. S21 and 22 are controlled spaces, and once again access to religion is monitored by an adjacent convex space. S21 is negatively articulated, which may have stressed its function as a kind of “forecourt” to the lararium.

What is striking is the function density and the boosting in the south part of S20, in S21 and 23. Besides the monumental lararium arcade and a water facility, there are two sets of transverse stepping stones (one in the south part of S20, one in S21), and for once stepping stones in the north – south direction should also be noted, crossing the continuation of the Via degli Augustali on the east side and targeting the same caupona as one of the transverse sets. This could actually indicate that in the perception of space in this

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spot there was another dimension at work (now lost to us) encompassing the intersection proper, the street in front of the caupona and the lararium spaces.

Fig. 34. The largest lararium of Pompeii sits in a rather cramped intersection. The vaulted arcade in front of it draws attention to this spot. View from the west.

**Experiencing a sacred area**

The chief priest of the Augustali was planning tomorrow’s ceremony. He had summoned his priestly colleagues to the caupona opposite the main lararium of Pompeii, where they usually gathered to discuss such things if they didn’t need to be absolutely private.

There would be a lot of spectators tomorrow, with people coming from all over town, as this lararium was the most important one: to take part in the ceremony showed that one felt part of the town and part of one’s own neighbourhood with its smaller altar – in fact, all the altars to the lares and all the local priests held Pompeii together in a sacred net, so to speak. The chief priest rather liked this idea.

It was not an ideal place for such an important shrine, though. The cross-roads was cramped, and the arcade in front of the shrine blocked the sidewalk, although it looked good. There was no choice, however. He had read the omens and it was here the lararium had to be built. Also, it hadn’t come amiss that his patronus owned a shop across the street and rented it out cheap, to be converted into the administrative office of the priests.
Tomorrow people would throng here and it was necessary to have a strict timeline for the events as well as to make decisions on where people could stand and watch and where they could not. Well, at least the host of the cauponara would do good business. The priest thought that the whole crossroads had in fact become associated with the altar: the arcade, the office, the cauponara, and the stepping stones that allowed people to move from one side of the street to the other to see better, talk with friends, or get a snack or a drink of water.

Today, he was also pleased that he lived just north of the lararium, even though he hoped he would be able to leave his upper floor apartment and get himself a small domus sometime soon. But just now it meant that he could get up early tomorrow morning, sit on his balcony and get a grip on which people gathered for the ceremony and which slunk by without paying any attention. He also would send his daughter out to fetch water and bring home any gossip – it always paid to see who was loyal and who didn’t care for either the lares or the emperor!

5.6.6. S25, an intersection, and S26, a space for metalworking

Situated in the intersection with the Vicolo di Balbo, S25 controls its adjacent spaces and gets 5 convex points, but we have no remains of specific activities, and no boosting.

By contrast, in S26 two adjacent metal workshops/shops make this a space with a specific activity. Sidewalks are large on both sides, and the west side is a closed wall (the Stabian baths, with an entrance in a projection of the wall in this space). The closed west side singles S26 out, and the bath facade may actually have been a monumental facade that distinguished this space and others to the south – in that case the boosting would make S26 spatially more important. Interestingly, the bath entrance is once again monitored from the adjacent high-control space S25, a parallel to the situation in S16 and S17.

5.6.7. S29, the most important intersection on the Stabiana MA

In S29 we come to what is perhaps the most important intersection of Pompeii (Fig. 35), between the Via Stabiana and the Via dell’Abbondanza, where three of the most integrated axial spaces of Pompeii intersect.

The entire west side is open to an adjoining, monumentally decorated space on the Via dell’Abbondanza (the tetrapylon of the Holconii) and S29 functions jointly with this space in some aspects. The only syntactical reason for dividing this area into two spaces is actually a level difference from the Via dell’Abbondanza, and the tetrapylon itself. Incorporating the west space would make size and degree of convexity rise significantly.
The east sidewalk widens to the north; an embryonic, strongly articulated largo is formed and there is a well on it. In S29 we find both a bakery and a bakery shop, and this space controls intense shopping spaces in all directions with its high control value of 2 (which, incidentally, would not change if the tetrapylon space were considered integral to S29).

S29 and the space west of it, then, is a place where interaction is possible and likely. The mingling of people in the shade of the tetrapylon would not in itself have produced intense interaction between inhabitants and strangers, but the possibility of vendor’s stalls here would have generated slightly more intensity, and the cauponella to the south certainly would have seen intense interaction.

The tetrapylon itself is a monument to the glory of one of Pompeii’s leading families, and its identity-proclaiming function is not so much a statement about the Pompeians’ collective identity as about their social structure – this is a town with prominent families, and these families may give the general population benefits they appreciate, for instance a shaded, richly decorated area in a central shopping district. S29 thus combines identity proclamation, less intense and more intense interaction, a strong control function, and specific activity (bakeries), all of which testifies to the importance of this place in the urban structure.

Fig. 35. The intersection between the Via Stabiana and the Via dell’Abbondanza is arguably the most important in Pompeii. It is made conspicuous by the tetrapylon of the Holconii family bordering the west side, and by a marked level difference down from the tetrapylon to the Via Stabiana. The level difference is lined with protecting stones, and there are stepping stones and a fountain in the intersection. View from the south.
5. Urban activity in the convex spaces along the movement axes

Experiencing the most important intersection

Quintus felt pleased when he looked at the important monument his family had set in the crossroads. He hoped people would see the family resemblance between himself and the statue adorning it, and he stood for a while in the sun beside it. People didn’t notice, though, and of course he was still too young to have acquired the majestic looks of the male Holconii. Anyway, people went gratefully to the shade under the tetrapsylon, and a woman from out of town was heard to say that the Pompeiians were lucky indeed to have a fine family that could build a monument like this. He pricked his ears and caught the gratifying response – yes, they were lucky, but this was only because they all knew how to value their grand families, and paid them due respect.

It irritated Quintus that a gaggle of gossiping matrons occupied most of the shade and commented on everything they saw: weren’t there far more people about than there used to be in former times? Shouldn’t the slaves be kept busy at home instead of wandering about town; and look at that freedwoman giving herself airs and heading towards the Forum... The gossipers seemed to have discovered that this was a prime place to observe things and pick up juicy news. Their poorer sisters gathered in the sun on the other side of the street, and fetched water from the fountain. They took their time, he noticed, perhaps gathering their own information as well.

Quintus’ real errand was to go north to the metal shop and fetch the new candelabrum his father had ordered from the high-quality shop opposite the bath facade. Quintus liked this kind of errand, as the bronze smith treated him as an important adult and presented him to the other customers who gathered there and looked over his goods on the wide sidewalk. But it was nice to hang out in the crossroads and watch all manners of things pass by. One of the gossiping matrons had spotted her daughter further east, for instance, and screamed in angry outrage – the girl was apparently in the company of a handsome gladiator. Quintus laughed happily, but decided he had to go on.

Just then a most delicious smell came wafting by, and he decided that he had to get a honey bun before he went north. As Quintus jostled to get out and down to street level so he could cross over to the bakery, a man bowed and saluted him before going in under the roof to get out of the sun. Quintus’ day was made – it was true, the Pompeiians respected their great families and knew when they were well off!
5.6.8. S31, incorporating the intersection with Vicolo del Menandro/Via del Tempio d’Iside

In S31 very high permeability and a high number of convex points come together. In this elongated space the intersection constitutes only one part; there is also a specific function with three bakery entrances to the south. This is the second time that an extremely long space incorporates an intersection, the other being S20. Regarding S20, there were indications that space was perceived in a special way in its south part, unrelated to the convex or axial structure of the environment. The same kind of observation cannot be made in S31, however.

5.6.9. The theatre spaces, S35, S36 and S37

S35 is clearly articulated to the north, and to the south it is actually only delimited by the open border of the platform in front of the theatre, S37. It would be possible to see S35 as forming a group together with S36 and S37, creating an enormous convex conglomerate. The extremely large size compensates for a certain lack of convexity, so that S35 receives 6 convex impact points.

Grouping the spaces S35, S36 and S37 (Fig. 36) outright would mean that the two axial spaces necessary to tie in both S36 and S37 in the axial grid would be reduced to one, and this would make the axial dimension between S28 and S36/37 more normal. But even if this might be excessive, an area functioning in an interwoven way should be envisaged, especially as stepping stones border it in both the north and the south.

![Fig. 36. Diagram of the intersection in space S15 (not to scale).](image)
The intersection in S35 results in a control value of 1.58, thus controlling S36 with several theatre entrances, S37 with the south access lane to the large theatre and the theatre entrance in S34. There is a large sidewalk on the west side of S35, which consists entirely of the theatre facade, and it is likely that this area was used by street sellers when there was a performance or a meeting in either the large theatre or the smaller odeion. Three cauponae on the east side testify to intense activity and interaction in the convex space. The same type of interface is present in S37 where the east side houses two cauponae.

When it comes to identity building and proclaiming, the theatre area is the ultimate identity machine, and it has a very strong global importance for Pompeii. The large theatre is a place identifying all Pompeiians as belonging to the town, while at the same time sorting them into their social classes by letting them in via different entrances and seating them in different sections. This identity generator was sponsored by the Holconii family, again pointing out a fact of social stratification. The smaller theatre, or odeion, may have been used for the new, colonial inhabitants\(^{177}\) and their meetings as well as for more select performances—broadly identifying the rulers in the first capacity and the intellectual upper class in the second.

The intense interaction possible in the cauponae here, and the doubled axial spaces following the Via Stabiana, indicates that the message was brought home both to inhabitants and to strangers. This place would surely have provoked a multitude of sensations!

**Experiencing the theatre spaces**

*The crowd was dense outside the theatre before people were allowed to enter. The grape gatherer Marcus stood patiently with his family and watched Pompeii's nobility get out of sedan chairs or arrive with slaves and clients in tow. He knew that these people would be admitted first, and then would come others who were less noble, though not as insignificant as he was. He and his family would be among the last to enter, followed only by slaves, and they would get in only through their own special entrance. They would sit together with others of their kind as well.*

*Standing here waiting made him feel very unimportant and small, and he resented that feeling. Anyway, he supposed he was lucky to be able to go and see a play at all, and of course he was proud, too. This was his theatre as much as anyone else's, since he was a citizen of Pompeii.*

*Now people began to go in. Suddenly there was a commotion, and in front of a caupona on the opposite side of the street a man shouted at the slaves guarding the theatre entrance. They barred a man from going in, a rich man...*

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\(^{177}\) Zanker 1998, 107-114.

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by the looks of it. He argued and shouted back, and it became clear that he
was a freedman that had made a fortune in the garum trade. People laughed
— this was not a nobleman! He eventually went away, and the orderly pro-
cession into the theatre resumed. Marcus realized that the man who had
noticed that someone tried to sneak in to get a better place had stationed
himself very well, standing by the counter of a caupona that allowed him to
watch and guard all the theatre entrances.

While waiting, Marcus bought some sweets at a stall set up along the
blank wall of the theatre. Here at least there was no pulling of rank — every-
body crowded around the stall owner and wanted to be the first to buy. Mar-
cus couldn’t help but think that in this kind of crowd the feeling he got was
very different from what he felt up north at the grape gatherer’s post. There
he felt at home and could make decisions about his life — as when he refused
to work for the woman the other day. Here he was a visitor who had to be-
have in order to belong. He sighed. At least he knew how to behave and
didn’t try to force his way in among the nobles, although he had a sneaking
feeling that the angry freedman was somehow in the right in spite of every-
thing. He must discuss this with someone, he thought, perhaps after the play,
at one of the eating places that lined the opposite side of the street. There,
one could always strike up a casual friendship and have a good time. Come
to think of it, why not go there immediately? He made a movement, but his
wife caught him by the hand. It seemed he simply had to belong.

5.6.10. From the Vicolo del Conciapelle to the Stabia gate, S40
to S43

In S40 we find an isolated, but articulated, crossroads convex space that is
vested with control but with seemingly no convex importance. From there,
the convex points rise towards the gate.

In S41 there is an extremely wide and specific sidewalk, as well as a cau-
pona belonging to a hospitium on the east side, creating both the possibility
of intense interaction and a specific activity area with hospitality. S42 and
S43 again each have a caupona and a hospitium on the east side, and S43
additionally boasts a water facility and a gate entrance. S43 has a control
value of 1.25, and both S42 and S43 are strongly articulated spaces, further
singling them out as places in their own right.

This gate would have seen heavy traffic, and the hospitality trade in the
area is no surprise. People from out of town were turned into visitors here,
and public space was adapted to their needs. There were extremely large
sidewalks facilitating interaction between visitors, and in the sidewalks there
were gaps for driving in carts with produce.

The gate building itself is the only identity-proclaiming structure in these
spaces, which clearly sets the gate area apart from its north counterpart, the
combined area of S4 and S5. In the north we had the Castellum Acquae and an important street-side shrine, whereas here we have only the gate. There is a fountain on the west side in space S43, with a relief of what is probably a river god, perhaps emphasizing the importance of the Sarnus river and its port for Pompeii. But all in all, the global, Pompeian element is rather weak here; these spaces were for strangers turned into visitors and for the inhabitants catering to them.

**Experiencing an area catering to people from out of town**

Hefaistos the gladiator stood at the counter of the caupona that served the best wine in Pompeii, and watched a trader from Nucerium arrange for a place for his cart. The cart and a slave waited outside the gate for the time being, but at nightfall the trader would deliver a variety of goods and then house himself, his cart and his slave in the hospitium for the rest of the night.

Hefaistos planned on buying the trader a drink. He liked the place just inside the Stabia gate – on the one hand it was exciting, as lots of foreigners came through here on their way from the harbour. Some of them stopped for a night or two, and the further they had travelled, the more exciting the tales they told. Some would be impressed by him being a gladiator, and he had made good friends here. On the other hand, he also felt safe in this place, with its river god fountain. He might be a stranger to this block of the town, but the river god gave prosperity to the whole of Pompeii, making him feel very much a part of the whole.

Strange, he thought, that a gladiator would like the feeling of safety. But there it was. In the future, when he was a wealthy man, he planned to buy a house here. This place needed some developing for sure – if the space inside the gate were enlarged a little, he could have an even better caupona than the one where he was drinking right now, with a very large white and black sidewalk and benches for people to sit on outside. There was no lack of customers, he thought, as he looked at the steady stream of people going by. And later on, who knows, maybe he could have a hospitium, too, and regular customers coming back... Really, there were no limits.

**5.6.11. Summing up the intersection spaces and their convex importance on the Stabiana MA**

As we have seen, the convex spaces that include intersections along the Stabiana MA are of different types. First, we have the identity-building and identity-proclaiming intersections, where convexity is an important feature and where there is a potential both for chance encounters and for intense, focussed interaction between inhabitants and strangers. Control values are high and permeability is low. Here we find S4 and S5, S15, and S29 in con-
juncture with the west space on the Via dell’Abbondanza. S43 is not as clear cut as the other examples, but it belongs to this group as well. Major axial spaces intersect in these convex spaces, except for S43.

Second, there are several instances of elongated street spaces, where what might be called “ walkthrough spaces” incorporate an intersection. These spaces are generally on the high side of convex impact points and get high control values. There may have been some specific activity that related to the space proper rather than to its interface with interior space, but most often such activity would not have been particularly conspicuous, and the control is, so to speak, wasted – human presence over time is needed to gather information about traffic flow, and about who does or does not do what. Spaces S10c, S20, and S31 are examples of this, but S17, S19 and S25 might also be counted among this group. Important and fairly important axial lines intersect in these spaces too, except for S19 and S25.

There are also spaces that incorporate intersections but where other factors seem to be more important. In the theatre space group of S35, S36 and S37 the important thing is that access to the theatre area is controlled. This, of course, was of major importance for the self-image of the Pompeiians and for the image projected to people from out of town. Control of convex spaces on highly integrated transverse axial spaces is not a feature, however.

Lastly, we have one intersection space that is merely just that – S40 incorporates an intersection, and there is hardly any space left over for interaction.

There are also some important convex spaces that lack intersections altogether. These are primarily S9, S26, S41 and S42 (specific activity spaces), but one should note that there are activity clusters in less important convex spaces as well. S31 combines a specific activity with the presence of an intersection.

5.6.12. Summing up activity clusters and cauponae on the Stabiana MA

In discussing the most convex and most controlling spaces, where the more spectacular boosting of convexity is present, it is easy to miss the fact that the convex dimension is of course present in every convex space. Interior activities that cluster together would provide an ambience of sound and smell that pervaded a certain space or group of spaces. People with an interest in this activity/commerce would have come, waited outside, talked, built their identity as “someone who trades in metal”, for instance.

These clusters may encompass several convex spaces in a group, like the wine dealing in S4 to S8, the fullonicae in S9, S10b and c, the bakeries in S11 and S12, and the hospitality region of S41 to S43. We also have the bakery district in S30 and S31, with a side entrance in S29, and the hospitali-
5. Urban activity in the convex spaces along the movement axes

...ty in S4 and S5 that doubles the wine trade cluster. The fulleries in S19 and the bakeries in S20, however, belong to their respective convex spaces. This diversity suggests that convex spaces and groups of spaces may sometimes have been enhanced by trade clusters (or trade clusters may have made use of them), but most often trade does not seem to cluster in convex spaces or groups of spaces. In Pompeii, clearly one could go to the “bakery space” or the “bakery spaces” or simply to a specific bakery.

Cauponae and their concomitant use of the convex dimension are also sprinkled into every type of convex space. This again suggests diversity – the caupona in the important identity-proclaiming space may have served an additional intensification of the message (stand here and just look), while the caupona in the walk-through space provided intense interaction possibilities in an otherwise continuous flux of people.

5.7. Interpreting the spatial data of the Mercurio MA and the Fauno MA as a comparison

Working through the two other movement axes in my material in the same way as for the Stabiana MA, I will proceed directly to Tables 4 and 5 and diagrams Figs. 38 and 40, summing up their characters and attributes. Size groups are based on the size groups established for the Stabiana axis, based on quartiles of the size of the convex spaces along this axis. Since the spaces on the Mercurio MA are much larger than on the Stabiana MA, a size group 5 is added for spaces larger than the largest space on the Stabiana MA, 352 m².

In Table 5 below, the convex spaces of the Mercurio movement axis are detailed. The sorting of the spaces is based on size-calibrated degree of convexity (see 5.3.1 above), which means that spaces are grouped according to an increasing number of convex impact points.178

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178 Detailed information about the spaces is contained in Table of interior units.
Table 5. The convex spaces of the Mercurio movement axis.

Column 1: space name and size group (see grouping according to quartiles on the Stabiana axis above, 5.3.1 with an added group of spaces larger than the largest space on the Stabiana MA). The colour of column 1 is according to permeability (see *Fig. 23*). All other columns for a particular space are coloured from white to blue to black according to the how many convex impact points they get.

- **Column 2**: approximate size
- **Column 3**: degree of convexity
- **Column 4**: convex impact points
- **Column 5**: articulation (A) and negative articulation (A)
- **Column 6**: approximate percentage of open border
- **Column 7**: axial spaces crossing convex space (the axial spaces are sorted from t1 to t4 with decreasing integration)
- **Column 8**: control value
- **Column 9**: enhancing or boosting of a convex space, type of boosting feature, strength graded from + to +++
- **Column 10**: functional indications including clusters of specific interface

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<td>M6</td>
<td>23</td>
<td>0.27</td>
<td>1+2=3</td>
<td>Arch</td>
<td>space, defined by arch</td>
<td>1 x t1</td>
<td>does not apply</td>
<td>1</td>
<td>whole space defined &amp; shaded by arch++</td>
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<tr>
<td>M11</td>
<td>96</td>
<td>0.09</td>
<td>2+1=3</td>
<td>A, all</td>
<td>sides. Lat.space in colonnade</td>
<td>1 x t4</td>
<td>54.3</td>
<td>0.86</td>
<td>on sidewalk &amp; lined by porticus west++</td>
<td>1 caup</td>
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<td>M9</td>
<td>93</td>
<td>0.45</td>
<td>2+2=4</td>
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<td>M10</td>
<td>12</td>
<td>1</td>
<td>1+4=4</td>
<td>A north</td>
<td>east south (lateral)</td>
<td>1 x t4</td>
<td>25%</td>
<td>0.25</td>
<td>not boosted</td>
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<td>M7</td>
<td>302</td>
<td>0.25</td>
<td>4+1=5</td>
<td>A north</td>
<td>(clear angle), NA south</td>
<td>1 x t1 1 x t4</td>
<td>61%</td>
<td>1.16</td>
<td>lined by porticus east+++</td>
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<td>M1</td>
<td>64</td>
<td>0.71</td>
<td>2+3=5</td>
<td>A north</td>
<td>&amp; south</td>
<td>2 x t1</td>
<td>90.8%</td>
<td>1.83</td>
<td>arch north side+++</td>
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<td>M2</td>
<td>542</td>
<td>0.11</td>
<td>5+1=6</td>
<td>A north</td>
<td></td>
<td>1 x t1</td>
<td>10%</td>
<td>0.5</td>
<td>wall tower and altar space (no sidewalk)</td>
<td>Altar</td>
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<tr>
<td>M4</td>
<td>415</td>
<td>0.13</td>
<td>5+1=6</td>
<td>A north</td>
<td></td>
<td>1 x t1</td>
<td>11%</td>
<td>1</td>
<td>not boosted</td>
<td></td>
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</tr>
<tr>
<td>M2</td>
<td>564</td>
<td>0.15</td>
<td>5+1=6</td>
<td>A north</td>
<td></td>
<td>2 x t1</td>
<td>18.3%</td>
<td>2</td>
<td>step. stones v. large sidewalk w.++</td>
<td>Well 2 caup</td>
</tr>
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</table>

*Boreas 33*
5. Urban activity in the convex spaces along the movement axes

Table 5. The convex spaces of the Mercurio movement axis, continued.

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<tr>
<td>M5 gr. 5</td>
<td>296</td>
<td>0.29</td>
<td>4+2=6</td>
<td>A south (arch of Caligula)</td>
<td>1 x t1</td>
<td>22.4%</td>
<td>1</td>
<td>arch south side +++</td>
<td></td>
</tr>
<tr>
<td>M8 gr. 2</td>
<td>52</td>
<td>0.87</td>
<td>2+4=6</td>
<td>NA north A south (clear angle)</td>
<td>2 x t1</td>
<td>42%</td>
<td>0.5</td>
<td>Fortuna Augusta temple +++</td>
<td></td>
</tr>
<tr>
<td>M12 gr. 4</td>
<td>255</td>
<td>0.47</td>
<td>4+2=6</td>
<td>A north &amp; south (arch)</td>
<td>1 x t1 1 x t2</td>
<td>42%</td>
<td>2.24</td>
<td>arch of Tiberius south +++</td>
<td></td>
</tr>
<tr>
<td>M25 gr. 2</td>
<td>49</td>
<td>0.86</td>
<td>2+4=6</td>
<td>A north (Forum colonnade)</td>
<td>1 x t1 1 x t2</td>
<td>53.6%</td>
<td>0.7</td>
<td>Forum colonnade, sidewalk on 3 sides +++</td>
<td>well altar</td>
</tr>
<tr>
<td>M26 gr. 5</td>
<td>594</td>
<td>0.12</td>
<td>5+1=6</td>
<td>A south (clear angle)</td>
<td>1 x t1 1 x t2</td>
<td>8%</td>
<td>1</td>
<td>bench south side +</td>
<td>well altar</td>
</tr>
</tbody>
</table>

Fig. 38. The convex spaces on the Mercurio movement axis, convexity graded according to size. Legend, see Fig. 30.
5.7.1. Degree of convexity and permeability on the Mercurio MA

The first thing to be noticed on the Mercurio axis is that the axis is much less broken up in convex spaces than is the Stabiana axis. Even taking account of the Forum and all its lateral spaces there are only 26 convex spaces on the axis, while there are 50 on the Stabiana axis (this includes spaces within the town gates). The Mercurio axis is only slightly shorter than the Stabiana axis, and the spaces therefore are on the average much larger. The residential component is stronger (see above, section 4.5 and Fig. 27) and there are groupings of high-class houses in the convex spaces of the residential areas.

Also, the degree of convexity scaled to size is high throughout, with dips in the commercial area M10 and M11, and in M3 and M6/M7. Looking at the north high-convexity area, M6 is a transitory space effectively cutting off M5 from M7. M7 is an intersection space with a high control value, and it controls important things: access through the arch northwards, access to the temple of Fortuna Augusta southwards and traffic on the intersection Via di Nola. It provides no really good possibility of outdoor interaction, but large sidewalks in the north- and southwest provide a modicum of “watching space”. In M10 and M11 the degree of convexity scaled to size gets low points – each of those spaces encompasses only half of the street, with an open colonnade as a border between them. These spaces would probably share some functions. If M10 and M11 functioned and were perceived together, a much more convex conglomerate with high permeability would emerge. It seems that high and low permeability, residences and commerce all go together with a high rate of convex points on the Mercurio MA.

The largest spaces on the Mercurio axis are in residential areas with a low degree of convexity, but the extreme size of those spaces lessened some of the disadvantage of low convexity, and almost all the spaces and space groups are boosted in some way in the convex dimension. Two spaces stand out – the intersection space M7, and M8 in front of the temple of Fortuna Augusta. Again we find that religion and access to cult is something that is controlled.

5.7.2. Other features of the Mercurio MA

When one looks at the Mercurio MA, it is clear that “convex spaces” as such play an important role in the area from M7 to M12, the commercial centre. To the north articulation is strong only between M3 and M4, where a new insula begins. In the same way, the border between M25 and M26 is not very heavily accentuated. The convex dimension could be called underplayed in these residential districts, a very different situation than on the Stabiana MA. This lack of convex articulation inevitably stresses axiality along one insula at a time. The convex walk-through spaces seem to merge into enormous
swathes of elongated street space with little distinction between them. One swathe extends between insulae VI 7 and VI 9 (Fig. 39). Between these insulae space is not particularly articulated, but the borders where these insulae end are highlighted both in the north and in the south: in the north we have a dead end with an altar placed in front of a defence tower, and in the south there is a very marked negative articulation. The next swathe of low articulation is between VI 8 and VI 10, starting off with a significant articulation to the north and ending with the triumphal arch in the south. South of the Forum, a single convex space covers almost all of the Mercurio MA except for a small, northern space.

Microcosms, like the ones we found on the Stabiana MA, are here reduced to the intersection M7 and its relation to adjacent spaces.

However, one of the features observed on the Stabiana MA, namely the spatial unit that seems to be wholly conceptual in the south part of S20, S21 and S22, has a counterpart on the Mercurio MA: in the north the dead end forms a special place, where there is no sidewalk on the west side, and an altar occupies the middle of the street (see Fig. 39 and 5.9.2).

Fig. 39. A spatial delimitation created according to principles we cannot fully grasp today: at the north end of the Via di Mercurio we find an altar placed in the middle of the street’s termination, in an area where the sidewalk on the left side is missing.
5.7.3. Degree of convexity and permeability on the Fauno MA

Finally, the Fauno MA (Fig. 40) can be considered. The back street character of the Fauno movement axis is immediately apparent in Table 6 in that no space gets more than 5 convex impact points, and two of the highly rated spaces have their major development along crossing axes. One of these spaces, F4, also has the highest control value. It is a safe conclusion that interaction in the public space was mainly related to the crossing traffic on the Vicolo di Mercurio and the Via di Nola. Permeability on the Fauno axis is low, aside from the crossing space F8. This is a fairly commercial space, but since it mainly belongs to another axis this cannot be used to interpret the relation between commerce and the degree of convexity. The rather commercial F1 (c. 60%) has only 3 convex points.

In Table 6 below, the convex spaces of the Fauno movement axis are detailed in the same way as for the Stabiana axis and the Mercurio axis (See Tables 3 and 5 above). The spaces are sorted according to size-calibrated degree of convexity (see 5.3.1), which means that spaces are grouped according to an increasing number of convex impact points.

Table 6. The convex spaces of the Fauno movement axis.

Content of columns, see Table 3.

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<tbody>
<tr>
<td>F2b</td>
<td>87</td>
<td>0.14</td>
<td>1+2=3</td>
<td>NA north &amp; south</td>
<td>1x t3</td>
<td>14%</td>
<td>1</td>
<td>not boosted</td>
<td></td>
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<tr>
<td>gr. 2</td>
<td></td>
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<tr>
<td>F3b</td>
<td>28</td>
<td>0.57</td>
<td>3+1=4</td>
<td>NA north &amp; south</td>
<td>1x t3</td>
<td>18.2%</td>
<td>0.75</td>
<td>not boosted</td>
<td></td>
</tr>
<tr>
<td>gr. 1</td>
<td></td>
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<tr>
<td>F5</td>
<td>34</td>
<td>0.36</td>
<td>2+1=3</td>
<td>NA north &amp; south</td>
<td>1x t3</td>
<td>26.4%</td>
<td>0.75</td>
<td>not boosted</td>
<td></td>
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<tr>
<td>gr. 1</td>
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<td></td>
<td></td>
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<tr>
<td>F6</td>
<td>98</td>
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<td>1+2=3</td>
<td>NA north</td>
<td>1x t3</td>
<td>20%</td>
<td>1</td>
<td>not boosted</td>
<td></td>
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<tr>
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<tr>
<td>F2b</td>
<td>87</td>
<td>0.14</td>
<td>1+2=3</td>
<td>NA north &amp; south</td>
<td>1x t3</td>
<td>14%</td>
<td>1</td>
<td>not boosted</td>
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<tr>
<td>gr. 2</td>
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<tr>
<td>F2a</td>
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<td>3+1=4</td>
<td>A north &amp; south</td>
<td>1x t3</td>
<td>33%</td>
<td>1</td>
<td>not boosted</td>
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<tr>
<td>gr. 1</td>
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<tr>
<td>F3a</td>
<td>159</td>
<td>0.11</td>
<td>1+3=4</td>
<td>NA north</td>
<td>1x t3</td>
<td>11%</td>
<td>1</td>
<td>not boosted</td>
<td></td>
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<tr>
<td>gr. 3</td>
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<td>F1</td>
<td>213</td>
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<td>A north &amp; south</td>
<td>1x t3</td>
<td>5.8%</td>
<td>0.5</td>
<td>not boosted</td>
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<td>gr. 4</td>
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<tr>
<td>F4</td>
<td>76</td>
<td>0.25</td>
<td>2+3=5</td>
<td>A west</td>
<td>1x t3</td>
<td>38.2%</td>
<td>1.75</td>
<td>not boosted</td>
<td></td>
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<tr>
<td>F7</td>
<td>225</td>
<td>0.08</td>
<td>1+4=5</td>
<td>A south</td>
<td>1x t3</td>
<td>8%</td>
<td>0.83</td>
<td>not boosted</td>
<td></td>
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<tr>
<td>gr. 4</td>
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<td>F8</td>
<td>454</td>
<td>0.14</td>
<td>1+4=5</td>
<td>A west</td>
<td>1x t1</td>
<td>12%</td>
<td>1</td>
<td>not boosted</td>
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<tr>
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5. Urban activity in the convex spaces along the movement axes

5.8. Conclusions on convex spaces

We know from the previous chapter that public buildings in Pompeii create a spatial pattern of their own, functioning as global features and not necessitating any specific permeability in the convex spaces where they are situated. Thus, they override and break up the basic pattern of convex spaces both on the Stabiana and the Mercurio axis.

In this chapter it became clear that the convex dimension is generally not related to permeability, and that there is no strong connection to commercial establishments. These follow the axial dimension – that is to say, permeability and commerce increase and decrease along axial lines, depending on factors like intersections with other axial lines and traffic flow. The importance of the convex dimension also shifts, but it follows another pattern. This pattern at its most basic level is one of long “walk-through spaces” that can be of varying permeability and commercial intensity due to other factors, interspersed with a few rather large spaces with a high degree of convexity.

On the Stabiana MA these larger spaces with a higher degree of convexity are often situated at crossroads where they automatically get a high control value. These spaces are not especially permeable or especially commercial, which tells us that their importance lies in another aspect. They were spaces suited to encounters and interaction between inhabitants and strangers, but
the possibilities of more intense interaction are a complement rather than a main feature. These spaces are heavily reinforced with official structures that proclaim and build identity – and this aspect is global as it encompasses the town as a whole, or the social structure of the town as a whole.

Not every street (and axial space) intersection was used in this way. Spaces at the town gates, as well as the convex spaces where important axial spaces intersect were preferred. But enhanced spaces with a strong convex impact, used for ideological proclamations about social groups, identities and belonging, do not absolutely need an important intersection, as witnessed by the spaces in front of the theatre. The town gates and intersections were of course important, since spaces situated there were easy for people to find and to get the message, but it seems this factor could sometimes be dispensed with – for instance when the spaces were placed along the south part of the Stabiana MA where traffic flow already was very intense due to the intersections north of it. These important, reinforced, convex spaces with their messages were used or even constructed by the Pompeiians in a conscious effort, since their boosting is that of official buildings and monuments.

When not singled out for identity proclamation or interaction possibilities, the intersection spaces ended up as slightly boosted walk-through spaces, slightly more controlling and slightly more convexly important than spaces without intersections, or they ended up as small spaces of no perceivable convex importance, covering only the intersection itself. Another type of important convex space was probably related to specific commercial activity across the interface, and a more private kind of interaction.

On the Mercurio MA some evidence also suggests that important identity-building convex spaces were placed in intersections with highly integrated axial spaces. The Forum of course is the grandest of them all, but there is also indication of the same pattern at work on a lower scale. The stress on axially in the remaining spaces was noted above (5.7.2).

Lastly, the Fauno MA displays low permeability and no great convex importance in its spaces.

This means we have three different patterns of urban structure along movement axes in Pompeii:

- The Stabiana movement axis represents the spatially variegated axis with walk-through spaces with and without intersections, and with important, identity-building, convex spaces to which different axial spaces guide the traffic flow. Permeability fluctuates according to axial influences, and is not related to the degree of convexity, even though it tends to be low in the most important convex spaces.
- The Mercurio movement axis represents the spatially merged axis where the above-mentioned characteristics are much less in evidence (although
they are at least indicated) and where axially along insula lines is one of the features.
- The Fauno axis represents the back street axis with low permeability and without important convex spaces.

5.9. Interaction and identity conclusions

5.9.1. The Stabiana movement axis

Interaction between inhabitants and strangers on the Via Stabiana would have been intense in all highly permeable and commercial spaces. This means that even in spaces of little convex importance there could have been a lot of crowded interaction between sellers and customers, and that this kind of interaction was squeezed in whether the space was suitable or not. This kind of interaction was intense, but usually short lived and it did not generate deeper, long-lasting relations.

Eating with others at street-side food places likewise is spread out in all kinds of convex spaces. The interaction here would have been more lasting, more prone to shape lasting relationships. The degree of convexity and the area of these spaces were again of little importance, but it is fair to suppose that well situated establishments furthered interaction more than those that were not well situated.

Official monuments and buildings, and primarily monuments that emphasised the town as a social entity and its social structure, were placed alongside large spaces with a high convex impact: examples include the Castellum Acquae, the hoi polloi sponsored by the leading family, the theatre for everyone but only according to a specific social order, the town gates marking the boundaries and the privilege of being allowed in. These places and their monuments stressed belonging and identity. They did include strangers to the neighbourhood, but probably only if the strangers were not strangers to the town itself, and they differentiated between town dwellers and people from outside. The relationships between strangers (from inside Pompeii) and inhabitants of the particular space would have been swept up in a regulated togetherness, making these spaces the foci of social reinforcement. When more intense interaction was possible, it probably fostered building of orderly long-term relations. The potential labour market at the Porta del Vesuvio stands out as a particularly apt function for a space that operated in a socially cohesive manner. In the spaces lined by official buildings and monuments, space worked for social coherence, and interaction was facilitated. People from out of town would have had the possibility of watching these spaces, of occasionally using them, and of defining themselves as not included in the proclaimed identity.
5.9. Interaction and identity conclusions

What about reinforcing and building local, as opposed to global, identity? In the Roman world after Augustus, the neighbourhood was an important entity regulated by magistrates, a lararium at a central crossroads in the area and a joint cult. Lararia at crossroads were built in Rome, and possibly older shrines were neglected in favour of the new Augustan ones. This may have happened in Pompeii as well – and if so, could the lararium in S22 have been of the new kind and of great importance locally?

A fuller discussion of this question lies outside the scope of this study, but what can be said is that space is treated in a special way around this sacred place. No large, important, convex space sets the shrine apart, and the intersection north of it is included in the elongated S20. Space is fragmented south of this, we get S21, S22 and S23, none of which is large enough to favour large-scale interaction. But another way of defining space seems operative here, since stepping stones hem in both the lararium spaces and the intersection proper and also link two cauponae intimately to the context. This creates an environment where indoors and outdoors mix, where convex boundaries are overruled and where a larger entity is created. It is possible that this perception of space had to do with defining the hub of a network of lararia in religious terms. It seems that this perceived spatial unit could have been a place of intense interaction between inhabitants, which strengthened their view of themselves in the context of the town at large, and which also had a global importance, marking Pompeii as a town with neighbourhood lararia and embodying all those lararia in a central spot.

A parallel to this space is found in S15, although it is not nearly as marked. Here, an area that encompasses part of S15 and part of S14 is marked with a specific arrangement of kerbstones, again implying that space was perceived in some other way than the convex or the axial dimension. S15 is an important convex space as well, so it too may have had multiple functions, and a large altar forms part of the set-up.179

Other spaces built specific identities and facilitated specific relations, namely those important convex spaces that seem to belong to a specific, dominating activity. These are places inviting people to stop, to become customers, to enter into a specific relation – but these activities also took place in much less favoured spaces. Commerce did not need specific places to thrive, but could use them if possible. Likewise other specific relations, like the one between patronus and client, do not seem to have needed specifically defined places, but were spread along the axial lines, located in diverse convex spaces following non-spatial needs and rules.

179 Weilguni 2011.
5.9.2. The Mercurio movement axis

Interaction on the Mercurio movement axis is difficult to assess. The very large convex spaces north and south of the Forum combine to still larger units, and the size partly makes up for a low degree of convexity. This implies that these spaces were easier to use outdoor public activities, and for interaction, than a walk-through space on the Stabiana MA – and we saw that even there the interaction of commerce and street-side eating was located in rather unpromising convex situations.

The north and south parts of the Mercurio axis lack the important, identity-boosting spaces of the Stabiana MA, and the only place in the middle part where a public monument, the temple of Fortuna Augusta, fills this role is adjacent to the intersection M7, which is not large enough to house extensive interaction. This suggests that the Forum dominated all identity-building interaction, leaving the commercial interaction to follow the axial spaces as it did on the Stabiana MA. However, the weak convex articulation outside of the Forum and top commercial section stresses axiality. This axiality seems to have a goal in the north, where an altar sits directly where the street ends, under the looming defence tower in the town wall. A small special place (see 5.7.2) is created by the lack of a sidewalk on the west side, and a building usually called a hotel opens onto this. This brings to mind a processional way, ending at the altar – possibly a rather grand way of expressing the neighbourhood coherence and uniting inhabitants and strangers (keep in mind that these strangers would be people living in the town, converted into visitors of the exact convex spaces where the procession passed). Whenever there was a procession, interaction between people was furthered and would have been important in building local identity, and on other days it would have called these processions to mind, strengthening both the local and global identity. The so-called hotel might have been the place where the local magistrates met, perhaps to take part in a ceremonial dinner on specific occasions.

Once one looks for it, a similar kind of arrangement could be present just south of the Forum, where there is an altar and where the sidewalk crosses the street behind a centrally placed well at the north end of the Via delle Scuole.

The difference between the Stabiana MA and the Mercurio MA brings out the very variegated way in which space was perceived and used in Pompeii, and shows that high axial integration is connected to very different convex environments used in very different ways.
5.9.3 The Fauno movement axis

Although the amount of commerce, and the number of main entrances to both commerce and living quarters, was slightly higher than expected, the Fauno MA presents the typical case whereby low axial integration, low permeability, a low degree of convex importance and a lack of official or identity building-space all come together. This could easily be the pattern for every segregated back alley in Pompeii, while variation and interaction mainly focussed on more highly integrated axial spaces.
6. Circulation of wheeled traffic in Pompeii

6.1. Introduction

The circulation of human beings and goods is an often neglected factor in the study of public space in antiquity, and Pompeii is no exception to this. While circulation on foot leaves little archaeological evidence, the ruts left by the wheels of different vehicles in the streets of Pompeii provide us with a unique opportunity to try to discern the routes of wheeled circulation, to ask if there possibly was a regulatory system for traffic, and to search for the more or less defined rules governing traffic flow. We may even identify the indicators that guided carts to their various goals and away from problems.

This study concerns Pompeii’s last period, just before the eruption in AD 79. New archaeological evidence points to a town which was resuming its urban life after an earthquake in AD 62, or even a series of earthquakes between AD 62 and 79.

The main hypothesis of this chapter is that there was a regulatory system for wheeled traffic in Pompeii. To test this, a number of hypothetical routes through the town have been reconstructed, in order to establish the feasibility of a town-encompassing and consistently organised traffic system. These routes are reconstructed on the basis of target areas for vehicular traffic, the empirical evidence of wheel ruts, deliberately placed features such as blockers for vehicles or indicators for traffic, and the intrinsic characteristics of the urban fabric. The axial integration of these routes (the axial integration of Pompeii is the subject of Chapter 3) is also considered in relation to these routes, in order to verify their plausibility.

The absolute dating of changes made in Pompeii’s urban fabric before AD 79 is not the object of this study. The changes themselves are, however, of import. A change in urban fabric can make a route impassable, difficult or unintelligible, and cause malfunction in traffic regulation and traffic flow, if there is no guidance for the traveller. This aspect is explored in the chapter at
6. Circulation of wheeled traffic in Pompeii

6.1. Previous research

Vehicular traffic in Pompeii has only recently become a focus of archaeological interest. The first to comprehensively address the problem of vehicular traffic in Pompeii on an archaeological basis was S. Tsujimura, in ‘Ruts in Pompeii: the traffic system in the Roman city’, *Opuscula Pompeiana* 1, 1991. Tsujimura’s study includes an inventory of wheel ruts turning around insula corners, blocked street entrances, and other evidence pointing to the actual flow of wheeled traffic throughout Pompeii. Tsujimura focuses on vital points of interest and identifies an important rule for carts entering and leaving the two most important streets in Pompeii (see 6.8.3).

A very interesting study was recently presented by E. Poehler: ‘The circulation of traffic in Pompeii’s Regio VI’, *JRA* 19, 2006. Using the evidence of wear traces left by cart wheels on the corner stones of sidewalks, or on stepping stones for pedestrians, Poehler suggests a reconstruction of the traffic flow in the northwest part of Pompeii. I discuss his evidence and the conclusions that may be drawn from it in section 6.8.6. Although Poehler reaches different conclusions than I do regarding the specifics of the traffic flow, his work underscores the likelihood that there actually was a regulatory system for vehicular traffic in Pompeii.

6.2. Urban prerequisites for wheeled traffic in Pompeii

The wheeled vehicles of the Roman world were used both for the transportation of people and of goods. Although there may have been different types, I will generally use the word *cart* for these vehicles. In Pompeii, carts will have been used primarily for the transport of goods from outside the city to destinations within, and vice versa. Inside the city, people will have moved about on foot or been carried in sedan chairs, while slaves, donkeys and smaller carts pushed by hand may have served for local transport of goods.

The main reason for transporting goods into town would have been to distribute commodities. Most of the cart traffic carried building material, food,
6.2. Urban prerequisites for wheeled traffic in Pompeii

firewood and other daily items needed in town. This would have been far
greater in bulk in comparison to exports.

Commercial centres and other areas with need of frequent deliveries
would thus have been important primarily for the delivery of farm produce
and raw materials from the surrounding countryside. In order to identify
these centres, it is necessary to discuss to some extent the urban fabric of
Pompeii just before the disaster of AD 79.

6.2.1. Pompeii in AD 79

The town buried in AD 79 was encircled by a wall with seven gates, through
which one could reach the countryside as well as the two harbours and the
roads to other important towns in Campania. In the north, east and south
there was an extramural circuit road, connecting the gates with each other.183

In the northwest-southeast direction the town was bisected by the Via del
Vesuvio/Via Stabiana, with a gate at each end: Porta del Vesuvio to the
north and Porta di Stabia to the south. A gate further to the southeast is
known today as the Porta di Nocera. At a slight northeasterly angle the Via
Marina/Via dell’Abbondanza extended from the Porta Marina in the west to
the Porta di Sarno in the east. This street crosses the Forum in the southwest
part of the town. A northeast gate is Porta di Nola, a continuation of the Via
di Nola. In the northwest we find the Porta di Ercolano, through which the
Via Consolare entered the town. These modern names still tell us the main
communication directions from the gates, given by the geographical sur-
roundings. At least another three passages in and out of the city may once
have existed.184

The town plan itself shows what is usually deemed to be an older part in
the southwest, as this part has a more irregular street pattern than the rest.
The northwest and the east parts of the city consist of city blocks (insulae)
ranged along a grid pattern of streets (see Figs. 15 and 18). The orientation
of the grid pattern differs slightly between the northwest and the east.185

183 Eschebach & Eschebach 1995, 85, 96-97. (Cf. also Seiler 2005). This road once also ex-
isted on the west side of Pompeii, but there it was gradually given up and built over. The
northwest part of the circuit road, connecting the Porta del Vesuvio to the Porta di Ercolano,
was abandoned after AD 62. 184 Eschebach & Eschebach 1995, 47-48, 103-104, fig. 7 for an early north gate at the end of
the Via di Mercurio, at the place of tower XI in the later wall circuit, without evidence for cart
traffic; 108, 110 for a south gate where the Via delle Scuole allegedly led to a pedestrian gate
with a ramp down the steep incline; 83, 89, 96 for a town gate on the west side, at the site of
VII 16.17.20-22, which once led down to the circuit road outside the walls. A possible town
gate, where later the tower IX was situated, has been disproved, cf. Sakai & Iorio 2005, 318-
326. 185 Geertman (2007, 82-97) gives a model for the development of Pompeii’s different regions,
also citing earlier literature.
This may seem simple enough, but the fact that the ruins we see today are not frozen in time in the middle of a normal process of change poses a problem. The town was badly damaged by an earthquake in AD 62, and the latest research has shown that several other tremors or earthquakes may have occurred in the time between AD 62 and 79. Some of the damage may indeed have happened only days before the eruption and should thus be seen as part of the disaster that wiped out the town. This means that the town at certain times and in certain aspects worked in a provisional way in the intervening 17 years between AD 62 and 79, and that parts of it remained in a provisional state even in 79.

The following section will look more closely at some vital areas in town in order to determine their status after AD 62. Is it possible to assume that the urban fabric of Pompeii was rebuilt and functioning in an organised, non-provisional and non-haphazard way in the years just before 79?

6.3. Pompeii – an urban disaster area between 62 and 79?

6.3.1. The Forum situation

The buildings of the Forum had suffered much destruction in AD 62 and possibly in subsequent tremors and earthquakes. Opinions differ as to the extent of the damages, and it is also probable that extensive organised collecting (or less organised robbing) of precious building materials after the eruption in 79 is what gives the ruins of the Forum a more dilapidated appearance today than they should have. It is clear, however, that repairs of the earthquake damages of 62 were undertaken.

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186 Wallat (1997, 89) suggests a single major disaster in AD 62, followed by extensive rebuilding of the Forum area. The Forum was not subjected to further destruction before the eruption of Vesuvius. See also Descouedres 2007, 18, with references to the earthquake debate in n. 116, p. 27. Allison 1995, 189; Ehrhardt 1995, 64; Fröhlich 1995, 158; Gierow 1995, 69, 72; Nappo 1995, 54; Pappalardo 1995, 190-191; Simone 1995, 4 and Varone 1995, 33; all suggest damages to the town at some instance or instances after AD 62. Fröhlich also suggests the rebuilding of an official structure, the town gate Porta di Ercolano, after AD 62. Ling 1995, 204, 205, however, is more cautious about subsequent earthquakes after AD 62. Varone 2002, 342-345.


188 Dobbins & Ball (2005, 60) hold that the Forum’s east side was structurally repaired as well as newly and lavishly decorated after the earthquake in 62; cf. also Dobbins 1994 and Wallat 1997, 293-294; 1995, 84-85, 87, 89. Eschebach & Eschebach 1995, 91, holds that the Forum was in ruins. This opinion is ultimately based on A. Maiuri’s investigations, cf. A. Maiuri 1942. Ohr 1991, 14-15, shows that the basilica in the southwest corner of the Forum had also been damaged in 62, and had been left without a roof until 79. The temple to Jupiter, Juno and Minerva was not repaired, cf. Richardson 1988, 144-145. For the post-eruption collecting of marble from the Forum, cf. Zanker 1998, 132; Wallat 1995, 88; Dobbins 1994, 634; Richardson 1988, 25-26.
If one supposes that commerce had been forced to abandon the Forum in AD 62 and establish itself in other areas of the town, it seems reasonable that these areas would have continued as centres of trade even after the Forum to a large extent had been rebuilt.

Thus, in this article the Forum is treated as a functioning administrative, commercial and social centre, although with some buildings ruined and others in a state of repair.

6.3.2. The aqueduct

The aqueduct, coming in from the north, had also been damaged in 62, but it had subsequently been repaired, and a water supply system was in place in the years between AD 62 and 79. Parts of this system may have been dependent on short-term solutions, but as a whole both the water supply and the sewage system were working. It is obvious that a full restoration of the supply system was at least planned, and it follows that baths, parks and wells for the most part functioned as usual during this period.\textsuperscript{189}

6.3.3. Social structure of Pompeii

Private houses were, of course, also destroyed by the earthquake in AD 62 and possibly later. It is often said that the earthquake of 62 accentuated, or even provoked, a significant social change in Pompeii. The upper class left the town, and various craftsmen took over the beautiful town palaces and used them as shops and workshops.\textsuperscript{190}

In her recent research Allison states that the last 17 years of Pompeii were characterised by several earthquakes, gradual abandonment of houses, and deteriorating and changing living conditions. Various spaces in the houses were used in different ways than earlier; repairs did not aim at recreating the former style and function, but rather at making spaces usable in a downgraded kind of way.\textsuperscript{191}

Other researchers suggest that this could not have been a constant situation, but rather a short-term result of one or more late earthquakes. These earthquakes were followed by a period of repair and resumed city life, which

\textsuperscript{189} Cf. Dybkjæer Larsen 1982, 42, 57-58, 61-63. Although only one water tower can be identified with certainty as post AD 62, Dybkjæer Larsen makes a good case for the majority of the towers having been built after AD 62. See also Descoeudres 2007, 19; Eschebach & Eschebach 1995, 130, 136. Varone (2002, 344) discusses ongoing rebuilding in AD 79 with materials that needed a great amount of water. Ling (2005, 91) is of the opinion that the water supply system was provisionally repaired immediately after the earthquake damage. It was not in function in AD 79, as it was in the process of being replaced by a new subterranean system.

\textsuperscript{190} Cf. Maiuri 1942, 217; Richardson 1988, 18-21; cf. also Eschebach 1993, 186, describing VI 8, 20 where a fullery had moved into an atrium house, situated along the noble Via di Mercurio, near the Forum.

\textsuperscript{191} Allison 2004, 191-196; 1995, 185-186, 188.
was cut short by the disaster of 79. A change in social structure may also have been under way for other reasons, and may have become more pronounced by the natural disasters striking Pompeii.\textsuperscript{192} The more prominent aspects of crafts and trade might, for instance, be due to a large influx of builders and decorators to a town determined to recreate and even surpass its former glory.\textsuperscript{193} The large number of public projects would have created a commercial boom for the city, attracting all kinds of people and perhaps further speeding up changes with regard to both property and business.

Also, if an extensive and innovative repair programme of the public Forum buildings was executed after the earthquake in AD 62, then the leading citizens must still have been a presence to be reckoned with in Pompeii even if some of them had moved elsewhere, and the economy of the town could not have been in too catastrophic a state.\textsuperscript{194}

6.3.4. Concluding remarks on the urban situation analysed

In spite of the many questions left to answer when it comes to the problems of rebuilding and repairing, and the demographical changes in Pompeii, it seems that urban life resumed between AD 62 and 79, even if the very last weeks or months may have been all but normal. The analysis, then, concerns this normal everyday situation with resumed city life before AD 79 and treats the town’s infrastructure as if the repairs needed after AD 62 had been largely completed.\textsuperscript{195}

The Forum will be treated as a functional public space, and the water supply as working. As a consequence, the different bath complexes will be treated as functional units (except for the Central Baths, a new building complex still in progress). Commercial enterprises would have been placed along important thoroughfares, mixed in with private houses of varied social standing, various sanctuaries and recreational facilities.

One change in the urban fabric rendered by the earthquake of AD 62 will be treated as permanent. The road encircling Pompeii outside its walls was closed between the Porta di Ercolano in the northwest and the Porta del Vesuvio further to the north. It was filled with debris cleared from the town up to a level of 1.5 m above its paving. Obviously this road was not going to be restored to its former use and therefore will be treated as nonexistent.\textsuperscript{196}

\textsuperscript{192} Varone 1995, 33; Simone 1995, 41, 43; Nappo 1995, 52.
\textsuperscript{193} Jones & Robinson 2007, 403; Ling 2005, 89-90.
\textsuperscript{194} Dobbins 1994, 694.
\textsuperscript{195} This reasoning is similar to what is found in Ling 2005, 146; Ling states namely that in a study of the urban situation of Pompeii a researcher can recreate an ideal situation, as if the earthquake in AD 62 never had happened.
\textsuperscript{196} Maiuri 1942, 175. See Seiler 2005, 231-33, for the different phases of the gate area.
6.4. The character of goods transports

It is now time to assess the need for cart transport inside Pompeii. In order to do so, it is necessary to identify the geographical position of the town within the larger landscape as well as the internal target areas for deliveries.

6.4.1. Large-scale through transport of goods

Pompeii had at least one commercially important harbour, thanks to its position on the Sarnus River (mod. Sarno). To the south of the town, this river flows into the sea, as it did in AD 79. The ancient coastline and the ancient river bed are difficult to establish as the eruption of the volcano in AD 79 buried the town and its environment under ash and pumice, and the modern town has also been built over parts of the area.

It is clear, however, that the coast lay much closer to the site of Pompeii than it does today. It is probable that the coastline formed a bay, or lagoon, to the west of the town, where the west harbour was built. The main stream of the Sarnus River reached the sea to the south of the plateau, and here the delta was developed into an important harbour area, the Sarno harbour.197

Goods destined for export from the surrounding landscape of Campania would often have been shipped from one of Pompeii’s harbours, but they would seldom have needed to pass the town. Instead, these transports would have made use of the circuit road outside the walls and then gone on to the Sarno harbour. The possible west harbour could only have been reached by private stairs belonging to the houses along the town’s west wall, and would have been much less important due to the circuit road having been abandoned west of the town.198

There were, of course, some special goods for export produced in Pompeii, like garum, the famous fish sauce, and metal products. If these products were made in the suburban areas of Pompeii, they also need not have entered the town.199

Fish and salt must have been important trade items. A fish market on a larger scale than what was possible in the Macellum (the covered market by the Forum) may have existed in or near the Sarno harbour. West or north-west of the town there were the salt marshes, the “Salinae of Hercules”, in a marsh area created by an older river mouth.200 Salt transports would thus have come into town along the Via Consolare. Salt would have been delivered to the town’s market areas or been transported through to the harbour.201

197 Eschebach & Eschebach 1995, 2-4.
199 Production of metal items outside the town walls is attested by Gralfs 1988, 12-14.
201 There is a possible “statio saliniensium” on the Via Consolare, VI 1.13,22, where salt may have been sold at least for the town’s needs. Eschebach 1993, 153.
Thus, much of the trade on a large scale never came into town, and Pompeii’s street network need not have been adapted for a large through traffic.

6.4.2. Internal target areas for delivery of commodities

In any urban situation goods transports must be able to reach target areas, made available by the street grid. In Pompeii these areas made certain commodities available on a regular basis for the inhabitants – food and drink and household items are obvious commodities, but hygiene and entertainment also required specific transports.

- The Forum area was still an important commercial centre. In its northeast corner was the Macellum, a partly indoor market for fish, meat and other foodstuffs.\textsuperscript{202} To the north of the Forum was the Via del Foro, a wide, market-like street lined with shops and on the east side shaded by a portico. To the southwest was the basilica, along whose north side, fronting the Via Marina, were places marked out for different market stands.\textsuperscript{203}
- The Via dell’Abbondanza, west of the intersection with Via Stabiana, was lined with shops and suited to market stalls in its enlarged section.
- The Via degli Augustali was bordered by shops, restaurants and fast food places.

The last two areas may have taken over some of the commerce conducted earlier in the vicinity of the Forum, and were established centres in AD 79. Other commercially important areas were:

- The rest of the Via dell’Abbondanza (except the westernmost part)
- The Via di Nola/Via della Fortuna/Via delle Terme
- The Via del Vesuvio/Via Stabiana.

The bath complexes situated in different parts of Pompeii also must have been reached by cart transports on a regular basis. The Stabian baths, the Forum baths, and the small bath complex south of the Vicolo della Regina would have needed fuel for their furnaces in addition to bath products (oils, perfumes etc.) to sell to customers. The Central Baths were not yet ready and of course had no need of such deliveries, but on the other hand building material on a large scale must have been delivered to the site.

The theatre complex would have had its own needs, and the peristyle south of it, used for housing and training gladiators, could not have gone

\textsuperscript{202} Richardson 1988, 198-199; Eschebach 1993, 310. Finds of fish scales, bones from livestock, fruits and nutshells, etc.
\textsuperscript{203} Ohr 1991, 7.
6.5. The importance of vehicular traffic

What knowledge we have from the literary sources about the use of wheeled vehicles for circulation in the urban environments of the Roman Empire is scanty and often relevant only to the city of Rome. We know of a law of Caesar prohibiting transports of goods by cart during daytime. The waggons of necessities thus rolled into the commercial districts of the city during the night, in order not to further complicate an already chaotic traffic situation.205

There is some uncertainty as to whether this law applied only to Rome or to other cities as well, but surely it can be assumed that the busiest hours of the day were also avoided in Pompeii.

Another piece of legislation relevant to Pompeii was passed by the emperor Claudius.206 It forbade travellers to use a carriage inside Roman towns, which meant that private persons were not allowed to go from one spot in the town to another by carriage. Also, passing through a town without having any special errands there would have been out of the question. This law

204 Zanker 2000, 46-49; Eschebach & Eschebach 1995, 154-155. The peristyle south of the theatre may have been part of a gymnasium in the Greek style before it became a place for gladiators. A smaller peristyle northwest of the theatre may have been part of a boys’ gymnasium, which may have increased the need for commodities in this area.
certainly was valid for Pompeii, and it means that wheeled vehicles were almost exclusively limited to transports of goods to and from the town.

The most frequently mentioned means of transportation for goods from the country, and thus mentioned in the law, was the *plaustrum*. This was a heavy cart with two solid, iron-shod wheels, drawn by mules or oxen. In Pompeii, which had about 10,000 inhabitants, there must have been a sizeable number of such *plaustra* delivering daily necessities.

Our primary evidence for the intensity of the traffic is the wheel ruts worn into the basalt paving of the Pompeian streets. To wear down the paving stones into ruts about 20 cm deep, regular usage is needed: these ruts are not the result of an occasional wagonload passing by. The amount of wear indicates frequent use; the heavier the carts, the more quickly the wear would have been evidenced, but even the most laden and sturdy carts would not have produced tracks this deep without incessant repeats.

Streets were often repaired, which also tells us about frequent use. Along one and the same street the paving may change its quality several times. The worn down paving may alternate with new paving, free of ruts, or with paving only moderately worn. This means that the most worn sections of paving were replaced, and that the rest of the paving was left as it was for the time being. The choice not to repair an entire street, or at least a substantial part of it, at one and the same time may in some cases be due to economic reasons, but it also may mean that one did not wish to impair the traffic more than absolutely necessary. If wheeled traffic had been a sporadic occurrence, repair work would have been less frequent, and these considerations would have been superfluous.

6.6. The marking of new functions in the remains of an older townscape

The frequency of vehicular traffic is in itself an indication of the existence of a regulated traffic system. An even stronger indication that there actually was a planned vehicular traffic system is the need for indicators and messages to the traveller, particularly in places where the urban fabric and earlier messages had become obsolete and could lead to the wrong conclusions. It is at these urban locations, where function changed over time, that one can expect to find strong, unambiguous messages and indicators so that older messages would not misdirect the traffic flow.

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208 Wallace-Hadrill 1994, 97-98, discusses the difficulty of estimating the number of inhabitants, but finds that a population of 10,000 may be a workable hypothesis. Eschebach & Eschebach 1995, 93, also settles for 8,000-10,000 inhabitants.
209 Eschebach & Eschebach 1995, 117 – but this can readily be seen by any visitor to Pompeii.
6.6.1. The Forum and its indicators

The town’s market square, the Forum, kept its traditional location throughout the history of the town, as did the Apollo temple situated on the west side of the square.\(^{210}\) In the southeast corner of the Forum was the intersection between the original town’s north-south and east-west axes. In the early Forum, circulation traffic on wheels would have been possible, as it was surrounded by private houses and shops.

The further development of the Forum\(^{211}\) need not concern us here, except to note that the end result before the earthquake in AD 62 was a Forum whose southern end expanded over the Via Marina/Via dell’Abbondanza and along the east side of the basilica.\(^{212}\)

This “new” Forum was blocked to circulation by cart, and this was made intelligible to the traveller in several ways:

- The Via delle Scuole arrives at the new Forum limit in the southeast. A clearly visible column in the south colonnade of the Forum marks the street’s north end at the Forum border. A water fountain strengthens the signal of a blocked entrance received by the traveller (see Fig. 41).
- The Via dell’Abbondanza east of the Forum ends with a sidewalk incorporating the short end of the street. In front of the sidewalk are three upright white caserta stones (Fig. 42) which serve as an explicitly placed “traffic sign”.
- From the west, a cart could not even reach the Forum limit, as the Via Marina became too narrow for carts (approx. 140 cm) directly east of intersection 65 due to a high sidewalk jutting out on the north side of the street. The blocking sidewalk is reached by a few stone steps from the west, which already at some distance give off a message because of their eye-catching lighter colour, attracting attention to the narrowness of the street. The passage between the northern sidewalk and the kerbstones below the high wall of the temple of Venus to the south was thus possible to identify as too narrow for a cart.\(^{213}\)


\(^{211}\) New research by The Pompeii Forum Project implies that the early, not yet organised, state of the Forum persisted until between 89 and 80 BC, when a large-scale building programme under Sulla changed the appearance of the Forum, cf. Dobbins & Ball 2005, 68. It is also possible that there was a gradual process beginning in the 2nd century BC, which led to an enlarged Forum becoming lined by monumental edifices and partly framed by colonnades, see Eschebach & Eschebach 1995, 65-66. Zanker (1998, 53-57) gives a summary of the buildings lining the first extended Forum. In Augustan times houses and shops were largely supplanted by public buildings, cf. Wallat 1997, 287-289.

\(^{212}\) The basilica is dated to 150-100 BC by Ohr 1991, 1, but seen as an integral part of the Sullan Forum programme by Dobbins & Ball (2005, 72).

\(^{213}\) The street became too narrow either when the basilica was built, cf. Ohr 1991, 4-6, or when the Via Marina was furnished with sidewalks, cf. Eschebach & Eschebach 1995, 90.
6. Circulation of wheeled traffic in Pompeii

- In the northeast, the Via del Foro reaches the Forum. An arch can be seen over a long distance: this indicator signalled the official and formal aspects of the place, and in itself it induced caution in the driver of a vehicle. Just north of the arch, there are two caserta stones blocking the entrance under the arch. Again, this is an unambiguous and explicitly placed “traffic sign”.

- In the northwest, the Vicolo delle Terme arrives at the Forum area. Here one was confronted with a façade that had two openings with staircases leading down onto the Forum – immediately recognisable as not negotiable by cart.214

The fact that the Forum in its new function could no longer be crossed by carts was also marked by the square itself being on a lower level than the surrounding colonnades and by being paved with white, regular, stone slabs. The colonnades also send a message in themselves, as they are visible at a distance from all directions. An area that was previously open to cart traffic, and that could misguidedly have been perceived to be open even after it was changed, thus received some explicitly placed blockers and warnings where the urban fabric was not enough to warn off vehicular traffic.

6.6.2. The indicators of the Via Marina/dell’Abbondanza and the Via di Mercurio/Foro/Forum/delle Scuole

The blocking of the Via Marina/dell’Abbondanza to wheeled traffic arriving at the Forum drastically changed the function of this decumanus.215 The whole west part of this axis had its circulation value lessened. The Porta

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Assuming the Via Marina could be used by carts at a time before the south part of the Forum was framed by colonnades and formalised, the sidewalks, or lack of them, would then have permitted traffic. The northern sidewalk has a tufa colonnade, deemed by Dobbins & Ball (2005, 72) to be part of a Sullan reconstruction of the Forum area. The Forum became interdicted to carts and the Via Marina was narrowed by a colonnade on a (enlarged) sidewalk.

214 The west passage is more like a door opening than a street entrance, and the east passage is through a vaulted opening, again alluding to the arches marking public spaces of an official character. Between them, in a vaulted niche, is a well, right on the sidewalk that continues unbroken from the east to the west past the entrances to the Forum.

Fig. 41. The north end of the Via delle Scuole (the Mercurio MA south of the Forum) terminates at a well, behind which the sidewalk crosses the short side of the street. A column in the south Forum colonnade also highlights the Forum limit. Against the west facade there is a street altar.

Fig. 42. Visible already from a distance, three upright white stones show that it is impossible to pass into the Forum with a cart if coming from the east on the Via dell’Abbondanza. View from west.
Marina kept its orientation and its role as the west terminating point of the *decumaneum*, but it also lost much of its importance for traffic circulation.\(^\text{216}\) The extremely steep passage through the gate was probably seldom used by carts, and the paving shows no wheel ruts.

The intersection between the Via dell’Abbondanza and the Via Stabiana (80)\(^\text{217}\) became the central intersection of Pompeii (*FIG. 36*). The blocking of the Via dell’Abbondanza in this intersection is signalled from both the west and the east by the tetrastyle of the Holconii and their honorary statues in the vicinity.\(^\text{218}\) From the east a sharp difference in level was also visible and marked out by a series of dark basalt stones.

In AD 79 town gates were conspicuously missing at the ends of the axis crossing the Forum: the Via di Mercurio/Foro/Forum/delle Scuole. The earlier north gate at the end of the Via di Mercurio, as well as the gate to the south of the Via delle Scuole, was closed. In both cases this was plainly visible from a distance without the need of specially placed indicators.

What was once the original main north-south bisection of the town thus remained, sweeping wide and straight through the heart of the town. However, the closed gates transformed the old, important communication line into a road from nowhere to nowhere, and it was furthermore closed to carts along the whole east side of the Forum.\(^\text{219}\)

### 6.6.3. The Via Consolare: Visual extension showing the way

The Via Consolare mirrors the path of the coastal road from Cumae coming in to Pompeii from the north. It enters the town in the northwest by the Porta di Ercolano and branches off in intersection 22. The east branch enters the Via delle Terme. Its original continuation towards the south or the east is no longer obvious in the town plan, but in one way or another it passed closely by the Forum area. The west branch continued along the Vicolo del Farma-

\(^{216}\) Eschebach & Eschebach 1995, 35 and figs. 8:1, 8:2. The harbour gate in the west had earlier been situated on top of the steep incline to the city. It had been moved down towards the harbour later, as the town walls were rebuilt. This did not imply a major change in communication with the harbour area.

\(^{217}\) Throughout this article I refer to the intersections with the numbers given in *FIG. 43*.

\(^{218}\) Richardson (1988, 215-216) emphasises that the location of the tetrastyle was chosen for its importance in public life. He is of the opinion that the Via dell’Abbondanza did not have any cart traffic at all west of the tetrastyle.

\(^{219}\) Fridell Anter & Weilguni 2003, 36. The special character of this street becomes clear in a Space Syntax analysis, where the axial line along the Via di Mercurio/Via del Foro/Forum/Via delle Scuole gets a high integration value, which means that there was a high potential for movement in and through the town. In Pompeii, long and highly integrated axial spaces usually are connected to the town gates, which makes this an interesting exception. Further references to the Space Syntax method can be found in Chapter 2.
cista and the Vicolo del Gallo. Presumably it was by taking the west branch that one had once reached the west harbour area outside the Porta Marina.\textsuperscript{220}

Later the Vicolo del Farmacista was blocked where it intersects with the Via delle Terme by a low vault supporting a ramp (23). The ramp leads up from the Via delle Terme to the entrance of a private house built out over the town walls and closing the former town gate in the last century BC.\textsuperscript{221}

One would expect a powerful indicator on the Via Consolare, signalling that carts from the north could not continue into the Vicolo del Farmacista, and also an indicator showing that the southeast branch of the street was the route to take. Admittedly, the blocking vault was visible at a certain distance. But while nearing intersection 22 a traveller lost the free line of sight, and the vault as well as the extension of the west branch again disappeared from sight due to the street curvature. One would have had to enter the small dead-end vestige of the Vicolo del Farmacista in order to become aware of the blocking vault again.

Here, visual extension came to the help. The east branch of the street opened up visually a few metres before one arrived at intersection 22: one could see right through it, onto the small largo (the enlargement of the street) that lay just before the entrance into the Via delle Terme. At the point where this vista opened up, the only thing visible of the west street branch was its opening. Thus, the street net itself served as a guide showing which route to choose.

6.6.4. Concluding remarks regarding the older town plan of Pompeii

There are, thus, several urban places whose function had changed at some time before AD 79. As a result there were some physical obstacles, indicators and “traffic signs” correcting an older visual message that no longer corresponded to the urban function in Pompeii. Indicators were deliberately placed where the townscape could give the wrong impression about the possibilities of circulation for carts. When the regulation of traffic circulation was already clear from the fabric of the town, there was no need for additional “traffic signs”.

These observations strengthen the hypothesis that there was a regulatory system for vehicular traffic, and that the Pompeiians were anxious to uphold it.

\textsuperscript{220} Pesando 1990a, 196-198, also fig. 12; Eschebach & Eschebach 1995, 1-2, 9-10, fig. 7. Earlier literature relevant to the discussion of this street, cf. Eschebach & Eschebach 1995, 10, n. 40.

\textsuperscript{221} Pesando 1990a, 205, dates this blocking to the last century BC; Eschebach & Eschebach 1995, 83, 108. The platform was destroyed by bombing during the Second World War. The only thing visible now is an earlier street paving, which formed the floor of a sewage channel under the ramp.
6.7. Inventory of evidence

When interpreting material remains and traces for the purpose of reconstructing the vehicular traffic system of Pompeii in its last years, one should make use of several different categories of evidence, which should then be assessed together before any hypotheses are put forward. Different categories of evidence\(^\text{222}\) do not, of course, always point in the same direction, owing to, for example, changes in driving behaviour over time. This complication must be borne in mind in the analysis; using only one or two classes of evidence could easily lead to the wrong conclusions. It is equally important not to reconstruct an implausible traffic system: the target areas must be accessible from each town gate, and the condition that a cart entering through one gate should be able to exit by the same gate should apply (see 6.4.3 and 6.9 below).\(^\text{223}\)

For the purpose of this study, I inventoried all of the approximately 130 street intersections of Pompeii and the street net between them. Each intersection was investigated with regard to the following: the possibility for one cart to pass in the streets leading up to/off the intersection, or for the possibility of two carts meeting in these streets; the presence of wheel ruts denoting carts turning around corners, or going straight past the intersection; physical blocking of street entrances in one or more directions, and different types of indicators either warning off traffic or guiding it into a particular street; as well as other phenomena forming part of the evidence for traffic on wheels, such as stones protecting corners, architectural features like wells and sidewalks, degraded insula corners, the view of landmarks in the town-scape, and so forth. All these facts are put together in the Table of Intersections in Pompeii,\(^\text{224}\) enabling the reader to form his or her own conclusions based on the empirical evidence.

\(^{222}\) Obviously we cannot know all the means that Pompeiians used for directing traffic, so an analysis must be based on what is still extant.

\(^{223}\) Much of what we see in Pompeii today is the work of more or less accurate reconstruction belonging to different epochs since the time the town was discovered. The large-scale urban features that are the subject of this study, however, did not undergo such severe changes as the paintings or mosaics. There are instances where modern works in a street (electricity, water) may have resulted in changes in the placement of paving or other stones, but most paving stones are in their original place. This also applies to built-in level changes at street intersections, and other obstacles. One change we know about is the removal by the Bourbons of some stones for pedestrian crossings, so that their carriages with noble visitors might pass unhindered (pers. comm. Professor Anne-Marie Leander Touati). In these cases we are left with a lacuna in the street where the stone once was.

\(^{224}\) Table of intersections, http://urn.kb.se/resolve?urn=urn:nbn:se:uu:diva-153187. My empirical catalogue regarding the street intersections of Pompeii is presented in this table. I do not give detailed measurements – that would be a work of greater time and scope. For the aims of my study I deemed it sufficient to give a simple assessment of the form of an intersection and of various features that are present. The facts listed are related to Tsujimura’s findings wherever possible.
At the conclusion of my inventory work Poehler published his findings of the cutting marks made by wheels on corner kerbstones in intersections, which therefore are not included in my inventory of intersection features. Poehler reached some conclusions that differed from mine, so I studied his evidence in the intersections along the Vicolo di Mercurio and Vicolo dei Vettii in situ. I also checked to see whether the hypotheses he put forward are compatible with the overall need to access target areas and leave town easily. The discussion follows below, in 6.8.6.

The possibility of wheeled traffic built into the street pattern is discussed in the following section.

6.8. Presentation and discussion of empirical evidence

6.8.1. Street width and wheel spans of carts

The width of the streets is of basic importance, since some streets could be used by two carts travelling in opposite directions and some by only one cart at a time, while still others were altogether too narrow for vehicular traffic.

In the research published by Tsujimura, the estimates of wheel spans of carts are based on reconstructions of carts from Pompeii and Stabiae as well as on the measurements of traces left by a single cart in the soil of Boscotrecase. They reveal that the wheel span was between 142 and 158 cm.\(^\text{225}\) The hub of the wheels exceeded these measures by approximately 16.5 cm on each side, but the hub was placed high enough to pass above the kerbstones of the sidewalk. It was thus sufficient if the street accommodated the breadth of the wheel span of a cart. My own measurements of wheel ruts, taken on the Via della Fortuna where the ruts had been worn down clearly and precisely in the form of “rails”, also gave a span of 142 cm.

The width of the street accordingly had to be about 145 cm to allow the smaller carts to pass, and about 160 cm to allow for the larger ones. More comfortable driving would have been achieved with another few centimetres. This means that certain streets can be immediately eliminated from the traffic system as being too narrow, or as being narrowed down or blocked by features jutting out.

The streets or parts of streets that were too narrow or inaccessible, or that were blocked to access at both ends, are set out in Fig. 44.\(^\text{226}\)

\(^{225}\) Tsujimura 1991, 61-62. The lower measurement limit comes from a reconstructed cart in Pompeii; no references to a publication are given. This cart seems to be the same as the one discussed above by Pisani Sartorio, cf. n. 209.

\(^{226}\) Cf. Tsujimura 1991, 78-79, fig. 12 for Vicolo di Tesmo between intersections 32 and 52; Tsujimura 1991, 63 for Vicolo del Balcone Pensile between intersections 58 and 59, Vicolo del Gallo between intersections 43 and 56 and Vicolo Championnet, inaccessible for carts from “intersection” 67. Via Marina was inaccessible between intersections 65 and 66 (see 6.2 above).
Streets wide enough to allow carts to meet had to allow some space for the inside hubs of both vehicles, that is 16.5 cm for each cart. It follows that small carts could meet on a street about 3.25 m wide, and larger carts on a street about 3.55 m wide. The streets that allowed even two larger carts to meet, and that consequently could have had traffic in two directions, are also easy to identify. They are:

- Via Vesuvio/Via Stabiana in its entire length from the north to the south\textsuperscript{227}
- Via dell’Abbondanza from the Forum and eastwards in its entirety
- Via delle Terme/Via della Fortuna/Via di Nola from intersection 24 and eastwards in its entirety\textsuperscript{228}
- Via dei Teatri between intersections 72 and 76\textsuperscript{229}
- Via del Tempio d’Iside between intersections 76 and 94
- Via di Castricio in its easternmost part, from intersection 104, where the street changed into the open space around the palaestra and the amphitheatre
- Via di Porta Nocera between intersections 103 and 130
- Via Consolare from intersection 1 to intersection 22\textsuperscript{230}
- Via delle Scuole from intersection 69 to intersection 73
- Via di Mercurio in its entire length from the north to the south
- Via del Foro in its entirety

All other streets, except those shown in Fig. 44 as inaccessible, allowed one cart to pass. I assume that, for practical reasons, circulation in these streets was usually only in one direction, although there may have been some short streets used in both directions intermittently.

\textsuperscript{227} Nissen (1877, 528) gives the width of Via Stabiana as 3.24 m-4.10 m. This shows that there were narrow passages in wide streets as well. Carts would have had to wait for oncoming traffic to pass at such places.

\textsuperscript{228} Eschebach & Eschebach 1995, 143-144; Tsujimura 1991, fig. 5.

\textsuperscript{229} The street at its narrowest was 3.30 m, which means that the smallest carts could meet.

\textsuperscript{230} This street has high kerbstones and therefore allowed only the smallest carts to meet. At certain points all meetings were impossible. If one assumes that carts waited for their turn to pass such points, traffic in two directions was possible. Tsujimura 1991, 62. Width measurements, cf. Nissen 1877, 528.
Fig. 43. Numbered intersections of Pompeii as referred to in this chapter.
6.8.2. Physical obstacles and guidance in intersections

Driving in Pompeii, one also encountered physical features in the form of blockers (blocked road or road entrance), warnings (not a regular blocker, but a deliberately placed construction making it possible to pass with some difficulty, at least in one direction) and indicators (a condition in the urban fabric or a deliberately placed “message” marking a route as suitable or unsuitable). To understand traffic organisation these physical features must be interpreted.

It is important to understand that an urban condition guiding traffic need not be a feature planned with traffic guidance in mind. A dead-end street may be constructed this way for a variety of reasons, but when this street is seen to be a dead end, this fact guides driving behaviour. If it is not perceived as a dead-end street upon entrance, then a sign announcing this fact may be put up.

Blocked street entrances

A street could be entirely blocked to carts entering and leaving in an intersection.231 All blockers can be seen in Fig. 44.232

The most usual kind of blocker was to let the sidewalk of one street continue straight through the intersection, cutting off the entrance of another street. The kerbstones of the ongoing sidewalk in these cases have not been angled, but are vertical and thus difficult to negotiate with a cart.233

A sidewalk could also close the short end of a street, making it a dead end. This applies to intersection 68, where the Via dell’Abbondanza comes into the Forum from the east. Another case in point is intersection 69, where the Via delle Scuole meets the Forum: here a well was placed at the street’s end, in addition to the sidewalk hemming in the street’s north end (Fig. 41).

Sometimes stepping stones were used to create a blocker: the spaces between the stones were walled up to stop the passage of carts. This was the case in intersections 43 and 84.

Blocking by upended large stones can be seen at the entrance to the Forum from the north, where two upended white caserta stones are placed slightly in front of a triumphal arch, leading to a staircase down to the Forum. In intersection 68 the blocking was additionally emphasised by three upended white caserta stones (Fig. 42) in conjunction with the impassable

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231 Even a blocker might sometimes have been ignored and forced, but the degree of difficulty would have made this a rare event.

232 Tsujimura (1991, fig. 5) does not distinguish between a real blocker, rendering a street inaccessible from an intersection, and an obstacle that can be negotiated with a cart. In the Table of Intersections obstacles deemed by me to be warnings have been described as such. Obstacles noted by Tsujimura 1991, but not seen by me, are marked *.

233 This kind of blocker can be seen in intersections 34, 40, 49, 50, 82, 85, 87, 89, 90, 91, 109, 110 and 120.
sidewalk. There also is a stone monolith blocking the street leading north in no. 28.

Other blockers are water fountains (no. 56 and no. 69), a water tower (no. 58), and the jutting sidewalk on the north side of Via Marina in intersection 65. We also find a low vault in no. 23, two steps in no. 103, and a vertical level difference in no. 80, where the Via dell’Abbondanza, coming from the west, enters the intersection at a level some 40 cm higher than the other streets.

In a few instances a street was blocked off by a building feature that was not placed directly in the intersection but further in along the street. In these cases the urban fabric itself made the street a dead end.234

Warning obstacles
Instead of being totally blocked, street entrances in intersections could have a slope of paving stones, a ramp, or some other physical obstacle that made passage into the street in question rather difficult but not impossible.235 Such an obstacle made leaving the street in question possible without too many problems as one went down over the obstacle, and therefore it indicates that there was some amount of wheeled traffic passing over it. Places with a warning obstacle can be seen in Fig. 44.

The warning obstacle typically appears in an intersection where the sidewalk crosses one of the streets. This street, situated at a higher level than the others in the intersection, could be reached by a small ramp leading up to the sidewalk. The ramp was made up of one row of street paving stones, placed at an angle.236

The same type of ramp could also lead up to platforms over the openings of the town’s sewage channels. These platforms were paved in the same manner as the streets and would simply have been interpreted as level differences. In intersection 45 the Via degli Augustali ends with such a ramp up to a platform, which then slopes down to the level of the Via del Foro. In intersection 50 a ramp from the south leads up to a platform on the same level as the sidewalk. One cannot leave the platform by going north, however, as it ends with the usual vertical kerbstones of the sidewalk of Via degli Augustali. In no. 23, the Via della Fortuna ends with a ramp.

A ramp placed across a street where there is no intersection can be found where the Via dell’Abbondanza widened into an extensive open space, approximately between intersections 72 and 80 – not leading onto a platform this time, but simply marking a level difference by a “bump”.

234 Intersection 113, where the street leading east to 114 was built over some distance to the east of the Via Stabiana, and 114 where there possibly was a building feature to the south.
235 Gesemann (1996, 66-67) is also of the opinion that certain street entrances had “thresholds” that could be overcome but nevertheless served as a deterrent.
236 This kind of warning obstacle is found in intersections 63, 71 and 83.
Possibly also the northern street in intersection 27 should be counted as displaying a warning to the driver of a wheeled vehicle: the Vicolo del Fauno was partly unpaved and formed in long sections or steps.

Fig. 44. Obstacles to cart traffic in Pompeii. Hatched streets are blocked at both ends, too narrow for carts, etc. ■ symbolises a blocker, and □ a warning in street entrances/exits. Wheel ruts around insula corners are shown with curved lines.
Blocker or warning visible over distance

The obstacles that led to total blocking, as well as those that warned traffic, could be of the kind that was not noticed until a driver was actually in the intersection and had to make a choice about which way to go. In these cases the obstacles could not work as real “traffic signs” that gave advance warning of circumstances ahead.

There existed, however, traffic-regulating messages that were visible and intelligible from a distance. A “traffic sign” could be built into the urban fabric. This means simply that the urban fabric was self-explanatory and needed no additional deliberately placed “traffic signs” as reinforcements. An example is the total blocking seen from far away by a traveller westwards on the Via di Nola. The continuous facade of Insula VII 16 (Insula Occidentalis) in the west clearly showed that there was no west gate corresponding to the entrance from the east.

Two obvious examples of consciously placed “traffic signs”, in a place where the urban fabric was not self-explanatory when seen from a distance, are the earlier mentioned white stones blocking carts from entering the Forum from the north and the east (intersections 45 and 68). Thus, a driver was warned of an upcoming total physical obstacle well in advance.

There were also less absolute warnings and indicators of direction – messages that did not indicate an absolute impossibility or interdiction to pass – that could be discerned from a distance. These are what may be termed conceptual warnings, indicating a street or an area of special character. This special character may, or may not, have been of the kind that precluded circulation by wheeled vehicles. Today, many of these conceptual warnings are lost to us, but colonnades, temple facades, triumphal arches, tetrapyrons and honorary statues of marble would all have singled out official and special areas.

Positive indicators of direction

Positive indicators guided the cart driver along a suitable route. Some of these were noticed only as one reached a place where a decision was necessary. For the traveller following a sinuous path through the town, the similar structuring of two intersections could, for instance, be a helpful road indicator. Seen from intersection 70 with its white fountain, another white fountain in no. 47 could easily be interpreted as a pointer to the suitable route northwards (cf. section 6.10 below).

Other indicators were visible over a longer distance. A town gate visible along the course of the road leading up to it was a clear indicator built into the townscape itself.

Many indicators, both positive and negative, may well have been lost over time. Graffiti, dipinti and wall paintings may all have helped to mark the
way, as did the spoken word. Of these, we know nothing and must be content to interpret what is left.

**Choice of road: indicators abstracted from street layout**

In spite of blockers and warnings, the traveller not familiar with Pompeii often must have come upon intersections where no obvious help to choose the route was found.

A simple psychological insight may be valuable: if there is no sign of any kind, people tend to continue straight ahead rather than turn off the road they are on. This is certainly the case if the street is wide and turning would mean entering a narrower one. It is generally also the case if the streets are about equal in width. To leave the street by turning, there would either have to be some kind of indicator in these situations, or one would have to know in advance that a turn was necessary. When travelling in a small street that crosses a wider street, the choice between going straight ahead and turning is harder, but if the wide street is wide enough one will choose to turn.

In a difficult situation the visual extension of the alternatives may be decisive. This means one chooses the alternative that takes up the larger part of the visual field when moving towards the intersection. Often one is not left with only the visual extension as a guide, but uses it as an aid in the selection of alternative routes.

An example may show the meaning of this: in intersection 76 “straight ahead”, for someone coming from the east, would have meant continuing along a narrower street, a street that also looked as if it would turn out to be a dead end. This would have made turning an attractive solution, and the turn to the north into the Via dei Teatri’s wide northern part is already some distance away visually dominant over the turn to the south.

**Combinations of different obstacles and indicators**

Sometimes different types of obstacles and indicators were combined. The cart driver travelling from the west towards intersection 80 would, from a distance, have seen the tetrapylon of the Holconii, a conceptual indicator. Thus, he would have been warned of the special ambience of the open place at the end of Via dell’Abbondanza. In case this was not sufficient, there was also the slight ramp about 50 m to the west of the place where the street widened, a very easily negotiated difficulty that served as a physical warning obstacle of the usual kind.

If all this were ignored, in this case the driver would be stopped by the stark reality of a physical and interdictive blocker. A cart continuing on its way eastwards would simply have fallen down about 40 cm from the Via dell’Abbondanza onto the Via Stabiana, as this is the vertical level difference between these two streets.
6.8.3. Wheel ruts turning around the corners of insulae

Carts, while turning, have worn deep ruts into the paving. A first inventory of these ruts, as well as some case studies, was done by Tsujimura in 1991. The curved ruts are marked in Fig. 44.\textsuperscript{237}

It is noteworthy that, almost without exception, wheel ruts go around only one or two corners in a four-street intersection. This is an important argument supporting a regulated circulation system, as Tsujimura was the first to notice.\textsuperscript{238} If wheeled traffic had gone haphazardly along the streets, then most streets would have had traffic in both directions intermittently. The turning ruts would in time come to go around all the angles of the intersection.

A specific regularity can be identified for turns along the Via Stabiana and the Via dell’Abbondanza. Looking at the remaining traces, the following becomes clear:

- carts \textit{exited} the Via dell’Abbondanza by turning right
- carts \textit{entered} the Via dell’Abbondanza by turning left
- carts \textit{exited} the Via Stabiana by turning left
- carts \textit{entered} the Via Stabiana by turning right

Every instance of turning ruts except one is compatible with either one of the entering or leaving actions described above. This regularity is presumed to be due to a rule. It is, however, not possible to tell only by looking at the ruts whether carts actually entered or left the road at a specific turn.

In crossings between streets with two-way traffic, the wheel ruts around only two of the four corners mean that if carts could turn to and from both streets they would run great risk of collision in the corner, especially as these wide two-way streets were among the busiest.\textsuperscript{239} I will therefore assume that around a specific corner one kind of turning action was the general rule. Wheel ruts around more corners than two may be indicative of a traffic regulation change.

\textsuperscript{237} Tsujimura 1991, fig. 5. On this map the turning ruts identified in 1991 can be found. In the \textit{Table of intersections} I have marked the ruts only seen by Tsujimura with *, and the ruts only identified by me with **. All unmarked entries agree with one another.

\textsuperscript{238} Tsujimura 1991, 63-69, where the regulation of turns to and from the Via dell’Abbondanza and the Via Stabiana is described. For my description of the rules governing the turning into and off Pompeii’s two most important thoroughfares I rely on Tsujimura’s work. The general conclusions Tsujimura draws from this are, however, not extensive, and regarding specific cases I do not always agree with them. An exception to the turning rule is placed in intersection 92, where one left the Via dell’Abbondanza for the amphitheatre by turning right.

\textsuperscript{239} The only clear example of a complete intersection of this kind is no. 30, the intersection between the Via di Nola and the Via Stabiana. Intersection no. 80 between the east part of the Via dell’Abbondanza and the Via Stabiana is a “T-intersection” between streets with two-way traffic flow, as the entrance to the west part of the Via dell’Abbondanza is blocked.
It is important to keep in mind, that obstacles and indicators must be interpreted and reasonable suppositions made before drawing conclusions as to whether turning wheel ruts meant that carts left a street or instead entered it.

6.8.4. A location with traffic direction identified

There is one place in Pompeii where Tsujimura was able to establish the actual traffic direction in two streets. This is intersection 79, where the Vicolo di Tesmo goes in a north-south direction and the Vicolo di Balbo in an east-west direction (Fig. 45).

Both streets are only wide enough for one cart. In the intersection there are wheel ruts around the southwest corner, and in the middle of the intersection there is an upright stone that is clearly meant to guide traffic in some way. There are four possibilities regarding the direction of the circulation of carts, and if we compare them with the evidence of the wheel ruts and the upright stone, the following emerges for each case:

1. The carts on the Vicolo di Tesmo went straight from north to south, or turned into the Vicolo di Balbo, going west. This would leave ruts around the northwest corner, which is not the case. This possibility can be dismissed.
2. The carts on the Vicolo di Tesmo went straight from south to north, or turned into the Vicolo di Balbo, going west. This possibility coincides with the existing wheel ruts.
3. The carts on the Vicolo di Tesmo went straight from north to south. The carts coming from the west in the Vicolo di Balbo turned south and joined the flow on the Vicolo di Tesmo, going south. This possibility coincides with the existing wheel ruts.
4. The carts on the Vicolo di Tesmo went straight from south to north. The carts coming from the west in the Vicolo di Balbo turned north and merged with the flow on the Vicolo di Tesmo, going east. This would leave ruts around the northwest corner, which is not the case. This possibility can be dismissed.

Tsujimura 1991, 76-79, Case study no. 4. The reasoning is fairly hard to grasp and is therefore set out here in a detailed way, after studying the intersection closely on the spot. In Fig. 45, the two curving wheel ruts turning around the southwest corner are a distance of c. 150 cm apart. If they belong together, the passage for carts was very nearly impossible. As the usual wheel-span was c. 142 cm, however, it is likely that the ruts belong to different time periods. The east rut is likely to be earlier than the west, and was made before the guiding stone was erected. North to south-east curving ruts in the Vicolo di Tesmo obviously predate the stone as the cart would have turned east over the place where the stone was set up. A rut that closely follows the east kerbstones of the Vicolo di Tesmo supports Tsujimura’s hypothesis of north to south traffic being forced eastwards by the guiding stone, though this rut was not mentioned by her. It is clearly visible in Pompeii in pictures, http://pompeiiinpictures.com/pompeiiinpictures/Streets/Vicolo_di_Tesmo_p2.htm, photography 13.
Thus, alternatives 2 and 3 are possible. The evidence of the upright stone, which is clearly intended to separate two traffic flows to avoid the risk of collision, helps us to understand which alternative was used. If the traffic flow had been northwards in the Vicolo di Tesmo and westwards on the Vicolo di Balbo, this stone would have been quite unnecessary. The traffic flow would then have split neatly in the intersection, some carts going off west and others continuing north.

The stone is positioned in such a way that carts on the Vicolo di Tesmo were forced to the east in the intersection. If these carts went southwards, there would be more space for eastwards-travelling carts in the Vicolo di Balbo to make their turns to the south, joining the flow on the Vicolo di Tesmo. This, then, is Tsujimura’s conclusion on how the traffic flowed in intersection 79, a conclusion that is accepted and built upon in this chapter.

This also affects the interpretation of the curved ruts found in intersection 81: they obviously must represent carts turning left into the Via dell’Abbondanza from the Vicolo di Tesmo. The ruts in intersection 78, on
the other hand, represent carts leaving the Via Stabiana and entering the Vicolo di Balbo. The interpretation of intersection 79 is thus of great help in understanding how the flow of cart traffic was managed in Pompeii.

6.8.5. Other indications of turning around corners

In addition to the ruts curving around the corner of an insula, there is other evidence showing that a turn was made. Most often one turned where the insula corner formed an obtuse angle, that is, an angle exceeding 90 degrees. This is easily seen in Fig. 44.\textsuperscript{241}

A turn around an obtuse insula angle could sometimes be made even easier by giving the building corner itself a rounded contour. Apparently, in some instances turns around insula corners were made even though the angle was acute. In that case also the contour of the building corner could be degraded. A case in point is intersection 60, where an acute angle, between two streets meeting in a Y-shaped intersection, is rounded. It was even more common for the sidewalk to be degraded, as can be seen in intersection 17, where both one obtuse angle and two acute angles have received this treatment.

The positioning of protective stones in a corner, or around some special feature in the intersection, can also be evidence of carts turning. In intersection 29 the northwest corner is protected, as is a nearby well.

The curved ruts are thus supplemented by other indications of turns, and all those additions (as well as the deeply ingrained ruts themselves) also served as indicators and helped carts to find their way. These additions can also be helpful for an interpretation in cases where ruts are missing, either because of repairs done shortly before the obliteration of the town or because of infrequent use.

6.8.6. Additional directional evidence: cutting marks on corner kerbstones

The previously neglected evidence of cutting marks made by wheels when carts turned around street corners was recently investigated by Poehler, who found that these cutting marks produce a distinct parabola-shaped pattern when a cart makes a tight turn from one street into another, the wheels scraping against the stone.\textsuperscript{242} My inventory did not take account of these marks, and the routes I propose are based on other types of evidence. A comparison between Poehler’s results and mine may therefore highlight problem areas.

\textsuperscript{241} Tsujimura 1991, 66-67.
\textsuperscript{242} Poehler 2006, 57-58, fig. 7.
Having studied Poehler’s evidence on the site, I will now discuss some of the intersections along the Vicolo di Mercurio. This is a fairly important street, where Poehler made a detailed study and opted for westbound traffic in Pompeii’s last period, whereas I hypothesize an eastbound flow.

The intersection between Vicolo di Mercurio and Via Consolare

This intersection (no. 10 in Fig. 43) presents a classic wear pattern according to Poehler, and he uses the traces of wear on the north corner kerbstone as his cardinal example. The wear traces indicate that carts turned from the Vicolo di Mercurio into the Via Consolare, where they then headed either north or south. The traffic flow on the Vicolo was thus east to west.

My own suggestion is that traffic went west to east on the same Vicolo, and that carts turned into it from the Via Consolare. This is based on wheel ruts around the obtuse and rounded NE corner, and also on the fact that traffic on the Vicolo must tie in with a traffic system for the entirety of the town.

Without doubt, the cutting marks are there and they clearly denote carts turning from the Vicolo into Via Consolare (Fig. 46A). At some time, then, the traffic flowed as Poehler would have it. But there is a problem: northwest of the stone with the diagnostic traces there is a higher protecting stone which projects into the street in such a manner that a wheel continuing its trajectory in the way indicated by the kerbstone would butt against it (Fig. 46B). Thus, the wear traces on the kerbstone must predate the protecting stone. Once this protecting stone was in place carts could certainly have continued turning from the Vicolo into Via Consolare, but they would not have produced the cutting marks on the corner stone, as the turn would have been forced to be wider.

This street corner was indeed used for turns even after the positioning of the protecting stone; the stone itself exhibits some (level and non-diagnostic) wear traces about 35 – 40 cm above street level. But the cutting marks on the corner stone do not tell us in which direction cart traffic flowed in Pompeii’s last years.

Poehler also suggests turning around the south corner of this T-intersection, and wear traces (there are no wheel ruts, however) suggest that this was done at some time. In this corner modern cement and the presence of a modern manhole for water/sewage makes the positioning of the kerbstones and protecting stone imprecise, and therefore no more can be said than that carts at some point in time turned around this corner.

The intersection between the Vicolo di Mercurio and Vicolo dei Vettii

This is an important intersection, where it is difficult to reach a conclusion. Poehler seems to think that the Vicolo dei Vettii was once a street used in

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243 Poehler, 2006, 57-58, fig. 6; also entry 8 in table 1, p. 66.
Fig. 46 A. Kerbstone in the northeast corner in the intersection between the Vicolo di Mercurio and the Via Consolare. Parabola-shaped wear patterns indicate that westbound carts turned north here.

Fig. 46 B. A protecting stone in the northeast corner in the intersection between the Vicolo di Mercurio and the Via Consolare. This stone would have been an obstacle if a westbound driver tried to effect a turn to the north.
both directions at the same time but was later changed into a southbound street. The Vicolo in its broader part measures around 3 m, which leads me to the conclusion that in its present condition it supported only one-way traffic.

Starting with the northeast corner kerbstone, according to Poehler this should indicate westbound traffic turning north. The wear does not have the diagnostic parabola shape and is thus difficult to judge.

The continuation of the trajectory indicated by the traces on the northwest stone are, just as in intersection 11, blocked by a protruding protective stone on which there are indistinct wear traces, and the southwest corner kerbstone has wear that can be interpreted to fit either traffic direction. Again, the evidence is inconclusive.

Other intersections along the Vicolo di Mercurio

In the intersection with Vicolo del Modesto, Poehler supplements the evidence from wear traces on the corner kerbstones with wear marks on the southeast corner of a stepping stone in the Vicolo di Mercurio. He concludes that westbound traffic turned north into the Vicolo Modesto. The angle of the stepping stone abrasion is, however, so steep that it is hard to see how a cart could have produced it unless the cart came almost directly from the south (where there is an insula wall). As stepping stones were cut to a rounded shape before being placed in the street, it may sometimes be difficult to distinguish between cuts resulting from forming these stones, and wear traces. Could this possibly be the case here?

In the intersection between Vicolo di Mercurio and Via di Mercurio, Poehler’s evidence for westbound traffic hinges upon a protecting stone in the northwest corner. Its wear pattern, however, is rather inconclusive and does not provide unambiguous directional evidence. Even overriding marks on stepping stones in the intersection give conflicting evidence; the marks show that both directions had been used but not, as I see it, which direction was the final one. If we move to the southwest corner kerbstone, the abrasions on it again show traffic flow both for westbound carts turning south and for northbound carts turning east, but the last traces are not listed by Poehler.

In the intersection with the Via Stabiana, the vicolo continues eastward as the Vicolo di Nozze d’Argento. The single stepping stone in the east branch has an overriding mark indicating westbound traffic, which seems to be superimposed on an overriding mark showing the opposite. In a major intersection like this, however, it is possible that traffic in the two branches of the vicolo went in opposite directions. Thus the evidence used by Poehler says nothing about the direction of the traffic flow in the west branch (Vicolo di Mercurio).
Conclusions on Poehler’s work

Poehler suggests that traffic on the Vicolo di Mercurio went westwards in the final phase. His evidence shows conclusively that traffic flow on the vicolo at some time indeed went west, and that it went east at another time. His evidence, however, is not conclusive regarding which direction was the final one.

I suggest that traffic in the final phase went eastwards, since this ties in with a traffic system encompassing the entire town of Pompeii and is not contradicted by Poehler’s evidence.

This rather detailed discussion makes it absolutely clear that no single type of evidence will give us the whole picture of vehicular traffic in Pompeii. The best solution should be to look for a traffic system that is not contradicted by any material evidence, and at the same time is supported by some of it: the wheel ruts turning corners, the street width, and the wear on corner kerbstones must all be studied together with blockers, warnings and indicators as well as with the urban fabric itself that guided traffic. This collected evidence must then be brought into accord with the important prerequisites of access to target areas from every town gate and the possibility of smoothly entering and leaving town by the same town gate.

My main conclusion, further discussed in section 6.9, is that a traffic regulation system was plausible and that it could function with eastbound traffic on the Vicolo di Mercurio. Possibly it could also function with westbound traffic on the vicolo. I eagerly look forward to seeing Poehler’s further work.

6.9. A model for the flow of vehicular traffic through town

In order to test the hypothesis about a traffic regulation system, I will now construct a model of the possible routes through town available for carts. The evidence discussed above is used to recreate a traffic system that also takes the following preconditions into account:

- Most important goods transports concern commodities delivered to the town (cf. 6.4.1 above)
- Traffic must be able to reach important commercial and other target areas
- Vehicular traffic must be able to enter by one gate, complete a circuit to one or more important target areas, and leave by the same gate. Certainly, it must also be possible to enter by one gate, complete a circuit to one or more important target areas, and leave by a different gate
Reconstructing the routes through the town means that any one route must be supported by extant wheel ruts, physical obstacles and other evidence of various kinds. Evidence not supporting the route cannot be contradictory to it. Its existence must be possible to interpret as having been caused by earlier traffic or as supplementary use of the street system.

6.9.1. Entering by one town gate, reaching target areas, exiting by the same gate

I have reconstructed routes for all town gates except the Porta Marina, which was hardly used by carts. The first of these routes will be more fully discussed than the following, in order to make clear the type of evidence used. The interested reader may take part of the data for any one intersection in my Table of Intersections in Pompeii, and check out the conclusions I have drawn from the available information, as well as the routes proposed. 244

**From the Porta di Sarno to the “centre” and back (Fig. 47)**

The road into town was straightforward until one reached intersection 80 with the Via Stabiana. When going westwards from the gate there were a number of possibilities to turn into streets neither blocked nor fitted out with a warning, but these streets were all much narrower than the Via dell’Abbondanza and, as far as they are sufficiently excavated, lacked any indicator encouraging a turn (except intersection 92 where traffic bound for the amphitheatre would enter, as this enormous building was plainly visible from the main street).

Assuming that travelling “straight ahead” on the wider street was more attractive than turning into a narrower street, the cart would have gone on until it arrived at the intersection with the Via Stabiana. Already from a long distance, the impossibility of continuing west past the tetrapylon of the Holconii became evident because the level difference and its adjacent basalt stones sent a clear message. In the intersection (80) deep wheel ruts show that carts turned the northeast angle and could have continued north.

Is it possible that these wheel ruts indicate the opposite – cart circulation from the Via Stabiana, turning into the Via dell’Abbondanza? In accordance with assuming that only one of these alternatives was used (see 6.8.3 above), this would mean that incoming deliveries from the Porta del Sarno had to make a detour through the insulae to the north or to the south. This is not a practical solution even if one disregards the necessity to turn into a small side street – delivery traffic was more common than empty carts entering town in order to buy goods, and a fully loaded cart was more hampered by detours than an empty one. Thus, in intersection 80 I assume a turn to the

244 Table of intersections, http://urn.kb.se/resolve?urn=urn:nbn:se:uu:diva-153187.
north, as one always left the Via dell’Abbondanza by turning to the right (cf. 6.8.3).

How did one get from here to the commercial nucleus of the town? Clearly ingrained ruts show the possibility of turning to the west from Via Stabiana, either into the Via degli Augustali (51), the Via della Fortuna (30)

*Boreas* 33
or the Vicolo del Panettiere (58). These three possibilities are discussed below.

Turning into the Via degli Augustali led directly into an important commercial district, but the consequences for further travel were rather laborious. The cart first passed intersection 50, where the continuous sidewalk made turning south impossible. In intersection 47 there would have been a chance to turn north, but here the wheel ruts going from north to south and from east to west run perfectly straight over the intersection without any traces of turning. This very clearly shows that this option of turning was not used, or used so infrequently as to leave no traces at all. Thus, carts would have continued on to intersection 45. Coming from the east, one would here have had to negotiate the obstacle of a ramp leading up to a platform over a sewer opening. This was feasible, as was leaving the platform by a rather steep incline and entering the Via del Foro. Turning around after making deliveries in the Via degli Augustali would also have been an option, but then there would have been some problems with carts going in the other direction. It would seem that all the alternatives in the Via degli Augustali could have been used by carts, but with some difficulty. The clear wheel ruts turning into this street may be from a time when access to the Via del Foro was easier.

Could a cart going northwards on Via Stabiana instead have turned west into the Vicolo del Panettiere, and then somehow have managed to turn south to reach the Forum area? There are ruts showing that traffic on wheels rounded the southeast corner of intersection 46, and possibly these ruts were made by carts leaving the Vicolo del Panettiere and continuing to the south. In that case, the carts would have touched on several localities where deliveries were needed. But then again, this street running in a north-south direction is part of another route through town which on good grounds can be shown to have had circulation from the south to the north along the Vicolo di Eumachia and the Vicolo Storto. Since traffic in both directions was surely avoided in the busy town centre, this rules out the possibility.

The last alternative was that the turn westwards took place in intersection 30, where the Via della Fortuna continued west. This is an intersection between two important streets, and the turn west would have presented a more attractive alternative than the narrower streets discussed above. By this route, the Via del Foro could be reached (26), and in this wide street neither turning nor two-way traffic presented a problem. Continuing to intersection 23 also offered a possibility to turn the cart around.

Leaving the commercial area and the town would have been effected by turning north into the Via di Mercurio (26) and then east into the Vicolo di Mercurio (13). Alternatively the turn to the north could have been made in intersection 25 or 24, and one block further north the cart would have turned
east. In intersection 17 a turn south would have set the cart on its way back along the Via Stabiana.245

To get back to the Via dell’Abbondanza, one used the two streets where we are absolutely certain about the direction of the traffic flow: the Vicolo di Balbo and the Vicolo di Tesmo, passing intersections 78, 79 and 81 (see 6.8.4 above).

Was this access to target areas sufficient? The Via dell’Abbondanza east of intersection 80, the Via Stabiana between no. 80 and no. 17, the building site of the Central Baths, the Via del Foro with baths and shops, and by choice the Via degli Augustali, could all be accessed. Goods destined for the Macellum, the Forum, and the Via dell’Abbondanza west of intersection 80 would have needed to be carried in the last instance, but only for a short distance. So, yes, the access would have been sufficient.

It should be noted that the Via del Foro in its main body lacks all traces of wheels, although it was a commercially central spot. This may be explained by the paving having been changed shortly before AD 79. As there are ruts turning around its corners both in the north and in the south, the Via del Foro was obviously part of the cart circulation system.

Regarding the journey back from the city centre to the Sarno gate, the Vicolo di Balbo lacks any kind of marker indicating it as the connection to the Via dell’Abbondanza. On the other hand, the choice of exit roads was limited if one did not wish to exit by the Porta di Nola and use the external ring road to get back to the Porta di Sarno. As the street leading east from no. 49 is too narrow for carts, turning east can only be done in intersection 51 or 78 north of intersection 80, though at present it is not possible to discern how the choice to use intersection 78 was made.

From the Porta di Nocera to the “centre” and back (Fig. 48)
The Via di Porta Nocera goes straight north from the Porta di Nocera until it reaches the Via dell’Abbondanza. In all three intersections along the road

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245 See discussion about the traffic flow on Vicolo di Mercurio in 6.8.6 above. If one holds to Poehler’s suggestion of an east to west traffic flow on the Vicolo di Mercurio, the return journey could have been made by going back along the Via di Nola, crossing the Via Stabiana, and turning south somewhere east of this street. This is more likely than that carts would have left the Via di Nola and turned south on the Via Stabiana, as Poehler suggests, as this intersection (30) probably was used to leave the Via Stabiana. If it were used for traffic into the Via Stabiana, the consequence would be that the Via degli Augustali or the Vicolo Panetiere was the main access route to the most important commercial area. Above, it was shown that this was a rather complicated way to reach the centre, with several difficulties.

The purpose of detailing this is to show the problems inherent in reconstructing a coherent, townwide traffic system. A presumed turn around a corner or a presumed direction of travel along one street has consequences for the interpretation of other indications in other parts of the town. A reconstructed traffic system must ultimately work for the entirety of Pompeii.
(120, 103 and 88) there are wheel ruts around the southwest corner. From no. 103 northwards the street is only wide enough for one cart.

Again, I assume that the most direct access route had priority over an easy exit. Therefore, one would have bypassed the intersections with narrower streets and gone on to intersection 88, where one turned west on the Via dell’Abbondanza. The “centre” was thus accessible in much the same way as it was from the Porta di Sarno.

The way back through the same gate would not have been made by intersection 88, as it can be assumed that the wheel ruts around the southwest corner were made by carts going into town. Exit was either by intersection 103 or 120.

One left the Via Stabiana one block south of the Via dell’Abbondanza, on the Vicolo del Menandro. In intersection 95 there are wheel ruts around the northeast corner, which is also protected by two stones, indicating that the suitable turn was from the north to the east. This means that traffic on the Vicolo di Menandro was eastbound. In no. 96 the ruts are compatible with a turn south, while the north street was an unsuitable choice. In no. 97 the only viable choice was the Via di Castricio to the east, since the street to the south makes a 90 degree turn back west and, looking like a dead end, gives no further clues about passing with a cart. Avoiding turns into smaller side streets, one was finally back on the Via di Porta Nocera in intersection 103.

From the Porta di Stabia to the “centre” and back (Fig. 49)
The Porta di Stabia linked Pompeii to the important Sarno harbour. Consequently, entering the town through this gate gave ample opportunities to reach the “centre”.

First, there was the same access to the Via degli Augustali, the Via della Fortuna/Nola, the Via del Foro and surrounding commercial areas, as there was from the gates already discussed. After reaching these places, there was no problem returning along the Via Stabiana in the same way as in the routes above.

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246 The Vicolo di Paquio Proculo was unpaved and formed by a series of platforms. It could also be closed by a gate. Turning south was thus strongly indicated. Even an open gate would have been a conceptual marker telling unauthorized carts to keep out.
Second, from the Porta di Stabia there was also a route through the absolute heart of the town. This route will be described later on (see below 6.10) in the context of a hypothetical journey as an illustration of this study. It provides interesting information about markers and indicators that guided the
driver of a cart through Pompeii, and it also shows what happened if somebody took a wrong turn. Here I will only give the basic details:

In intersection 94 one turned west into the Via del Tempio d’Iside. In no. 76 the route continued towards the north, making it possible to reach the market area on the Via dell’Abbondanza, to the west of the tetrapiylon of the Holcomii. The ingrained wheel ruts show that a turn to the west along the decumanus was also in order, and that thereafter it was possible to continue north in intersection 70. By taking this road, the back of the Macellum could be accessed from a dead-end street. The route then went on along the Vicolo Storto, crossing the Via della Fortuna, and into the Vicolo dei Vettii. In intersection 16 it was possible to turn east, and to regain the Via Stabiana in intersection 17.

It would be possible to imagine this route going from north to south, but walking it showed that, in this case, a pronounced lack of markers and intelligible visibility caused difficulties, the first of which was to choose the Vicolo dei Vettii as the road to take southwards instead of the larger, prominently visible and logical Via Stabiana.

This route through the heart of Pompeii shows varying degrees of wear on the paving stones. The least wear is seen on the Via dell’Abbondanza. It must be remembered that the west part of this street was part of the official character of the Forum and therefore worn paving stones would have been changed frequently.

From the Porta di Ercolano to the “centre” and back (Fig. 50)

To reach the commercial localities, it was self-evident to follow the Via Consolare down to the branching to the north of insula VI 4 (22). The choice of route in intersection 22 is discussed above (cf. 6.3). It became necessary to use the east street between insulae VI 3 and VI 4 to arrive at the Via della Fortuna (24). The wheel ruts in the southwest corner of intersection 26 and in the northwest corner of intersection 45 show that carts either circled insula VII 5 clockwise or counter-clockwise. Either way, this gave access to the

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247 Poehler 2000, 61 and fig. 3, suggests that the wheel ruts around the southwest corner of the intersection with the Via Stabiana (my no. 94) are indicative of traffic coming from the west and going south. There was also westbound traffic along the Via del Tempio d’Iside, and according to Poehler it turned north in the next intersection with the Via dei Teatri (my no. 76). I agree with the interpretation of intersection no. 76, but would suggest that the Via del Tempio d’Iside is the logical place for incoming carts from the Porta di Stabia to turn west.

248 The Vicolo della Maschera is fitted out with a warning, and towards the Forum the Via dell’Abbondanza ends with the three white caserta stones that form one of the true “traffic signs” in Pompeii.

249 That this was done is shown by wheel ruts on a platform in front of a rear access to the Macellum in the small dead-end street.

250 Poehler 2006, 70, makes a case for the Vicolo dei Vettii carrying southbound traffic, see above 8.6.
Via del Foro. The intersections 24 and 24a both lack turning ruts, but the obtuse angle to the southwest in 24a indicates a counter-clockwise direction.

Fig. 49. From the Porta di Stabia to the “centre” and back. Hatched stretches indicate main route as discussed (cross-hatching indicates traffic in both directions). Stippled stretches indicate alternative routes. Dots indicate “the route through the heart of the town”. Arrows show direction of traffic flow. Intersection numbers as in Fig. 43.
Another possibility was to follow the Via della Fortuna until one simply turned south into the Via del Foro, where turning around was easy. Returning, the route went back through intersections 24, 22 and 10. There is no problem involved in supposing that the traffic flow went in two directions through intersections 22 and 24, as the largo in no. 24 permitted waiting for oncoming carts to pass. The street section between the intersections was short and plainly visible in its entire length from both sides.251

Fig. 50. From the Porta di Ercolano to the “centre” and back. Hatched stretches indicate main route as discussed (cross-hatching indicates traffic in both directions). Stippled stretches indicate alternative routes. Arrows show direction of traffic flow. Intersection numbers as in Fig. 43.

From the Porta del Vesuvio to the “centre” and back (Fig. 51)
Entering through this gate did not make it easy to reach the commercial areas in west Pompeii: no wheel ruts show any distinct possibility of turning west. Some very faint traces turning the northwest corner of intersection 30 could perhaps indicate that this place was an exception in the traffic system of the town: an intersection where more than two corners were used for turns. A turn around the northwest corner from north to west would, however, violate the rule that one should leave the Via Stabiana by going to the left.252 If this

251 Poehler (2006, 61, 62) seems to make the same interpretation, adding the possibility of turning northwards into the Vicolo di Modesto (this would in his scheme have provided a means of regaining the Via Consolare).
252 Poehler (2006, 60) advocates this north to west turn in the intersection.
was done anyway, then of course the Forum area was accessed much in the same way as described for the routes from the south and east town gates, and the return was easy.

A cart could also have made a detour around some insulae to the east of the Via Stabiana. Turning into the Vicolo delle Nozze d’Argento (17) would have been followed by a turn to the south in one of the largely unexcavated intersections following. Arriving in the Via di Nola, access to the town centre would then have been by intersection 30. The exit would have been made along the Vicolo dei Vettii. For instance, intersection 19 (unexcavated) would lead on to no. 33, where there actually are curved ruts around the northwest angle. One could also have gone to intersection 21, and then on to intersection 35. The strong indicator expected to guide such a circuitous route east from intersection 17 is conspicuous only by its absence, however. There may have been something drawing the traveller onwards in the unexcavated area in the northeast, and something else again in the south to effect the turn to the Via di Nola, but this is pure speculation.

Fig. 51. From the Porta del Vesuvio to the “centre” and back. Hatched stretches indicate main route as discussed (cross-hatching indicates traffic in both directions). Stippled stretches indicate alternative routes. Arrows show direction of traffic flow. Intersection numbers as in Fig. 43.
From the Porta di Nola to the “centre” and back (Fig. 52)

The route from this town gate is similar to the ones from the other gates to the south and east once one had arrived at intersection 30, disregarding the possible turns into narrower streets on the way from the gate.

A second possibility was to turn south before reaching no. 30, and so arrive at the Via dell’Abbondanza. In intersection 38 there are some ruts compatible with such a turn to the left, though the corresponding ruts going around the northwest angle in intersection 86 to the south are lacking. The area in between is unexcavated, but it seems that intersection 86 would be in a fairly straight line from no. 38.

Turning south in intersection 37 is indicated not by ruts, but by degrading of the southeast sidewalk corner. This would mean one entered the Via dell’Abbondanza in intersection 85 – and here there possibly are ruts turning the northwest angle.253 Again, a strong indicator making carts actually choose this route is nonexistent.

The Porta Marina

There are no ruts whatsoever along the Via Marina. The Porta Marina had lost its importance when it was cut off at the Forum, and the abandoned outer circuit road in the west had made the west harbour less important for trade. The steep incline through the gate also made it almost impossible to exit by cart.

It is hard to imagine where a cart entering by this gate would have come from, and indeed how it would have gotten back there.

6.9.2. Entering by one town gate, reaching target areas, exiting by another gate

Carts may have entered through one town gate, delivered at the prearranged goal, and exited through another gate. In fact, such routes were probably very common as the main streets show the greatest wear.254 The hypothesis of a regulated traffic system must include such routes.

The routes described above touch on each other at different points. In Table 7 there is a short summary illustrating the choices that could be made. The Porta Marina is not included.

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253 The possibility of turning south in intersection 38 and ending up in intersection 85 anyway, also exists of course. This would mean that the continuation of the Via degli Augustali in the east had traffic going westwards. Above I assumed that the flow direction between intersections 51 and 53 was towards the east, but it is not impossible that a change of direction took place somewhere in the unexcavated area.

254 Discussions of wear build on my own evaluations and on Tsujimura 1991, fig. 5.
Fig. 52. From the Porta di Nola to the “centre” and back. Hatched stretches indicate main route as discussed (cross-hatching indicates traffic in both directions). Stippled stretches indicate alternative routes. Arrows show direction of traffic flow. Intersection numbers as in Fig. 43.
Table 7. Entry through one gate, exit through another.

<table>
<thead>
<tr>
<th>From gate to gate</th>
<th>Connection via centre*</th>
<th>Connection not via centre</th>
<th>Conn. special route**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sarno to Vesuvio</td>
<td>yes</td>
<td>Possibly north in unexc. area, north in no. 17</td>
<td>North part, access via no. 47</td>
</tr>
<tr>
<td>Sarno to Nola</td>
<td>yes</td>
<td>North in no. 86, east in no. 38 (but cannot be distinguished from use in the other direction)</td>
<td></td>
</tr>
<tr>
<td>Sarno to Nocera</td>
<td>yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Sarno to Stabia</td>
<td>yes</td>
<td>Possibly south in no. 80 (against rule, but intersection closed west)</td>
<td></td>
</tr>
<tr>
<td>Sarno to Ercolano</td>
<td>yes</td>
<td>Sarno route, joining Ercolano route in no. 26</td>
<td></td>
</tr>
<tr>
<td>Nocera to Vesuvio</td>
<td>yes</td>
<td>Nocera route, then north in no. 80</td>
<td>North part, access via no. 47</td>
</tr>
<tr>
<td>Nocera to Nola</td>
<td>yes</td>
<td>West in no. 88, north in no. 86, east in no. 38</td>
<td></td>
</tr>
<tr>
<td>Nocera to Sarno</td>
<td>yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Nocera to Stabia</td>
<td>yes</td>
<td>Possibly south in no. 80 (against rule, but intersection closed west)?</td>
<td></td>
</tr>
<tr>
<td>Nocera to Ercolano</td>
<td>yes</td>
<td>Nocera route, joining Ercolano route in no. 26</td>
<td></td>
</tr>
<tr>
<td>Stabia to Vesuvio</td>
<td>Yes</td>
<td>Direct route and alternate route</td>
<td>Entire alternate route accessible</td>
</tr>
<tr>
<td>Stabia to Nola</td>
<td>yes</td>
<td>Alternate route, east in no. 29</td>
<td></td>
</tr>
<tr>
<td>Stabia to Sarno</td>
<td>yes</td>
<td>Complicated. Alternate route, east in no. 47, south in no. 53, Sarno route from no. 78</td>
<td></td>
</tr>
<tr>
<td>Stabia to Nocera</td>
<td>yes</td>
<td>Complicated. Alternate route, east in no. 47, south in no. 53, Nocera route from no. 78</td>
<td></td>
</tr>
<tr>
<td>Stabia to Ercolano</td>
<td>yes</td>
<td>East in no. 30, joining Ercolano route in no. 26</td>
<td></td>
</tr>
</tbody>
</table>
Table 7. Entry through one gate, exit through another, continued.

<table>
<thead>
<tr>
<th>Route</th>
<th>Accessible</th>
<th>Exit Access</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ercolano to Vesuvio</td>
<td>Yes</td>
<td>East in no. 10, north in no. 16</td>
<td>Not accessible, except north part of Vicolo dei Vettii</td>
</tr>
<tr>
<td>Ercolano to Nola</td>
<td>Yes</td>
<td>Ercolano route, then east from no. 24</td>
<td></td>
</tr>
<tr>
<td>Ercolano to Nocera</td>
<td>Yes</td>
<td>East from no. 10, south from no. 17, then Nocera route from no. 78 or 94</td>
<td></td>
</tr>
<tr>
<td>Ercolano to Sarno</td>
<td>Yes</td>
<td>East from no. 10, south from no. 17, then Sarno route from no. 78</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Route</th>
<th>Accessible</th>
<th>Exit Access</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ercolano to Stabia</td>
<td>Yes</td>
<td>East from no. 10, south from no. 17</td>
<td></td>
</tr>
<tr>
<td>Vesuvio to Nola</td>
<td>Nola</td>
<td>East from no. 30</td>
<td>No</td>
</tr>
<tr>
<td>Vesuvio to Sarno</td>
<td>Yes</td>
<td>Sarno route from no. 78</td>
<td></td>
</tr>
<tr>
<td>Vesuvio to Nocera</td>
<td>Yes</td>
<td>Nocera route from no. 78 or no. 94</td>
<td></td>
</tr>
<tr>
<td>Vesuvio to Stabia</td>
<td>Yes</td>
<td>Direct route</td>
<td></td>
</tr>
<tr>
<td>Vesuvio to Ercolano</td>
<td>Yes</td>
<td>Vesuvio route, then Ercolano route from no. 26</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Route</th>
<th>Accessible</th>
<th>Exit Access</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nola to Vesuvio</td>
<td>Yes</td>
<td>Possibly north in unexc. area, then west and north in no. 17</td>
<td>Not accessible, except Vicolo dei Vettii</td>
</tr>
<tr>
<td>Nola to Sarno</td>
<td>Yes</td>
<td>Possibly south in no. 38, east in no. 86 (but cannot be distinguished from use in the other direction)</td>
<td></td>
</tr>
<tr>
<td>Nola to Nocera</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Nola to Stabia</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Nola to Ercolano</td>
<td>Yes</td>
<td>Nola route, then Ercolano route from no. 26</td>
<td></td>
</tr>
</tbody>
</table>

*A connection to another gate after a visit to the centre and turning around in the Via del Foro, or arriving there from the Via degli Augustali, means that the routes below could have been used.

To Porta del Vesuvio: North from intersection no. 26, east from no. 13, north from no. 16 along the Vicolo dei Vettii.

To Porta di Nola: North from intersection no. 26, east from no. 13, south from no. 17, east from no. 30.

To Porta di Nocera: North from no. 26, east from no. 13, south from no. 17, then follow Nocera route from no. 78 or 94.

To Porta di Stabia: North from intersection no. 26, east from no. 13, south from no. To Porta di Sarno: North from intersection no. 26, east from no. 13, south from no. 17, follow Sarno route from no. 78.

To Porta di Ercolano: Follow Ercolano route west from intersection no. 26.

** The special route is the “Route through the heart of Pompeii”, see 6.9.1: From the Porta di Stabia to the “centre” and back.

It can be noted that all gates could be reached fairly easily from all other gates, provided the cart passed via the centre of Pompeii. This is an impor-
6.9. A model for the flow of vehicular traffic through town

A model for the flow of vehicular traffic through town is important in the hypothetical reconstruction of a traffic system that could function smoothly.

Both from the Porta del Vesuvio and from the Porta di Ercolano all other gates were very easy to access without the need to pass the centre, and the Porta di Ercolano was also easily reached from all the other gates. It is, however, doubtful if the Porta del Vesuvio was connected with either the Porta di Nola or the Porta di Sarno in a way that did not make use of the town centre. This accentuates the importance of the Porta di Ercolano, and it should especially be noted that there is a fairly direct connection between the Porta di Ercolano and the Porta di Stabia. This means that salt from the northwest of the town could be transported directly to the Sarno harbour for export.

The Porta di Stabia, in spite of being the important harbour gate, was not easily reached from either the Porta di Nola, the Porta di Sarno or the Porta di Nocera without passing through the town centre. One possible explanation is that the east and southeast surroundings of Pompeii had their own access roads to the Sarno harbour.

6.9.3. Entering by one town gate, using only a main street and turning back the same way

Another type of route into and out of town would have been to use one main street to enter Pompeii, turn around at its end, and take the same street back. In a regulated traffic system, this also must be a possible solution. If the cart entered by the Porta del Vesuvio, the Porta di Stabia or the Porta di Nola, this would not present any problems. Entering by the Porta di Sarno or the Porta di Nocera, it was possible to turn around near intersection 80 and go out by the Porta di Sarno, whereas an exit through Porta di Nocera would demand a more complicated route. Regarding the Porta di Ercolano, turning the cart and going back along the Via Consolare might not have been considered important, as in practice it would be easier to reach the focal area near the Forum and then turn back after a short circuit.

6.9.4. Service for the area near the gate

In addition to what has been discussed above, it must have been feasible for carts to reach various places in town, places not on the main streets and not along the routes described above. It can be assumed that inhabitants of insulae near a certain town gate would use primarily that gate for their occasional deliveries. This would apply to deliveries to shops, restaurants, small workshops and private houses.

I do not suppose there was a completely regulated traffic system that took account of such service deliveries in the narrowest of Pompeii’s lanes. Transports would have been few, so that the rule of one-way traffic need not
have been rigorously applied. Dead-end lanes must have had carts coming and going along them anyway. These occasional transports would also seldom be frequent enough to leave identifiable wheel ruts.

6.10. Axial integration and the routes of vehicular traffic

Traffic on wheels was, of course, only one aspect of how Pompeii’s streets were used. In Chapter 3 overall axial integration patterns for the urban grid were discussed, thus highlighting those streets that had the greatest potential for use by travellers in town. An examination of the integration of streets used in the routes proposed for vehicular traffic will show if there is a pattern to the routes and let us see what such a pattern or its absence indicates. The use of highly integrated streets will be taken as confirming the hypothesized routes, as high integration denotes high movement potential and thus an active street front that catered to the needs of people, with shops, baths etc. needing deliveries.\(^{255}\) It should be noted that the routes from the various gates, as well as the “route through the heart of Pompeii”, were constructed without looking at integration values, which thus provides independent comparison material for the routes.

6.10.1. Axial integration when entering by one town gate, reaching target areas, exiting by the same gate

**From the Porta di Sarno to the “centre” and back (Fig. 47)**

Entering from the Porta di Sarno, one would follow, firstly, two of the most integrated axial spaces in Pompeii, those encompassing the Via dell’Abbondanza and the Via Stabiana. If we assume that the turn into the town centre was made by going westwards on the Via di Fortuna/di Nola (and thus not on the Vicolo del Panettiere or the Via degli Augustali), this means one turned into the most integrated axial space in Pompeii. Secondly, the via del Foro is still part of the most integrated axial spaces.

A return trajectory either by turning around, or by following the Via di Mercurio and turning first into the Vicolo di Mercurio and then the Via Stabiana, would also follow the most integrated axial spaces. A turn northwards to the Vicolo di Mercurio could have been made in intersection 24 or 25, if the Via di Mercurio was not used, which would have entailed using low integration axial spaces.

But it is the turn into the Vicolo di Balbo that for the first and only time makes use of a segregated axial space without presenting any alternatives.

\(^{255}\) See Chapter 2, section 2.2.2.

*Boreas 33*
6.10. Axial integration and the routes of vehicular traffic

The route then continues to the Vicolo del Citarista (among the 25% most integrated) and the Via dell’Abbondanza before exiting town.

If we assume that the complicated Via degli Augustali was used for going to the Forum area, incoming traffic would admittedly have used a less integrated axial space, but one that was not at the lower end of the scale and that functioned as an important interface in the ancient “central hub” of Pompeii (see section 3.3.2).

**From Porta di Nocera to the “centre” and back (Fig. 48)**

Coming into town from the Porta di Nocera would also have entailed using the most integrated axial spaces to reach the town centre (Via di Nocera, Via dell’Abbondanza, Via Stabiana, Via di Fortuna/di Nola). In the same way as for the Porta di Sarno route, one could also have used the Via degli Augustali for accessing the centre.

The return journey would have paralleled the one for the Porta di Sarno, but instead of turning into the Vicolo di Balbo carts would have used the Vicolo del Menandro and would still have been using an integrated axial space.

The Via di Castricio, leading to the Via di Nocera and the gate, is, however, only of medium integration, and thus once again the route makes use of a more segregated space on the return journey.

**From the Porta di Stabia to the “centre” and back (Fig. 49) and the “route through the heart of Pompeii”**

The route proposed for entering town, going to the centre, and returning to the gate is straightforward and uses only the most integrated axial spaces (entering by the Via Stabiana, Via della Fortuna/di Nola, Via del Foro, and leaving by the Via di Mercurio, Vicolo di Mercurio and Via Stabiana).

The “route through the heart of Pompeii” is, however, a more complicated matter. The route starts by using integrated axial spaces, entering the Via Stabiana in the south and turning into the Via del Tempio d’Iside, Via dei Teatri and Via dell’Abbondanza. The route then continues along a segregated axial space along the Vicolo di Eumachia and the Vicolo Storto before reaching the integrated space on the Via della Fortuna.

From here, one alternative is to continue west from intersection 29, then go north on the Via de Mercurio, turn east on the Vicolo di Mercurio in intersection 13 and eventually south on the Via Stabiana in intersection 17. This alternative makes use of integrated axial spaces.

Another alternative is to go north along the Vicolo dei Vettii, and then use the Via Stabiana in its entire length to go back (or leave by the Porta del Vesuvio). In that case a medium integration space would be used.

This leaves us with explaining the use of the Vicolo di Eumachia, the Vicolo Storto, and perhaps the Vicolo dei Vettii. In the first case, this is the one
and only option to pass through the centre, as other possibilities are blocked – using the Vicolo del Lupanare is impossible because there is a ramp blocking passage into the Via degli Augustali, the Vicolo dei 12 Dei is blocked already in the intersection with the Via dell’Abbondanza, and the Forum to the west is, of course, out of limits.

The Forum blocker with white stones (see above, 6.1) is so forcefully interdictive that the choice of going along the Via dell’Abbondanza was surely the route one naturally would have taken if there were no blocker, and thus one would have continued to use integrated axial spaces. The blocker thus prohibited the most natural choice.

The Vicolo del Lupanare, part of the ancient “hub” interface, would be another choice. It has high to medium integration and is actually unblocked at the entrance, which makes it likely that it was used. Like the imaginary traveller Sextus, below, one could have regained the “through route” with a little manoeuvring. But actually, pointing to the choice of the Vicolo dei 12 Dei and then to Vicolo Storto by the two white fountains seems a calculated device to enhance a route one would not choose to take naturally. So, the through route in this part seems a consciously planned route.256

What about the Vicolo dei Vettii? Here, we cannot know what would have enticed a driver to use this street instead of the alternative via intersections 26 and 13, but if he did, he would at least be using a medium integrated axial space that had some movement, and not a segregated one.

From the Porta di Ercolano to the “centre” and back (Fig. 50)

Using this gate to enter town, one would have followed axial spaces of medium integration down to the Via della Fortuna/di Nola. Circling the insula VII 5 to get access to the Forum would make use of an axially broken-up stretch of the Vicolo dei Soprastanti, but this is extremely short, the rest of the circumnavigation being in highly integrated spaces. The return journey would have been made along the same medium integrated spaces as one used for entering.

The medium integration of the access and return journey is somewhat surprising, as the streets are lined with shops and heavily rutted by carts, and the town gate is an elaborate three-arched structure. Likewise the relative narrowness of the Via Consolare surprises, allowing only smaller carts to meet (see above, 6.8.1) and on top of this making it necessary to wait one’s turn at a complicated crossing. If this road mirrors an ancient access to a town nucleus, kept in its traditional form while the town was added to with large, new, regular insulae, this would explain both the route’s features and its continued heavy use and importance.257

256 See above section 6.8.2: Positive indicators of direction.
257 See above section 6.6.3.
From the Porta del Vesuvio to the “centre” and back (Fig. 51)
This route is problematic for accessing the town centre (see above 6.9.1), but the solution proposed makes use of an access that initially has highly integrated axial spaces (Via Stabiana, Vicolo di Nozze d’Argento eastwards) continuing southwards by one of the grid plan streets in the east. The streets proposed for this have either a medium to high integration (Vicolo del Centenario, exact values pending further excavation) or a high integration (Vicolo dei Gladiatori, exact values pending further excavation).

Accessing the town centre by the Via della Fortuna/di Nola makes use of the most integrated axial space. The return journey is made by the Via di Mercurio, the Vicolo di Mercurio and the Vicolo dei Vetti, the latter of which does not belong to the highest integration group, as noted above.

From the Porta di Nola to the “centre” and back (Fig. 52)
This route consistently makes use of the most highly integrated axial spaces.

The first alternative, where one headed straight for the centre, then turned north in intersection 26, south in 17 and east again in 30, follows the most integrated axial spaces in Pompeii. The second alternative uses a north-south grid plan street in the east part of town to get to the Via dell’Abbondanza. This grid plan street would presumably have been among the 25% most integrated axial spaces, and the rest of the route belongs again to the most highly integrated axial spaces.

Going from one route to another, of course, makes use of the different axial spaces belonging to the respective routes and adds nothing new regarding the use of integrated or segregated streets.

6.10.2. Conclusions on axial integration
The first thing to be noted is that all the routes with an entrance and exit by the same gate mainly use the highly integrated axial spaces, which is what one would expect for any kind of traffic. This in itself strengthens the plausibility of the routes.

When a route makes use of less integrated or segregated streets, this mainly happens on the return journey (which also holds true if one uses one town gate to enter and another to exit). Segregated streets are usually employed only for very short stretches, while streets of medium integration may be used for slightly longer duration, again on return journeys. This makes sense: returning with an unloaded cart does not make it necessary to use the integrated streets with shops and other establishments catering to the flow of pedestrians during the day.

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258 Chapter section 2.3.1.
The notable exception is the route entering the Via Consolare, which uses a street with medium integration. This could be the result of this street having kept a traditional outline in the townscape.

The winding route from south to north, reconstructed as passing the “old town”, uses high or medium integration stretches, except in passing through the Vicolo di Eumachia and Vicolo del Storto. Here, more attractive solutions and more integrated ones are blocked, while the segregated alternative is highlighted and indicated in the urban fabric.

All in all, the integration pattern for the axial spaces used confirms the strong possibility of the use of the proposed routes.

6.11. A transport route through the heart of Pompeii, and the consequences of getting it wrong – a possible journey

Finally, let us try to imagine what travelling through Pompeii must have been like. Let us follow Sextus, who is heading into town with his cart through the Porta di Stabia. He is supposed to make a stop in the centre of the old town and also make a delivery in the vicinity of the Porta del Vesuvio before going back.

Sextus has never been in town before. At the gate, he is told that there is a rule for the street he will enter on: he can only leave it by turning left. This seems urban indeed!

Having entered, there is no choice but to go straight ahead. Since he is in a wide two-way street, which is visible for a long stretch ahead, he merely continues. The first intersection (112), where a street branches off to the right, comes into sight about 10–15 m before he is actually in it, and he slows down a bit even though the rule he was told about prohibits turning. Anyway, once he is in the intersection he can see that the street leading east is blocked further in.

Suddenly, on the left, there appears a paved area that seems to be an intersecting street, but appearances are misleading. It is only a paved entrance to the theatre area, and Sextus urges his two donkeys on. The next intersection (109) appears on the right, but the small street is both blocked and prohibited by the turning rule. The sidewalk of the street Sextus is on continues past it. He realises just how hard it is to become aware of intersections in advance, especially as the sun is low.

A few cart lengths before the next intersection (94), he manages to become aware of its existence. Now, he must decide whether to turn left or continue straight ahead. The view ahead is long and there is heavy traffic going north, and Sextus has some misgivings. Although he barely can see a
town gate in the north, this seems to be a thoroughfare, and he was not sup-
pposed to leave town now, was he? Suddenly he realises that there is a fine
monument a little to the northwest, a tetrarpylon glowing with white marble
plaques and statues around it. There clearly are important things to the
west. He recalls that he has just passed a small temple, and another one,
with a finely painted facade, lies along the west street of the intersection he
is hesitating about. Further on, there seems to be a portico of some kind, an
open space and a well. All this splendour is pointing him west; since the
street is wide enough, he can always turn back if the choice is wrong.

Sextus travels to the next intersection (76), already noting with some re-
lief that it will be possible to continue north from there. He has realised that
the portico leads to a beautiful park with a temple in it, but there are some
gladiators milling about in the park and yelling at each other, so he would
not like to have to stop. Then it happens: the donkeys do not want to turn
right, they want to go straight. And as Sextus does not want to look like a
fool in front of the gladiators, he simply tries to appear as if he had planned
to go straight ahead all along.

This very private street without shops is making him nervous, but he has
to move on. In the next intersection (74) there is a water tower looming to
his right, and he worries about the turn in advance. The donkeys, however,
have realised that the south street widens slightly at the intersection, making
an easy path to the left. They happily turn left, and Sextus understands that
this is what people usually do; there are no kerbs in the southeast cor-
ner, and this facilitates the turn.

Arriving at yet another crossroad (75), he has to force the donkeys up a
small incline, rather like a little knoll, and once up it bears steeply down to
the left. There is hardly time to realise that one could have gone right (al-
though not much is visible of that alternative in the intersection proper) – the
street just seems to deposit Sextus, the donkeys and the cart firmly on their
way to intersection 77. Once there, Sextus recognises the place, and now he
heads north (76), trying to look as if he has accomplished an important task
on his roundabout way.

Sextus can see that the street winds on towards the north, but he also sees
that he will soon cross an important main road. He passes into this road (72)
over a set of stepping stones filled in with smaller stones and forming a
slight bump; this is not a real obstacle and is meant to be driven over, he
decides.

He stops and takes in the view. To the left he sees three white stones shim-
mering in the dusk (68), beyond which are colonnaded porticoes, one behind
the other. This must be the Forum – and quite clearly he cannot go there
with his cart. The street leading there is rather grand: wide, with a facade
with arched niches on the north side of the street and a white marble well at
the beginning of it. To the east Sextus recognises the tetrapylon he saw from the south a while ago. Sextus knows that the town’s centre should be here, near the Forum, as should the Macellum, the covered market. His first stop is to be “at a small largo near the back of the covered market”. He decides to go on (72), and he passes rows of shops. In intersection 63 he can see a dead end further west, so this intersection is ignored.

Arriving at a Y-intersection (60), he would have continued north but people outside a bar stop him: he would have to turn around further on, and only yesterday a mule broke its hind leg when two carts attempted this at the same time (50). He turns left and comes to a small largo (59) from where he can actually see the back side of the covered market. He happily delivers some of his goods to a friend of his patronus.

Then Sextus goes south. This is the only option, as the road straight west narrows too much, and to the north he cannot really see where the tortuous road ends. He goes back to the main road, which he can see all along (71). Here, there is a short slope of paving stones into the main street, and Sextus realises that he has made an unnecessary detour again. He should have gone north by the white well, of course (70), and carried things the last few steps to his delivery stop! Now he has to wrestle his cart over the slope and into the main street – but it is possible to do. Another driver almost crashes into him, though, and Sextus remembers that he was given another rule when he met his patronus’s friend: only turn into the decumanus by going to your left!

Finally he can turn right by the white well (70), where he can see another white well further north. He considers this to be a smart thing: the wells obviously belong together in some sense and highlight the right way. Thus, he ignores some small intersections (61, 58) and even passes straight on through the crossing with the second white well (47). Sextus begins to think he should soon be on the other side of the town.

He hesitates a while when he comes to a street bearing east (46), but it looks rather narrow and he is actually quite sure he is going north as he should. Then another trouble surfaces: he has to decide what to do in an intersection with an obviously important east-west road (29a). He should not be going east or west, but then, who knows where the right turn north can be? Another well is visible to the left and a glimpse of a road northwards. Should the street turn out to be the wrong one, perhaps he can take the next. Going east and then north seems a viable solution, too, but he can see no other carts doing so. Rather, a lot of them seem to be coming from the east and the south.

Sextus takes his chances that the next intersection west (29) is the right one, and to his relief he spots the castellum acquae to the north almost immediately. This is where his second delivery should be made: a restaurant near the castellum is to receive a load of sausages. Sextus delivers the
goods, and then heads straight south back the way he came, exhausted after finding his way through Pompeii.\footnote{Sextus’s travels may be compared to the visit of a farmer on mule-back in Fridell Anter & Weilguni 2003, 38-39. This farmer enters by the Porta di Sarno and has slightly different preoccupations. His choices are wider, for one thing, as he is not hampered by a cart and the rules applying to a driver.}

6.12. Conclusions

The routes that I sketched above are not the only ones possible, but they are the most likely ones given the evidence so far considered. When our knowledge of what is hidden in the unexcavated areas increases, there will be more facts on which to build an understanding of how cart circulation worked in Pompeii.

The hypothesis was that there existed a regulated traffic system for wheeled vehicles in Pompeii. When reconstructing this system, account had to be taken of physical obstacles, warning indicators and positive indicators pointing the way. The traffic system had to agree with actual wheel ruts in Pompeii, and different routes from one town gate and back had to touch upon the important target areas for cart deliveries. Furthermore these routes had to be mutually compatible and interlocking, so that entry by one gate and exit by another would be possible. If such a reconstruction proved possible, then the hypothesis could be seen as a very plausible solution. A study of the axial integration of the streets used for these routes also verified the hypothesis independently.

As such a reconstruction was eminently possible, it can now be seen that vehicular circulation in Pompeii was not haphazard but followed certain rules. Those rules can be retrieved from the obstacles and indicators deliberately placed in the urban situation, and from the self-explanatory qualities of the urban fabric itself. There will have been other ways to impart knowledge about what was allowed and even recommended, and what was counselled against or clearly forbidden. A case in point is the rule that the two most important streets could only be entered from one direction and exited from the other – and different rules for making such turns applied to each of those two streets. How would cart drivers have known? Were they informed by word of mouth at the town gates or by fellow drivers? Or were there actually painted signs, perhaps outside the gates?

Anyhow, the existence of rules and of at least some real “traffic signs” clearly shows that cart circulation was large enough to require administrative decisions to ensure that it functioned smoothly. Traffic regulation was thus not only an issue for Rome itself and other large cities, but also for the middle-sized Campanian town of Pompeii. The regulation of wheeled traffic
may have been accompanied by rules that applied, for instance, to pedestrians, of which we know nothing. Certainly many of the indicators of routes and many urban features would have served to guide a traveller on foot as well as a cart driver.\textsuperscript{260}

\textsuperscript{260} On this topic, cf. Ling 1990.
7. Results and evaluation

In the introduction to this study, I stated that I wanted to analyse the character of exterior public space and its potential for different types of activities. I wanted to learn something about what happened in specific spots in the urban environment, to understand more about how the Pompeians saw themselves, and to recapture the function of public space in the daily life of Pompeii. It is now time to sum up this analysis and see what came out of it.

7.1. Movement, both of people and of carts

The first focus of attention was how people moved about town in Pompeii. In Chapter 3, I used the Space Syntax method to identify streets and parts of streets that have a high axial integration – that is, a high potential for movement. The streets that stood out in this analysis were those that entered the town gates and so connected Pompeii to the world at large. This is not surprising, since of course they would have been used by every out-of-towner with an errand in Pompeii and by everyone on the way out, regardless whether they travelled on foot or mule-back, or if they were drivers of carts. The Via di Nola/Via delle Terme, the Via Stabiana/Via del Vesuvio, the Via dell’Abbondanza/Via Marina, and the Via di Porta Nocera thus were all likely to have been busy and thronging with people.

What was surprising, however, is that the broad Via di Mercurio – which continued into the Via del Foro, the Forum proper and, south of this, the Via delle Scuole – had a high movement potential even though there are no town gates at either end. The movement potential in this street must have been used for other purposes than just getting to a specific destination and back, and I will return to this later.

Also, in Chapter 6 it became clear that traffic on wheels in Pompeii had to contend with a system of regulations. This entailed that routes with a high movement potential could not always be chosen since they might be reserved for vehicular traffic in the other direction (most streets were one-way streets) or be difficult to access from another street. Traffic on wheels was regulated by the urban structure itself when this was self-explanatory, but when not, there were “traffic signs” – especially when it came to prohibiting vehicular traffic from making the otherwise most natural choice in a street/area with high movement potential. Blockers were placed in intersections and were
sometimes visible from a great distance. My hypothetical reconstruction of a town-wide traffic system showed that the reconstructed possible routes allowed the central area around the Forum to be reached from every town gate, and that the entrance gate could always be regained on the way back. The most well-connected gate was the Porta di Ercolano in the northwest, from which every other gate was within easy reach.

7.1.1. Movement and what lay behind the street front

Looking at three specific movement axes in Chapter 4 – the Via dell’Abbondanza/Via del Vesuvio, the Via di Mercurio/Via dell’Foro/Forum/Via delle Scuole, and the Vicolo del Fauno – I found that patterns of pedestrian movement and the number of interior spatial units lining a specific street influenced each other. Many doorways and a street with a high potential for movement go together, reinforcing each other.

If there are many doors that lead into dwellings, baths, temples, shops and workshops, it means that there was a flow of people in the street space: clients on the way to visit the representative house of their patronus, customers for the baths, the shops and the street-side restaurants, people delivering necessities both to such establishments and to private houses, worshippers on their way to a temple, and not least the inhabitants of these houses going out and coming back. Many street doors thus meant a busy street, used by people with special destinations in mind. This would be true of any street, whether it showed up in a Space Syntax analysis as highly integrated or not.

But then, not only people with a special goal situated in a certain street will use a street if it is highly integrated. There is always a flow of people passing along it to get to some other place in town, or just passing through the town itself. This last group would have chosen such streets as they were well connected and usually both long and fairly articulated, which meant it was easy to find one’s way. And this choice had consequences. A continuous flow of people would have attracted shops and food places hoping to make a profit out of the passers-by, and the shop owners would have needed to live somewhere; all of this meant that the number of dwellings and establishments fronting the integrated street with a high movement potential increased further, drawing yet more passers-by.

The Via Stabiana is just such a street. It is a highly integrated thoroughfare and would have seen a steady flow of people walking or riding along it. In Chapter 4, I noticed that the doors lining the street do not prove to be consistent in number as one moves from north to south. Rather, there is a general increase of doors per 10 m wall length as one moves southwards and also a distinct shift in street-door density south of two intersections, with the Vicolo di Mercurio and the Via di Nola. It would thus seem that both these streets had an impact on traffic in the Via Stabiana and on the density of the interface between exterior and interior space. These streets either released a
flow of people into the Via Stabiana, to go southwards, or they siphoned off a traffic flow coming from the south (most likely some of both). Either way, there was a significant difference between the north and the south part of the Via Stabiana, the south being more densely occupied by simple (as opposed to representative) dwellings and commercial establishments, and more extensively used by people on the move.

If we go back to the Via di Mercurio, the street with high movement potential but no connection to town gates, we find that even here the south is slightly denser in street doors than the north. Here, however, the Forum distorts the pattern. This was a major commercial and official place, spilling over in the Via del Foro just north of it. The rest of the street, north of the Via di Nola/Via delle Terme and south of the Forum, had a fairly low street door density, and commerce was not as dominant as on the Via Stabiana.

The use of the excellent movement potential of the Via di Mercurio obviously does not lie in its usefulness for reaching a town gate, or for reaching the Forum and the town centre around it (if not dwelling in this street). Its movement potential did not draw crowds of shoppers (there would of course be customers to shops and workshops on the Via di Mercurio, but probably of a more goal-oriented kind), worshippers or bathers except in the Via del Foro and Forum part.

7.1.2. Zoning

This leads to the interesting question of whether there are different zones in Pompeii, representing a social stratification. This can be answered with a qualified “yes”. If one compares the Via Stabiana with the Via di Mercurio, there certainly are important differences between the streets. There is, for instance, a dominance of larger businesses in the Via di Mercurio, while small businesses dominate the Via Stabiana. Also, the representative large domus is more in evidence along the Via di Mercurio. But neither of this is a difference in kind: there are large businesses and fine houses on the Via Stabiana as well, and the humbler varieties of both can also be found in the Via di Mercurio. In neither case is representation separated from business or from simpler, poorer dwellings. It is just that the general mix is skewed in favour of representation and large businesses on one street and in favour of small shops and simple housing on the other. These are streets with different mixes, different proportions of all-present ingredients.

Not even a back alley like the Vicolo del Fauno was radically different in kind: here we still find small businesses and larger businesses, as well as front doors to non-representative dwellings. What is missing are front doors to representative houses and what might be termed communal establishments like baths, temples or larger monuments. Thus, a dichotomy between back
street and “front street” actually can be observed, but even this is not as obvious as one would expect from a modern vantage point.

7.1.3. The special places and their messages
Public space had of course other uses than being a transport artery. What characterises the public space on the Via Stabiana, for instance, is a decrease in doorway density in spaces that had a distinct presence in the convex dimension – that is to say, useful, open spaces with a large area and a suitable form. In Chapter 5 it became clear that this often was due to large official buildings with few entrances, and it also became evident that commerce was not especially strongly linked to these spaces. Instead, commerce generally followed the axial dimension, that is the flow of people along the street, even if it happened that an establishment was clearly located in a distinct section of space incorporating it with the activity indoors (like the fullonica in the Via Stabiana that lay north of the intersection with the Vicolo di Mercurio and had its own small largo in front of it).

Official buildings like the town gates, the theatres, the central lararium and the tetrapylon of the Holconii thus disrupted the usual fabric of the street and often introduced an element of what might be called “messages brought home” in a global sense. The theatre with its access based strictly on social class reinforced the sense of belonging to a specific section of society. The Castellum Acquae by the Porta del Vesuvio in the north gave the message of belonging to a town that was well ordered and well provided for. The tetrapylon highlighted a prominent family and its beneficial donation of shade to Pompeii. The central lararium (if that is what it was) stressed Pompeii’s adherence to the pattern set out for Augustan Rome.

Lastly, it was not possible to identify any immediately apparent social hotspots – that is, places where relationships between people were played out, where thoughts, talk and identities were mingled, scrutinized, exchanged, discarded or picked up. The fact that commercial interaction followed the axial dimension, and that the prominent spaces that could be perceived as “special places” (by this I mean places one would remember, seek out to orient oneself or to meet someone, or places that were defined by their buildings, such as the “theatre space”) most often were the places where official buildings and their messages were placed, would have meant that interaction in these “special places” often was of a specific kind. It was an interaction linked to special events (ceremonies, theatre plays, and so forth) and to a context that stressed groups of people, reinforcing collective identities. These spaces were not primarily geared to the more intense intermingling between strangers and inhabitants and the formation of new relationships outside a preordained context. Instead, the interaction between people on a more unregulated basis took place wherever it could – often in the long stretches of street, where the interaction was crammed in as best it could in

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front of the counters of food places or outside the shops’ wide doors. This, then, makes it difficult to identify socially important places that had more than the usual interaction and meetings between different categories of people. If there were any such social hotspots in the Via Stabiana in Pompeii, we are not able to discern them easily today.

On the Via di Mercurio outside the Forum, we find really large spaces with relatively few doorways and a high potential of movement, and no official buildings, the Forum having appropriated that aspect to the full. It seems dubious that these large street sections made daily use of their movement potential, and so they would usually not have been populous meeting spaces in any capacity. But there is an indication that the Via di Mercurio had another purpose besides providing a more representative living environment. An altar that stood conspicuously in the middle of this street’s closed north end could have been the goal for processions, reinforcing either a local or town-wide sense of belonging together. This, then, could have been the reason that one did not alter the urban fabric and take away the high integration and movement potential of this street.

All in all, I think this study shows a firmly structured urban context in the convex dimension of place, with the spontaneous and unregulated social encounters washing through it in the axial dimension, the dimension of movement. The stranger, the traveller and observer of the mix of varying functions along the streets might enjoy a freedom in this – but I suspect it was a freedom tucked in between the official statements. After all, he or she needed only to step into a space defined by an official building for the underlying structure to become obvious.

7.2. The explanation value of Space Syntax

Although Space Syntax has been used in previous studies, it is still unusual to use this method in an analysis of the urban environment in an archaeological context, as I have done, and as such it is something that needs to be evaluated.

The main criticism levelled at the method is that it attempts to explain everything in terms of space – the complex relationships in a society, the economy, and the culture thus all become reduced to the functionalities of spatial systems. I have already stated that I have not had this ambition, and that Space Syntax is used in a much more circumscribed way in my analysis of urban environments in Pompeii (see section 2.2.1).

But if spatial arrangement and organization do not explain everything, what do they explain?
7. Results and evaluation

I would like to answer that they actually do not explain anything – in full, that is. When the boundaries and extent of a certain type of space are established, if the underlying principles are stringent and coherently applied, the space within the boundaries is determined by the parameters used. Space can be seen as segmented in this way. Using a certain set of principles produces a spatial segment of a certain type. Using a different set of principles, perhaps principles based on visual perception or the gradient of a slope or what kind of light apertures a space has, would produce quite another segmentation of space. It would also be a space determined by a set of parameters, but different parameters. One may discuss which type of segmentation is relevant and which is not, but attacking the method for creating a segmentation system is only possible if the underlying criteria are not stringent within themselves or are being haphazardly applied.

The same goes for the different mathematically computed Space Syntax values. If one computes the integration value of a certain space, then this integration value is a parameter applying to this space in the same way as other parameters may apply to the same space, for instance that it has a specific volume, two doors or a sofa in the corner. The integration value may be deemed an irrelevant parameter, and so may the sofa in the corner.

What the Space Syntax concepts give us is, I think, another set of parameters. These parameters are not as evident as some of the concepts we use every day, and many of them cannot be experienced directly. Light, dark, small, large, dank and dry are categories we all could venture to say something about when entering a space, but integration would be much harder to have an opinion about. Therefore, the Space Syntax concepts put the focus on such properties of spaces that we otherwise would miss or disregard as vague feelings. This is in my opinion a good thing, since it enriches the set of characteristics we may collect about a spatial system. Choosing and using Space Syntax parameters for an analysis thus does not preclude choosing and using other concepts for the same analysis. The other parameters chosen tend to be more familiar and to attract less criticism, but the underlying process is the same: there has to be a choice made of which characteristics to study. What I want to evaluate is if the choice of concepts in this analysis was an adequate choice that gave meaningful information, or if another set of parameters (whether of Space Syntax type or not) would have been better.

7.3. The choice of concepts

The concepts used in Space Syntax increase in number with every new study performed. The covariance of the first set of basic parameters, like integration and control value, produces new parameters that can be pitted against covariance with parameters of both categories. Since using each and every
parameter is impossible there is a choice involved, and that choice will now be addressed.

7.3.1. The axial and convex dimensions
To study public space in any meaningful Space Syntax way at all, the most basic concepts of the system of axial spaces and the system of convex spaces had to be established.

I have said several times that the system of axial spaces is linked to movement, and since movement of people in an urban context is paramount, some way of capturing this cannot be excluded. The convex system basically segments space into small component parts where different activities can be located – and some form of segmentation obviously has to be done if one wishes to pinpoint where something specific happens or compare different environments in a spatial system with each other.

The question is, could the “movement dimension” not have been captured just by using the normal concept of a street, and the “place dimension” by partitioning the streets into equally large sections, or using the city block or insula as a delimitation factor?

Apart from the fact that then, of course, all subsequent Space Syntax analysis would have been moot, the mapping of axial and convex spaces in my study already as a graphic representation showed data that another portioning system would not.

The convex map (not rendered in this text, as it is too large), for instance, immediately showed that street intersections come in many different spatial arrangements – the street proper swells and constricts, and this is not only related to insulae or building facades but also to changes in direction or public edifices, and sometimes it occurs for no discernible reason at all.

Without any calculation at all, the axial map (Fig. 16) shows places with a dense cluster of axial spaces, regular areas, and areas somewhat empty of crossing axial lines. As axial spaces are not equal with streets but rather with an abstraction of possible trajectories, these dense clusters immediately suggest a potential for variegated movement.

7.3.2. The degree of articulation taken into account
It has been pointed out several times that the irregularities which form the limits for the convex spaces are disregarded below a certain magnitude, here 0.2 m. This value was chosen before any kind of analysis had taken place and could not be changed afterwards – so there was a risk it would prove too small and result in far too many convex spaces.

As a matter of fact, the value proved largely adequate. It could perhaps have been 0.3 or even 0.4 m, but this would not have reduced the number of
spaces significantly. It might have shown the low articulation of the north part of the Stabiana MA more clearly, but this is not something that is very important. At one stage I tried to merge spaces with an articulation lower than 0.5 m, which produced conglomerates that effectively nullified large parts of the analysis, much of the time creating the repeat pattern of “street – intersection – street”. At a rough level, this is exactly what the Stabiana MA looks like, and for this no Space Syntax is needed.

Again, Space Syntax provided the extra information that made it possible to identify differing qualities, for example in S40, S41 and S42, which otherwise would have formed such a chunk.

Also, the partition of convex spaces could have been made with the difference between sidewalk and street proper taken into consideration. This would produce more than thrice the amount of spaces dealt with here, and would probably have necessitated more sophisticated statistics for evaluation. It is something that might be done in the future, and would be especially valuable when studying a smaller environment, a “microcosm” of the type discussed above.

7.3.3. Integration

The axial map reveals its potential when integration is calculated and highly integrated axial spaces can be separated from more segregated ones. This produces the varied pattern, on the basis of which I selected three interesting movement axes for further analysis and also felt that some general observations could be made (see Chapter 3, section 3.4). Some questions that arise are: Could the interesting aspects of the streets chosen have been perfectly clear without calculating the integration? And was the choice the best possible one? Could the character of the chosen movement axes be discussed without information regarding the axial grid?

The answer to the first question is that these three streets could have been picked anyway. The main thoroughfare, the straight Forum street that lacks connection to the town’s surroundings, and the small back street are sufficiently distinct for that. The answer to the second question is that from the vantage point of the completed analysis, the choice of streets was not the most informative possible. In hindsight I think that the combination of axial spaces making up what is called “a route through the heart of Pompeii” in Chapter 6 would have provided a more interesting contrast to the Via Stabiana, since the varied integration values, the passage through the old town, and the connection to the gates both north and south would have provided a wealth of comparative information. To see this as a “route” was, however, nothing that crossed my mind before working through Chapter 6 – before that it was just a random collection of differently integrated axial spaces. This illustrates nicely that Space Syntax characteristics in themselves do not
jump out at you with a ready-made explanation, but that they must be interpreted, like all other parameters.

Luckily, the answer to the last question is “no”. Depending on the type and number of axial spaces intersecting, the different qualities of crossroads and their impact on permeability (see section 4.4.4) would not have been brought out without the axial integration. This is a main result in the analysis, and it is dependent on pinpointing axial integration.

7.3.4. Control value

One other purely Space Syntax concept used for the analysis was the control value. This is not a mathematically involved and complicated parameter, and it has a descriptive power in a local environment.

Of course it is possible to guess that an intersection has more control than the adjoining spaces, and the control value was not a major analytical tool regarding public space, although it sometimes added extra information. However, it proved invaluable when sorting the different categories of interior spatial units. Knowing that the multi-connected, large and circulation-friendly interior space was a main feature in a representative domus, it was vital to pick out the domus with this feature. Not using the control value when looking at rooms in interior systems would have resulted in guesswork, and this guesswork would probably have tended to favour rooms with status features, ranking an atrium with few connections as a representative space. The use of the control value thus served to separate some spatial features from others (see section 2.3.1).

7.4. Parameters developed for this analysis

I have not treated Space Syntax as a static system of parameters to be used or discarded, and I fail to see why it should be treated like that. The development of new concepts and parameters is very much an integral feature of Space Syntax, as I said in Chapter 2.

7.4.1. Constitutedness and permeability

Since constitutedness did not help me to analyse the density of passages to interior units in different convex spaces, the permeability value, based on constitutedness, was developed (see section 2.2.4). Constitutedness per 10 m is what I chose as the permeability value, as 10 m suited the size of the convex spaces in Pompeii and the distances between doors. In another context, one might choose constitutedness per 25 m instead, depending on the different measurements of the spatial system. The permeability value was central.
to defining different phenomena, like the influence on spatiality of public buildings, the intensity of traffic and the impact of street intersections (section 4.4.4).

Permeability need not be related to convex spaces in an analysis. One could partition a street into 10 m sections and have the number of doorways per 10 m fall out automatically – but though this sounds very exact, it would be a less precise way of analysing permeability. The permeability in this case would rise and fall according to an arbitrarily chosen starting point – if I start measuring the Stabiana MA and make 10 m pieces from outside the Porta del Vesuvio, this will produce different 10 m chunks than if I start inside the gate, or if I start where the street proper starts in S6. I would also have to decide if small squares and street intersections should be included in the 10 m pieces or not, and what to do about seriously angled stretches like the theatre wall. The beauty of the convex spaces of Space Syntax is that this does not happen – given the articulation of 0.2 m these spaces are what they are, placed as they are placed.

Linking permeability to convex spaces is thus entirely justified to produce a result that is unambiguous from a methodological point of view. From the point of view of results, it is also an advantage to be able to see if a specific type of convex space is less permeable or more permeable, for instance when identifying the lesser permeability in spaces with public buildings.

7.4.2. Size-calibrated degree of convexity

The degree of convexity of a given convex space basically tells us how much “squareness” a space has, and the use of such a parameter is evident in itself, although in this analysis I had to calibrate it for it to be really useful (see section 2.4.1). I found that the degree of convexity in an urban system gets skewed by small spaces generally being more convex than larger ones, so I calibrated the value according to size. Convex spaces were thus assigned points in relation to their size and their degree of convexity. This new value tells us more about how useful a space was in terms of allowing activities and interaction between different people to take place.

Calibrating was subjective, which is a flaw but not something that is easily eliminated. I judged the “pure” degree of convexity as important and used it for rating in equal measure with size – if one deems it less important in a system, then perhaps the points it gives should be proportionally less than the points from size (or the other way around).
7.5. Simplifying concepts and limiting the use of concepts

7.5.1. Simplifications

There are two main simplifications in this study:

When ordering the different interior spatial units into their respective groups, access graphs (see Figs. 1A to 1C) were not drawn for each and every unit, and control values for the different spaces inside the system were usually not formally calculated.

Units were classed as having a circulation node by looking at the major spaces of the unit and counting their connections, arguing that in almost all situations more connections than four give a high control value in respect to adjacent rooms.

Units were also split up (e.g. into one L-unit and one LW-unit) based simply on sections of access graphs, and in simpler cases this was done by assessing the house plan alone.

This simplification was still accurate enough, even if a few units happened to get into the wrong categories, and it saved an enormous amount of time.

To analyse parts of urban systems such simplifications must be permissible, since otherwise one faces the choice of either not analysing at all or of confining oneself to such small sections of the spatial system that the study basically becomes meaningless.

7.5.2. Limiting the concepts used

There are numerous Space Syntax concepts, measurements and parameters that are not used in this study, since it is not possible to include everything. I chose the concepts that were most likely to help me with the potential of traffic flow (axial integration), the use potential of bits and pieces of streets (convex map, degree of convexity), and how the inhabitants behind the doors used their piece of public space (permeability).

The concepts used are those that relate directly to the spatial facts of the axial and convex maps. The mathematical relation between different combinations of these parameters has not been explored. One direct parameter omitted was convex integration, the elimination of which is already discussed in section 2.2.2.
7. Results and evaluation

7.6. The limits of an archaeological context

It must be re-stated a final time that an archaeological context has certain limitations that would not be present in a living city or town. The most obvious is, of course, the lack of people. There are no traffic flows to observe, no notes to be had on the use of a small plaza, no observation of the way carts turn when delivering goods to shops. Therefore, conclusions must be expressed not as certainties but as likelihoods and potentials — it is up to the reader to decide how strong the likelihood is and if she or he thinks a potential was realized.

There is also the dilapidated state of architecture. Standing on site, questions like “is this an enormous domus or three small ones with a shop?” can baffle the best, and to get on with the job a decision based on literature and observation must eventually be reached. The archaeologist studying a more limited context in depth may think this a sketchy way to approach a subject — and she or he would be right. But I think this sketchiness must be accepted, since otherwise we would only get in-depth studies and never an urban overview of Pompeii.

That is not to say this is an urban overview, far from it. It is one small stone put in a pile that eventually will produce such an overview, hopefully before the ancient remains crumble to dust.

Lastly, I wish to express my compassion to the people of ancient Pompeii, to those who perished in such a horrible way and thereby made my study possible. Walking the streets of their town, they were never far from my mind. The “long ago” factor is no comfort; it may be long ago for us, but for them it was the present moment, the now. I hope that from somewhere they are able to smile at all the archaeologists and architects who busily explore and marvel at what were features of everyday life for the people of ancient Pompeii.
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Appendix

Colour in the Pompeiiian cityscape

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1. Background

The Roman city of Pompeii, destroyed by the eruption of Vesuvius in AD 79, is often referred to in connection with colour. These references often describe a richness in colour and an artistic skill that could serve as an inspiration to artists as well as architects. Most of this, however, is based on findings and analyses of interior colouring. The early excavations revealed rich buildings with well-preserved interior paintings, showing imitation architectural features, gods and goddesses, animals, fruits and flowers. The paintings exhibited a wide range of colours, and they stunned the visitors and became an inspiration for generations of artists and architects. Pompeiian interior painting also became a main source of knowledge about Roman painting up until AD 79, not because Pompeii was that important during its lifetime but because its tragic demise implied that all its paintings were left for posterity to study.1

Whereas interior painting has been the focus of much research, very little knowledge has been collected about the colour of the facades and outdoor spaces. Furthermore, the town in its present condition reveals very little about its original colouring, as most facades have lost their surface layers. The guidebooks are full of colourful illustrations, but it is not made clear whether they are based on archaeological evidence or on creative imagination. Even a recent book with scientifically solid articles, edited by a leading Pompeii archaeologist, shows a perspective town plan coloured in a stereotyped manner.2 This reveals that the colour of the Pompeiian cityscape has yet to be adequately researched.

2. Aim and main questions

This study is part of a larger project, investigating different aspects of urban space in Pompeii. Other studies within the project deal with the spatial structure of streets and public outdoor spaces, the potential for wheeled traffic and possible traffic regulations, as well as the character of buildings and activities along different streets.3 The joint aim of these studies is to analyse the function, status and appearance of Pompeii’s public space in the period just before its destruction, and to discuss the interrelations between urban space and the people using it.

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1 Pompeiian paintings are presented and discussed in, for instance, Helbig 1868; Mau 1882; Schefold 1952; Barbet 1985. For a recent analysis, see Strocka 2007.
2 Coarelli 2002.
3 Weilguni (in this volume); Weilguni 2011; Table of interior units; Table of intersections.
The aim of this part of the project is to survey the use of colour in the cityscape and analyse how it was utilised to indicate status, inform about function, and make the town intelligible to its inhabitants and visitors. The article concentrates on the appearance of the cityscape and the possible differences between streets and areas of different character. It also touches upon other related questions: How did colour, and its variation or unity, interact with factors such as status and function? How could colour have been used to facilitate the understanding of spatial structure and the use of streets and open places? This article does not, however, discuss the chronology or artistic style of facade schemes, decorations and pictures.

3. General presentation of Pompeii’s urban space

The Pompeii that was destroyed by Vesuvius in AD 79 had a long history, but this article concentrates on its appearance and function just before its final destruction. One important earlier event has to be mentioned, however: There was a severe earthquake in AD 62, which partly and possibly even totally demolished many buildings. Its possible influence on the social and economic life has been much debated, but this article will only refer to its direct consequences for the appearance of buildings and streets.

Pompeii is a dense town measuring about 1300 times 800 m and sloping considerably from northwest to southeast. It is surrounded by a defensive wall, which lost its military importance when Pompeii was made part of the Roman Empire in 80 BC. The street net is largely regular with narrow, approximately right-angled blocks, but an area around the Forum shows a more irregular street pattern and is often referred to as the oldest part of the town. The street width varies: some alleys can be as narrow as 1.20 metres, whereas important streets can measure more than seven metres. However, the width of the streets does not always coincide with their importance in the circulation of traffic on foot or by cart.

Along the streets there are high sidewalks, which here and there are connected by stepping stones in the middle of the street. Sometimes there are sewer pipes under the sidewalks, but often you can assume that the street itself had once served as a channel for running water. The blocks were built in close proximity to the street, and there were only a few open places. The most important of these was the large Forum, surrounded by colonnades and grandiose public buildings. Parks were few if any, and private gardens were

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4 For a presentation of recent research on all aspects of Pompeii, see the anthology Dobbins & Foss 2007.
5 The chronology of the different parts of the town and the reasons for their different street patterns are matters of continuous research and hypothesising, but lie beyond the scope of this article. For recent work on this matter, see Geertman 2007.
enclosed by high walls that hid most of the vegetation from those who passed on the street.

The houses differed in height and number of floors. Often the ground floor was high – the height of the rooms varied but could reach more than five metres in the central atrium – and most houses also had one or more upper floors. The knowledge of upper floors is, however, limited as most of them were severely damaged in the volcano eruption. Nonetheless it can be established that they were not built in the same manner as today. High rooms could be filled in with an inner loft, which was reached from the room or from the street. At the same time there could be other upper floors of different heights over different parts of the house, sometimes protruding over the street, which gave the house a form that was far from uniform or easily understood.6

The houses had few windows to the street, and those that existed were most often placed above eye level. Entrances, on the other hand, were wide and high. Entrances of tabarnae, that is shops and workshops of various types, were usually between 2.5 and 4 metres wide and around 3 metres high.7 Doorways to private houses were narrower – often between 1.5 and 2 metres – but on the other hand even higher.8 Thus, most doorways were either approximately square or high and rectangular. See Figure 1 for clarification of the terminology used in this article.9

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6 Pirson (1999) thoroughly discusses the function, size and placement of upper storeys.
7 A plaster cast of a taberna door can be seen at the entrance IX 7,10, facing Via dell’Abbondanza. See photo in Pirson 1999, 77.
8 Plaster casts of double doors to entrances (fauces) of atrium houses can be seen at I 9,1 and IX 7,9 and II 2,2 and II 2,4, all of them facing Via dell’Abbondanza.
9 The terminology for the zones of the facade differs among the sources, a matter that is further complicated by the fact that the sources are written in different languages. I have chosen not to use the words socle, dado or base, as they sometimes refer to the plinth zone and sometimes to the lower zone of the facade.
4. Method and main hypothesis

This investigation starts with the well-known pictures of Pompeiiian facades presented in Vittorio Spinazzola’s excavations of facades along Via dell’Abbondanza. These plastered facades, often with a red lower zone, have created the image of Pompeiiian streets and houses. The question is whether Spinazzola’s findings along a busy thoroughfare with many shops can also be considered valid for other parts of the town.

To investigate this and to find out what factors can influence the facade colour, I analyse Spinazzola’s work and formulate the main criteria for colour use on the facades along the excavated part of Via dell’Abbondanza. I pose the hypothesis that these criteria are also valid in other parts of Pompeii. To check, and possibly falsify, this hypothesis, I compare the formulated criteria with what can be found in other sources. In this comparison I concentrate on three streets, or rather on three axial lines within the street net of Pompeii.

The three axial lines have been chosen as part of our previous analysis of Pompeii’s public space, using the statistical-topological method known as Space Syntax. In other studies within the project Pompeii: life in the urban space we analyse other aspects of space and function along the same lines.

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10 Spinazzola 1953.
12 For the theory and methodology of Space Syntax, see Hillier & Hanson 1984; Hillier 1996.
The three chosen axes are shown in Figure 2:
- Via Stabiana – Via Vesuvio. An important thoroughfare, leading north-south from gate to gate. Further on called “Stabiana axis”.
- Via de Mercurio and its continuation over and south of the Forum, ending at the south end of Via delle Scoule. An important line in the city’s street net, but without direct access to the world outside the city gates. Further on called “Mercurio axis”.
- Vicolo del Fauno. An alley without much importance in the total street net. Further on called “Fauno axis”.

![Map of Pompeii with Via dell'Abbondanza and the three reference axes marked.](image)

Fig. 2. Map of Pompeii with Via dell’Abbondanza and the three reference axes marked. From the west: Mercurio axis, Fauno axis, Stabiana axis, Via dell’Abbondanza.

For each of these axes I gather the available information about facades and discuss to what extent it calls for a falsification of the hypothesis. In the analysis, each of the axes is divided into a number of convex spaces,\(^{13}\) defined by the Space Syntax method and numbered within each line (S1–S46, M1–M26 and F1–F8). These convex spaces are also used in other parts of the project *Pompeii: life in the urban space*, which includes a methodologi-

\(^{13}\) A convex space is a basic unit in Space Syntax methodology. It is characterised by the fact that each point in the space can be reached from any other point along a straight line running totally within the space. Along a street the different positions of its bordering facades form it into a series of smaller and larger convex spaces. In our analysis we have considered only protrusions or indents measuring 20 cm or more. For a more detailed discussion on our considerations when defining the convex spaces of Pompeii, see Weilguni (in this volume), Section 2.4.2: Articulation.
The analysis concentrates on the ground floor of the buildings. This is partly due to necessity, as there is very little source material for upper floors, but it also agrees with the fact that the narrow streets seldom allowed a person on the street to see much of the upper floors.

In addition to the study of the chosen axes I have collected whatever information I could find about Pompeii’s outdoor colours in various sources, as discussed below (section 5). I have also made a survey of the material possibilities for facade colours in terms of available materials and pigments (section 7).

The references to streets and houses are made according to the accepted modern convention (e.g. VII 2,4 = Regio VII, insula 2, entrance 4), sometimes with added information about the convex space (e.g. M3). The regions and insulae have sometimes been renumbered, resulting in one earlier and one later modern denomination, and for these I also give the earlier numbers that were used in Spinazzola’s reports on Via dell’Abbondanza.

5. Available source material regarding Pompeii facades

This survey of Pompeii facade colours is based on my investigation in situ, as well as on excavation reports and publications, artistic and other reproductions of the excavated town, and literature that deals with different aspects of the town’s function and appearance. The most important sources are presented and evaluated below.

5.1. Own investigations in situ

Recurrently during 1998-2008 I surveyed the Pompeii city space with regard to different aspects discussed within the project Pompeii: life in the urban space. I concentrated on the three north-south orientated axes presented in section 4. Along these axes I made a detailed survey of facade material and surviving colours. I also noted approximate measurements for the height of horizontal zone divisions and some other architectural features. For the rest of the town, I walked along all of the excavated streets and noted the

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14 For presentation of the Space Syntax method, see Weilguni (in this volume), Sections 2.1 – 2.2. For illustrations of the convex spaces along each axis, see Figure 6 and Weilguni (in this volume), Sections 4.2.2. – 4.2.4., figs. 20, 22 and 24.
occurrence of eye-catching features, but with no intention of making a total survey.

The first conclusion drawn from these surveys is that very little of the ancient facade material and colouring remains to be seen. Today most buildings have facades of raw brick and stone, some of them showing clear evidence of having once been plastered. The visible plaster is not always the original surface layer, but may as well be remnants of an inner layer. The facades and their material are worn by wind and sun, rain and vegetation, and also by the thousands of tourists who visit the site every day. Only those facade parts that have been considered extra valuable are protected by roofs or glass plates, and sometimes these precautions are wrongly constructed and might even have damaged the facades instead of rescuing them. A number of blocks, notably at both ends of the Stabiana axis, were completely destroyed by bombing during the Second World War. As for veneers and other artefacts of marble, they were to a large extent removed already directly after the disaster, as a result of an imperial order to recover as much as possible of Pompeii’s valuable materials.

Thus, the remaining facades can only rarely be considered a source of information about the colours and materials of the living town. They can, however, serve as comparative material for judging the reliability of other sources, as discussed below.

5.2. Excavation reports and publications

Excavation notes from 1748–1860 have been compiled and published by Giuseppe Fiorelli. These notes, however, do not include the plans showing where the excavations were made, information about earlier names of streets and insulae, or the names of the excavation leaders or authors. After examining the notes concerning various years (1809, 1814, 1830, 1833, 1845, 1859), I can conclude that they do not add essential information to this survey. Facades are very seldom mentioned, and when they are, the focus is on painted messages and not on the facades as such. As an example, the notes from 1830 include a description of the magnifica strada di Mercurio but do not mention the decorated facades that we know, from other sources, could be seen at that time.

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15 Plaster generally consists of several layers, made from partly different sand and stone materials. The series Häuser in Pompeji, edited by V.M. Strocka, includes very thorough analyses of remaining plaster on walls and, when present, on facades. See for instance Allison & Sear 2002, 62-65, 92-101 for presentation and discussion of the plaster in a house with well-preserved interior decorations. Meyer-Graft & Ehrhardt (1997) and Freccero (2004) discuss plaster in detail, but do not specifically deal with its outer, visible layer.


17 Fiorelli 1860; Fiorelli 1862.

18 Fiorelli 1860, 234-238.
In 1875 Fiorelli published a book describing Pompeii.\textsuperscript{19} After an introduction on the alleged history of the town, he presents what has been excavated so far of the town, and for every doorway he gives information about the interior connections and alleged functions of the spatial units behind the doors. He also presents some notes on interior paintings and other findings. To establish the value of Fiorelli’s book for this investigation I have compared Fiorelli’s notes on Via di Mercurio (\textit{spaces} M1–M7) with my own survey \textit{in situ} and with the evidence of facade appearance available from other sources. Fiorelli gives rather scarce information on facades, and the main part of his information is such that I have been able to observe myself and/or find in other sources. The information specific for Fiorelli deals solely with inscriptions and messages on the facades, and adds no information about the facade as such. On the other hand I, and/or other sources, have noticed features not presented by Fiorelli, although they must have been visible when he wrote his book. For example, he does not mention the simplified, dark, imitation marble (“zebra stripes”) on Casa di Meleagro (VI 9,2, \textit{space} M1), a feature mentioned and shown in a number of other sources although it is no longer visible.\textsuperscript{20} I draw the conclusion that Fiorelli’s \textit{Descrizione} adds nothing essential to this survey.

As of 1875, reports on the Italian excavations in Pompeii and other places are regularly published in \textit{Notizie degli Scavi} (\textit{NSc}). I have studied what is reported about Pompeii in a selection of volumes (1875–81, 1884–86, 1888, 1910, 1923–24, 1933, 1947, 1952, 1968, 1971 and 1983) and have found that the information on facades largely depends on the aims of the excavations and apparently also on the interests and priorities of the excavation leaders.

From the excavations between 1875 and 1885\textsuperscript{21} there are few reports on facade appearance, but the careful documentation of carved and painted messages on the facades still conveys some information about colours and materials. For instance, it is mentioned that messages were found on a lower facade zone imitating yellow marble, on a painted red plastered wall,\textsuperscript{22} on white plaster,\textsuperscript{23} and on a black lower facade zone.\textsuperscript{24} The minimal concern for the facades as such is demonstrated in the excavation notes from the south side of insula IX 5.\textsuperscript{25} From other sources we know that house IX 5,18 had a black lower facade zone divided into orthostats with red frames, and a red signboard where so far nothing had been written.\textsuperscript{26} The same sources reveal

\textsuperscript{19} Fiorelli 1875.
\textsuperscript{21} \textit{NSc} 1875-1881, 1884-1885
\textsuperscript{22} Both on the west side of insula V 14 (\textit{NSc} 1876, 243).
\textsuperscript{23} East side of insula V 12 (\textit{NSc} 1876, 244).
\textsuperscript{24} East part of insula IX 6 (\textit{NSc} 1880, 442).
\textsuperscript{25} \textit{NSc} 1877-1878, 734-35.
\textsuperscript{26} \textit{PPM} IX, 670ff.; also shown in the cork model in Naples.

\textit{Boreas} 33
that the lower facade zone around entrance IX 5,17 was black, whereas the upper zone was chequered in different colours.\textsuperscript{27} This is, however, not even mentioned in NSc, which tell only of the red signboard and that a message was made on a black lower facade zone.

Later excavation reports have laid more stress on the facades. One example is G. Spano’s excavations, where the reports sometimes include detailed descriptions of facade material, colours and the placement of windows.\textsuperscript{28} The latest NSc in which I found information on Pompeii is from 1933, when M. Della Corte led the excavations. Also here there is some facade information, but seemingly without the ambition to give a comprehensive picture of how the streets had once looked.

Thus, the notes in NSc give sporadic and far from consistent information about the facades at the time of excavation. They very seldom show pictures of facades, which adds to the problem that the notes often are open to different interpretations. For example, what does Spano mean when he writes that the house at the west end of Via delle Terme had red rectangles over (su) a black socle (zoccolo)?\textsuperscript{29} Does he mean that red rectangles were painted on a black surface, or that the lower part of the house was black and that the red rectangles were painted above that zone? Another difficulty is the interpretation of the phrase “rough wall” (rozzo or grezzo) – does it mean that the wall was unplastered, that the plaster had a rough surface, or that the plaster was unpainted? Similarly, what is a totally undecorated (disadorna) wall – is it simply painted without decoration, plastered without paint or unplastered, and in the latter case, has it never been plastered or has the plaster fallen off?

In spite of these limitations, the reports in Notizie degli Scavi give valuable first hand information about what could be found during excavations, and even if they do not provide material for a thorough survey or analysis of facade materials and colours, they give at least some indication of what could be found and what seems to have been common.

Among the excavation publications from the 20th century, I have used above all Vittorio Spinazzola’s texts and plates from excavations of Via dell’Abbondanza, further discussed in section 8 below.\textsuperscript{30} In addition to detailed descriptions and pictures of the form and colours of facades along the excavated street, Spinazzola provides information about coloured facades in other parts of the town. After examining his colour notations and facade presentations in regard to their inner consistency and comparing them with my own observations and other sources, I draw the scarcely surprising conclusion that the reconstructions shown in Spinazzola’s plates are well supported.

\textsuperscript{27} PPM IX, 670ff.; also shown in the cork model in Naples.
\textsuperscript{28} See for instance Spano 1910, 316, 330, 438.
\textsuperscript{29} Spano 1910, 438.
\textsuperscript{30} Spinazzola 1953.
During the latest decades several buildings and insulae have been re-excavated and given detailed presentations. Some of these publications give very specific information about the still remaining plaster and other materials, but in spite of that they seldom add much to the understanding of facade colours that are already irrevocably lost.31

5.3. The cork model in Naples

The National Archaeological Museum in Naples exhibits a cork model of Pompeii in a scale of 1:100. It was made in 1879 and shows in detail the houses and streets that had so far been excavated, which means approximately the western half of the town. See Figure 3. The model is not a reconstruction but shows the excavation site and its findings in the condition they were in at the time the model was made. Therefore, the model could be an important source of knowledge about colour in public space. But is it reliable in this respect, or are the paintings shown on the facades a result of somebody’s creative imagination? To test this, I have chosen nine facades that have distinct colouration in the model, and compared this colouration with what is discussed in literature and what can still be found on the site today.

Fig. 3. Cork model in Naples, detail showing south facades of Regio IX insula 5. Facade around entrance 17 has black orthostats and chequered upper zone. South facade of house IX 5,14-16 has lower zone with orthostats and “zebra stripes”.

31 See for instance the series Häuser in Pompeji, edited by V.M. Strocka and including 12 volumes from 1984 to 2004. They present very detailed descriptions of the house remains and analyse the chronology of their construction and subsequent alterations.
For four of the chosen facades I have found no literature mentioning their surface or colouration, and the remaining facade surfaces are too scarce to show any evidence of colour. Thus, for these facades, the testimony of the cork model is neither supported nor contradicted. I found five of the chosen facades in literature. For all of these, there is a close correspondence between the literature and the cork model, although the model shows the facades in more detail than the literature based on today’s remains.

Thus, I have found strong evidence for the reliability of the model and none that contradicts it. I draw the conclusion that the cork model is a reliable source of knowledge about facade decoration and colouration. It is, however, very difficult to study the model in detail because of the physical obstacles preventing clear views of more than just the outskirts of the model and, to some extent, the facades along the widest streets. For the same reason, and due to the condition of the model, it is also often not possible to distinguish the colours more specifically than “light” or “dark”. The evidence based only on observations of the model should therefore be seen as rather weak.

For most buildings the model does not show any specific colouration but could rather be interpreted as showing facades that have already lost their rendering. Those buildings where facade colouration is shown are often divided horizontally at approximately 2 m in height, and the rule for those buildings seems to be that base zones are darker and more decorated than the rest of the building. Such buildings with high base zones seem to have been prevalent in all parts of the town covered by the model.

5.4. Artistic and other reproductions of the living and the excavated town

There are a few surviving ancient pictures showing the living town of Pompeii. One of them depicts a fight outside the amphitheatre and also shows the large Palaestra and parts of the city wall. The Palaestra is light in colour, probably stuccoed. The town wall is not stuccoed but has visible large stones, and its towers are lighter, apparently stuccoed. This picture in itself cannot be judged as a reliable source for these facades, but it can add understanding to evidence given by other sources.

32 VII 15,12-13; VI 8,3.5; VI 1,4; IX 5,14-16.
33 House VII 15,11 (PPM VII, 817f.), house VI 1,5 (PPM VI, 4), house IX 5,6.17 (PPM IX, 485), house IX 5,18 (PPM IX, 670ff.), house VI 9,6-9 Casa dei Dioscuri (PPM IV, 860ff.).
34 Two examples, easily observable along the outskirts of the model where colour serves to distinguish a constructive and spatial unit from its neighbours, are IX 2,18 (red lower zone and light upper zone) and I 2,20-21 (yellow lower zone with red lines and light upper zone).
Several fragments of a large painting showing the Forum of Pompeii have also been found. Two of these fragments show citizens reading a verdict placed on the columns of a whitish colonnade, with equestrian statues on high plinths outside the colonnade. The painting should be interpreted as a free reconstruction of the town, its activities and monuments, and it adds nothing specific about the town’s colours.36

During the 18th and 19th centuries many architects and artists visited Pompeii as part of their educational tour through Europe. Is it possible that their paintings, sketches or notes could add to our knowledge about the town’s colours as seen before the facades withered away? I have looked through a number of books and exhibition catalogues showing such pieces of art.37 It appears that most paintings depict interior decorations. There are also street views, but most of them are made with ink wash or other methods that do not reveal anything about colour. A few exceptions, however, show exterior decorations, facades and town views in colour, using different techniques. Some of them attempt to reconstruct the living town. They can be seen as expressions of the artists’ creative imagination and have no value as sources. Others show the ruins in the condition observed by the artist, and they could give valuable information about the facades shortly after their excavation. To be judged reliable, however, such paintings should be compared as far as possible to the existing facades and other sources.

Several early drawings and paintings show facades with only patches of stucco, or with bare brick or stone surfaces that obviously had lost a covering layer of stucco or veneer.38 Some paintings show stone facades or possibly imitation stone modelled in stucco,39 and there is also evidence that facades built from large stone blocks could be covered with stucco.40 A few paintings show facades and their colouration in more detail, and will be further discussed below.41

36 Paintings nos. 9070 and 9068 at the National Archaeological Museum in Naples, from portico in the Praedia of Julia Felix (II 4,1-7). For further analysis, see Nappo 1989.
37 Gell & Gandy 1827; Gell 1837; Niccolini & Niccolini 1854-1896; École nationale 1981; PPM Suppl. 1995.
40 École nationale 1981, 245: A. Normand, Casa del Fauno 1850.
41 Gell & Gandy 1827, pl. 27: Via Consolare, insula VI 1, west side: unicoloured lower zone up to c. 2 m, upper zone chequered; Gell 1837, vol.1, tav. XXXVIII. House of Tragic Poet (VI 8,5). Horizontal division at over 2 m height. Lower zone with orthostats in red, white and yellow. Upper zone light stuccoed ashlar work imitating marble; Gell 1837, vol. 1, tav. LXXXIV: Torre XII near Porta Ercolano: light stuccoed with two layers of ashlars at the

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There are also numerous ink or pencil drawings showing pictures found on facades. Here the interest of the depicting artist most often lay in understanding the motif – was it Mercurius with winged sandals or Minerva with a spear? – and the discussions of these pictures have mostly dealt with their chronological categorisation and their symbolic and religious meanings. Less attention has been given to the colouration of the paintings, and almost none to their role in forming the cityscape.

All facade pictures that had been reported in excavation reports, reproduced by artists or documented in some other way, have been surveyed and analysed by Thomas Fröhlich. Fröhlich’s main interest lies in the contents of the pictures and their societal interpretation. His thorough investigation also provides a basis for an analysis of the pictures’ contribution to the appearance of houses and streets, as well as possible differences between paintings found in different parts of the town. His investigation cannot, however, be used as evidence of the non-existence of paintings where they have not been reported, due to the already discussed distortions and incompleteness of its sources.

The extensive topographical presentations of Pompeii include some older photos. Most often they show facades that are almost as bare as today. Warscher’s written observations from the 1930s and 40s do not add much to the understanding of facades, although she has often reported about the colour and decoration of those facades that still have traces of colour. From this I draw the conclusion that most of the facades had lost their surface material already in the early 20th century.

A recent website shows photos of all Pompeian streets and facades as they look today, as well as a few older photos. When it comes to colour, however, the photos do not add any significant information to what is already given in other sources.

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height of door top, below and above them flat light stucco; Casa dei Dioscuri (VI 9.6-9) is depicted by several artists: Gell 1837, vol. 2, tav. p. 8, PPM suppl. 1995, 780f. : P.M. Venero painting from 1843. Here there is a close correlation between the old pictures, the cork model and the present remains. See Figure 9 for Venero’s painting.

42 Fröhlich 1991.
43 Warscher 1938-1948 includes several photos from the 1930s and 40s and a few older ones. PPM I-IX also presents some older photos. A photo from 1904 in PPM V, 888, shows the facades south of Porta Vesuvio with no significant differences from today. Fröhlich 1991, tav. 56:1, shows a photo from 1905 in which there is a plastered facade that has since been totally destroyed.
44 Pompeii in pictures.
5.5. Literature on architecture and building technique

Neither the relatively contemporary writings of Vitruvius\textsuperscript{45} nor the recent literature I have found on Roman architecture, building technique and plasters deals much with the colouring of facades.\textsuperscript{46} Publications about specific themes or areas in Pompeii do, however, sometimes mention the colour aspect of facades and pavings.\textsuperscript{47} As for pigments, without special reference to outdoor use, literature is presented in section 7.5.

5.6. Conclusions regarding source material on facade colours

Today’s existing facades provide little information about the colours they once had. The source material discussed above leads us to the conclusion that the withering of Pompeii’s facades is not only an effect of the acid and polluted atmosphere of the late 1900s; it is a process that started much earlier. In some instances excavators wrote about facades that had fallen down,\textsuperscript{48} but more often the facades and their materials and colours were not even mentioned in the early excavation reports. Obviously such issues were not given high priority in documentation, and I find it credible that facades often were not even excavated properly. It is quite likely that heaps of plaster on the ground would have been shoved away as rubbish rather than carefully joined together to reconstruct the facade surface.

Some traces of facade colours can be found in the street names created shortly after excavation. Some streets have names that refer to facade paintings, such as \textit{Vicolo dei 12 Dei}, named after a facade painting showing the twelve Olympic gods,\textsuperscript{49} and \textit{Vicolo dei Serpente} (later renamed \textit{Vicolo di Balbo}), where the large street-shrine painting with serpents has now vanished and the only thing remaining is a niche in the facade.\textsuperscript{50} There is also a little alley called \textit{Vicolo delle Pareti Rosse}, where the red walls can still be seen but are crumbling to pieces more and more for every rainfall.\textsuperscript{51} Maybe this alley got its name not because other alleys had walls with less spectacular colours, but because this was one of few alleys where the plaster was still intact for the excavator to find and subsequently name the alley after the colours.

\begin{itemize}
\item \textsuperscript{45} Vitruvius’ \textit{Ten books on architecture} are believed to have been published in the 20s BC. See Vitruvius eds. I.D. Rowland & T.N. Howe 1999 for an English translation including discussion about the dating (p. 5, notes and illustrations).
\item \textsuperscript{46} For building technique and materials, see Adam 1994; Adam 2007; Dobbins 2007b. For plaster, see Meyer-Graft & Ehrhardt 1997; Freccero 2004. For architectural history, see Richardson 1988. For the use of real and imitation marble, see Fant 2007.
\item \textsuperscript{47} Examples of such work, referred to in this article, are Zanker 1998, 95, 101; Pirson 1999, 62 ff.; Gassner 1986, 205.
\item \textsuperscript{48} Fiorelli 1875, 113.
\item \textsuperscript{49} Fröhlich 1991, Kat. F60.
\item \textsuperscript{50} \textit{PPM VIII}, 1122f., figs. 14-16.
\item \textsuperscript{51} \textit{PPM VIII}, 684ff.
\end{itemize}
6. Some specific facade features

6.1. Facade styles

Around 100 BC Pompeii had a period of prosperity, and a large number of wealthy families built palace-like residences. They had facades of carefully hewn tufa blocks, as well as elaborate door frames, often with decorated capitals\(^{52}\) and sometimes with a thin layer of marble stucco.\(^{53}\) This type of facade became a marker of wealth and status, and also buildings in other techniques were eventually given facades with large blocks imitating stone but modelled in plaster. Interior decorations from this time were made in analogy with the facade ideals, imitating architectural elements like ashlar work, friezes and suchlike, mainly in a flat style without perspective. In Mau’s categorisation of interior decoration styles this is called the \textit{first style};\(^{54}\) a term sometimes also used for the corresponding facades.

Rome’s transformation from a republic to an empire was accompanied by a transformation of the cityscape, first in the capital and eventually in smaller towns like Pompeii. Augustus rebuilt Rome into a “city of marble”, and also in Pompeii several new public buildings were erected and faced with marble. This symbolised not only wealth but also allegiance to a new political culture and the provisional town’s ambition to be a worthy part of the Roman Empire. When marble was too expensive it was substituted by lighter shades of limestone or artful stucco work. The Forum was paved with slabs of white travertine and the town was embellished with smaller items – altars, public fountains, and architectural details – in real or imitation marble.\(^{55}\)

The interior decoration style of the early empire (\textit{third style}) exhibits large, unicoloured panels, often in intense colours and divided by painted architectural elements, candelabras or other vertical features. The panels often imitated marble or textile hangings. The \textit{fourth style} is characteristic for Pompeii’s last decades. In this style the wall panels are narrower, and in between them there are perspective views into slender, often totally unrealistic, fantasy architecture similar to theatre coulisses. Although the style labels are based upon interior decorations, they are sometimes also used for facades and refer to similarities and/or contemporaneousness to corresponding interior paintings.

\(^{52}\) Zanker 1998, 34.
\(^{53}\) Pirson 1999, 59; Adam 2007, 100.
\(^{54}\) Recent adjustments of Mau’s categories (Mau 1882) are presented in Strocka 2007.
6.2. Pictures painted on facades

Painted pictures on facades have been found in large numbers, especially in Spinazzola’s excavations of Via dell’Abbondanza.⁵⁶ Those found in other excavations than Spinazzola’s are, however, often incompletely documented with respect to measurements, placements and colours, and the emphasis in earlier analyses is on the symbolic and religious contents of the motifs.

Those paintings that have been found outside places for eating and drinking, shops and workshops most often depict deities, above all Mercurius, and/or scenes that might refer to the specific activity of the shop, etc. To what extent the choice of deity is also tied to the specific activity cannot be said, as many shops have unknown function. These pictures have been interpreted to have a double function of drawing attention to the commercial activity and expressing the religious devotedness of the owner. Sometimes they are also seen on private houses, which in at least some cases are owned by rich merchants.⁵⁷ Typically, this kind of painting is placed next to the doorway, directly above a dark, usually red, lower facade zone 150–200 cm high. The picture is painted on a white background and framed with darker lines. The typical height and width of the painting are both between 50 and 100 cm, although there are also larger paintings and combinations of paintings beside or above each other.⁵⁸

Paintings of another type are found at small neighbourhood or street-crossing shrines to the lares compitales, the genius of the place and/or the genius of Augustus.⁵⁹ They often show snakes and plants together with a painted or built altar and are typically placed on the lower part of the wall, exhibiting white fields against the darker lower zone of the facade.⁶⁰

Buildings with official functions could also have pictures painted on them. One example is the armatorium in insula III 3, which had large multi-coloured paintings showing trophies of war and deities, symbolising victory. These paintings, on a yellow background, covered a large part of the facade above a red lower zone, approximately 2 metres high.⁶¹

It is obvious that pictures must have been important features in the appearance of the streets where they existed. Due to the shortcomings of excavation reports, however, it cannot be established how common they were in other streets than the part of Via dell’Abbondanza excavated by Spinazzola.

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⁵⁶ Spinazzola 1953.
⁵⁷ Fröhlich 1991, 49.
⁵⁸ ’Katalog Fassadenbilder’ in Fröhlich 1991 includes 72 paintings. Background colour is given for about 50% of these paintings, and in most of these cases the background is white. Measurements are given for slightly less than 50%, and out of these about half fall within the limits given above. The height of placement on the facade is given for nine paintings, all of which are placed directly over the lower zone of the facade.
⁵⁹ For analyses of the local shrines and other religious facade paintings, see Small 2007, 189ff. and Laurence 1996, 41ff.
⁶⁰ See for example the north side of insula V6 and the south side of insula IX 2.
⁶¹ Spinazzola 1953, 135f.
6.3. Painted and inscribed messages

The various types of messages inscribed or painted on the walls have long attracted the interest of excavators, and thus they are better documented than other facade features. Interest has, however, been focused on the text as such and not on its appearance.

The frequency of messages varies greatly among the different streets, as has been shown by Ray Laurence. Evident or alleged thoroughfares like Via dell’Abbondanza and the Stabiana axis, together with the Mercurio axis north of the Forum, have messages more frequent than every 4 metres, whereas alleys like the Fauno axis and several streets in the southeast part of the town have fewer messages than one per 12 metres of street length.

Those messages that are still there to be observed, or that are documented in excavation reports or photos, are often large, painted in black and red colours on a whitish splash. Thus, it is likely that the messages would have been dominant in the appearance of the streets where they were common.

7. Facade materials and pigments

7.1. Building materials and stones

The walls, pillars and columns of the buildings consisted of brick and various types of stone, combined in different types of masonry or *caementum*, the Roman concrete. In the interiors all the walls were stuccoed, and also the exterior walls were normally covered with plaster.

There were also facades in visible stone, and different types of stone were used for the paving of streets and sidewalks, for water fountains, statue bases and statues, and for various smaller facade elements. The visible stones in Pompeii were mostly within three colour areas:

- subdued yellowish: Nocera tufa used for facades, Sarno limestone used for sidewalk kerbstones and sometimes for facades
- dark grey: Lapis Pompeianus, also called lava, mainly used for street paving
- white: Caserta travertine (limestone) used for paving in exclusive places; marble was used for extravagant facades, statues and other additional elements.

For specific purposes there was also coloured marble, both relatively unicoloured and vividly veined, in a colour scale that included white, black, grey, dark purple, yellow, pink and pale green.

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63 Spinazzola 1953, several tabulas; Fröhlich 1991, Taf. 56:1; own observations.
The walls of regularly placed multicoloured bricks and stones (*opus reticulatum*) were most often originally covered by plaster, however beautiful they might seem to today’s observers.\(^{64}\) There are suggestions, however, that at least some of these facades were meant to be seen unplastered.\(^{65}\)

The characteristic brown-red colours of brick and terracotta were also visible in mosaics and reliefs, apparently serving a decorative and indicative purpose as well as that of bringing luck and warding off evil. Ornamental mosaics of brick together with dark and light stone have been found in a number of places, often in street corners.\(^{66}\) See Figure 4.

Fig. 4. Street corner ornament, insula VIII 4.

There are also small terracotta or stone reliefs showing motifs, sometimes with a ritual function or serving as *apotrophaia*, sometimes connected to the

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\(^{64}\) Richardson (1988, 380) discusses the Venus temple; Adam (2007, 109) discusses the Porta Ercolano.

\(^{65}\) Adam (2007, 109) suggests that the geometrical brick and tufa design of the shops around the Central Baths, still under construction in AD 79, might have been meant to remain unplastered. Dobbins 2007b, 116, suggests the same thing for the south wall of the *Macellum*, built in *opus reticulatum*.

\(^{66}\) Such mosaics can still be seen at the NW corner of insula VIII 4 (two circular, flower-like mosaics, similar but not identical, placed at different heights on two sides of a corner pillar surrounded by large taberna openings into a corner shop) and at the NW corner of insula I 10 (similar to those mentioned above, next to a taberna opening) Both workshops are suggested to have been used by intarsia artisans, Eschbach & Müller-Trollius 1993, 55, 369. Differently shaped mosaics are found on a porticus column outside VII 4,6 (*space* M9) and outside a taberna facing Via Stabiana (VII 2,3, *space* S20). Spano (*NSc* 1910 p. 436) reports about a mosaic outside VII 6,28, now destroyed.
use of the building and sometimes simply serving as rainspouts. Reliefs of this type found in other places were often painted, and some of the ones in Pompeii also have exhibited traces of paint, which indicates that they can have served as colourful adorns on the walls. In addition, crushed brick in mortar (cocciopesto) was used for pavements and as wall rendering, giving the surfaces a pink colour.

7.2. The possible painting of marble

White marble has long been seen as materialising the essence of classical art and architecture, and ever since the Renaissance real or imitation marble has often been used as a token of cultural refinement, ancient lineage and, not least, wealth. But was the marble of classical temples and sculptures originally white, or is today’s naked whiteness the result of many centuries of wind and rain? In the 19th century several artists and architects presented testimonies or suggestions that the marble was originally painted. The French sculptor and antiquarian Quatremère de Quincy did a restoration of the monumental statue of Zeus in Olympia, Greece, and painted it with many and strong colours, and influential architects like the German Gottfried Semper used vague archaeological evidence to support his ideas of polychrome marble architecture. Since then, the whiteness or polychromy of classical monuments has been a matter of much debate and strong feelings. During the 19th century much of the driving force was aesthetic or ideological, based on antiquity’s role as the model for the new art and architecture of the time. In later centuries archaeological research has also focused on the matter.

A recent exhibition, shown in several European museums, has marble statues and sculptures painted according to archaeological evidence, and the result lies far from the noble whiteness that we are still used to seeing as a correct interpretation of antiquity. It seems that there is no longer any doubt

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67 Stone and terracotta reliefs found on facades: I 11,1 (space A5, niche), I 4,25 (face relief), II 1,4 (space A10, niche), III 4,6 (space A10, phallus), VI 9,6 (space M2, rainspout), VI 14,28 (space S12, relief with dice etc), VII 4,27, VII 4,56 (bird relief), IX 1,5 (space S26, tools and phallus), IX 1,13 (space S28, phallus), IX 2,2 (space S21, phallus), IX 2,3 (space S24, stone face), IX 7,2 (space A1, temple relief with phalluses on low structure – counter? – in opening), VII 6,24 (animal relief), VIII ins. occ., 7 (Fiorelli 1875, 440, now destroyed) plus those mentioned in note 69 below. Similar reliefs from Pompeii with phalluses or other symbols of fertility are shown in the National Archaeological Museum in Naples, for instance a phallus from a bakery next to VI 6,1.

68 Several examples are presented in Mielsch 1971.

69 Paint traces on facade reliefs: VII 1,19 (space S25, niche), VII 3,22 (space S17, niche), VII 4,15/16 (relief of wine carriers), VII 4,16/17 (painted Jupiter in niche), IX 2,7 (space S24, stone phallus).

70 Richardson 1988, 369ff.

71 Quatremère de Quincy 1815.

72 Semper 1834.
that Roman sculptures in white marble were painted, either fully or with gold and colours highlighting eyes, hair and clothes, leaving the skin marble white.\(^{73}\) One example of this is the statue of M. Holconius Rufus, placed outdoors in the vicinity of the Holconian tetrarylon in Pompeii.\(^{74}\) It was richly painted, not only the clothes and hair but probably also the skin.\(^{75}\)

As for painting on marble in Roman architecture, I have found very few examples in recent research.\(^{76}\) From this, as well as from discussions with archaeologists and in light of the imitation-marble stucco on, for example, the Casa dei Dioscuri,\(^{77}\) I find it likely that Pompeian marble facades might have had painted details, but that larger marble surfaces were mostly left unpainted to show the exclusive material as such.

### 7.3. The colour of wooden doors and window shutters

The doorways facing the streets had wooden doors. *Fauces* entrances typically had very high doors in pairs, opening inwards with a total width of 150–180 cm, while *taberna* entrances could be closed with large wooden panels, including a small night door that was used when the shop was closed. When the shop was open the panel was probably folded away and not especially prominent, but when shops were closed these panels formed a large part of the street view. There were also wooden window shutters.\(^{78}\)

All these wooden artefacts can possibly have been painted, but there is no evidence to tell if that was the case. Spinazzola has cast copies of a few doors, one of which is a double fauces door with heavy metal ornamentation, but in his reconstruction tabulas he suggests that doors to both *fauci* and *tabernae* were unpainted. However, based on the massive evidence for colourful decoration in interiors and on sculptures, I suggest that doors could have been painted in various ways.

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\(^{73}\) Østergaard 2004. As an alternative, marble of different colours could be used for clothes, complexion etc., as seen on several statues in the National Archaeological Museum in Naples.

\(^{74}\) Between insulae VII 1 and VIII 4.

\(^{75}\) Østergaard 2004, 110. Another Pompeian example is the white statuette of Venus wearing a bikini and sandals painted in gold, now shown in the National Archaeological Museum in Naples (inv. no. 152798).

\(^{76}\) Zink & Piening (2009) present a thorough investigation of the temple of Apollo on the Palatine in Rome built about a century before Pompeii’s destruction. The conclusion is that the columns were of white unpainted marble whereas their capitals were gilded and the entablature was brightly painted. The Ara Pacis in Rome is the subject of a project aimed at reconstructing its colouring and showing it with laser technique. A preview was given in September 2008.

\(^{77}\) VI 9,6. See description in section 9.2.

\(^{78}\) Spinazzola 1953, 80, tab. VIII.
7.4. The colouring of plastered facades

Stuccoed or plastered surfaces can get their colour from the stone, sand and other filling that constitutes the material, or from pigments mixed into the material or from paint applied to the surface. All three varieties seem to have existed in Pompeii. Today’s remnants often show a pinkish plaster on the lower section of the facades. This pink colour comes from crushed bricks and tiles that can have been mixed into the material for several reasons. One reason would be to protect the wall and prevent damages from water and humidity. Crushed brick was often used in such hydraulic plaster, for instance in baths and latrines. Another reason would be that the post-earthquake reconstructions during the town’s last period used material from demolished buildings as plaster filling. Whichever the reason, the pinkish surfaces added to the appearance of the facade and it is likely that they were sometimes left unpainted. As paint always meant an additional cost, it is a good guess that the same would also be true for plaster surfaces of various grey nuances. Both these possibilities can be concluded from the notes made by Spinazzola and in other excavation publications.

Red pigments together with reddish sand have been found in Pompeii stucco fragments analysed as part of a technical/methodological study. There are still many question marks in connection with this: The analysed fragments were taken from a waste dump and thus cannot be traced to any specific place, interior or exterior. Also, we cannot know for certain if the pigments were deliberately put into the stucco or if they just happened to get there when the remnants of a demolished painted wall were crushed and used for filling. Still, this opens for the possibility that the Pompeiians used pigmented stucco as a means to colour surfaces into light nuances of low colour intensity.

For stronger colours and more elaborate decorations, however, paint was the only option. Stucco and plaster were made with a lime binder, and the paint itself was usually based on lime. In interior decorative painting there also existed other types of paint with various organic binders (distemper or tempera paint). There is also the so-called encaustic painting, which uses beeswax as a binder. The techniques and usages for such painting were discussed by the Roman scientist Pliny the Elder, who was killed in the Vesuvius eruption, and they have also been the subject of recent research. I have, however, found nothing that indicates the use of such materials for exterior painting. From this and from my experience of exterior painting in other circumstances, I draw the preliminary conclusion that practically all

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80 Spano 1910, 315; NSc 1879, 46ff. For comments regarding Spinazzola, see Table 1.
81 Surveys in progress at EVTEK Institute of Art and Design, Finland (oral presentation at the Swedish-Finnish Pompeii Seminar, Hanaholmen 2005).
82 The main subject of Freccero 2000 is encaustic painting.
facade painting was done with the comparatively cheap and easily available lime paint/lime wash.

Discussions about decoration technique also start with the interior paintings. The sources available seem to agree that most lime painting was done *al fresco*, that is, on wet stucco. Details could be added afterwards on the dry surface and sometimes with other types of paint (for instance tempera with *gummi arabicum* or egg as a binder). None of this, though, adds much to our understanding of the techniques used under the different circumstances offered by exteriors.

### 7.5. Available pigments for outdoor use

Regarding the use of pigments, one source of knowledge is the remaining documents from the Roman world. Pigments and painting have been discussed by Vitruvius (about 80–20 BC), Pliny the Elder (AD 23–79) and Dioscurides (AD 40–90). These writers are often quoted in more recent literature on pigments. Vitruvius writes about the sources for and the means of extracting natural pigments, the procedure for making synthetic pigments and, to some extent, their relative commonness and price, but he does not write explicitly about their possible outdoor use. Pliny distinguishes between natural and synthetic pigments and also mentions the process of making some of them, including lakes made from white earth boiled together with organic materials in the same way that cloth is dyed. He also presents prices for some of the pigments and distinguishes six brilliant pigments that were so expensive they were separately paid for by the patron, but he does not mention the use of pigments on exteriors.

Another source of knowledge is the remains of surface materials and paint layers found in Pompeii. There are also finds of unused pigments in painters’ workshops as well as painting work in progress, obviously interrupted by the eruption. Even very tiny fragments that do not look like much to the world can reveal a great deal of information when studied under a microscope or analysed with chemical, spectrophotometrical and other technically advanced methods. However, even in this case there is a severe shortage of evidence that can be specifically connected to outdoor painting.

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83 Adam 1994, 220; Strocka 2007, 304; my own observations of Pompeian paintings exhibited in *Antiquarium di Boscoreale* and at the exhibition *Rosso Pompeiano* (Rome 2008) have clearly shown that different techniques and materials could be combined in the same painting.
84 Béarat (1997) compares the writings of Vitruvius and Pliny with analyses of pigments found throughout the Roman world.
85 Vitruvius, 7.7-14.
86 Pliny, NH 35.29-50.
87 Allison 2002; Allison & Sear 2002, 66-86.
88 Augusti (1967) presents archaeological findings from Pompeii and discusses them together with ancient written sources.
From the sources available, I draw the conclusion that both interior decoration and exterior painting were done mainly with earth pigments, that is, inorganic pigments that can be found in nature and used without other preparation than cleaning and grinding. They are cheap and extremely durable, and they are not destroyed by the alkaline lime used as a binder in paint and wash. The most common of these pigments today have names like ochre, terra di Sienna and umber, and they have a colour range of yellow – brown – red. There was also a greenish earth pigment, simply called green earth, which has now gone practically out of use. Black was made from soot or, more exclusively, from burnt ivory, and white was inherent in the lime wash used for exterior painting.

The Pompeiian painters also had access to crushed minerals, such as green malachite – in Latin called chrysocolla – and red cinnabar or vermillion. Pigments were also manufactured through controlled chemical processes. One example of this is the copper-based Pompeian blue or Egyptian blue, a pigment that was rather common in antiquity but for some reason has gone out of use today. Even in interior painting, however, these pigments were generally used only for details or very exclusive premises, and it has been shown that the choice of expensive pigments was not decisive for the appreciation or status of interior paintings.

There were also a few organic pigments like the exclusive red-purple purpurissimum, but due to their costliness and lack of durability they could not have played any role in exterior painting.

Thus, the main colour scale of painted facades was made up of white, grey and black together with the yellow, red and brownish-greenish colours of the earth pigments. The pure earth pigments give colours with somewhat limited chromaticness. To my knowledge, no survey has been done regarding their gamut in lime paint without suspended white particles. Some hints of their possible gamut can be derived, however, from a survey of the colour

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90 For a study of Egyptian blue in Pompeii, see Delamare, Monge & Repoux 2004.
91 Allison (2002) describes and analyses the interior paintings of Casa della Caccia Antica (VII 4,48), which was fully decorated shortly before the town’s destruction. She points out that the paintings were detailed and well made, but that the colours used mainly belonged to a standard repertoire of cheap and easily available pigments. The owner must have had the resources to completely redecorate his home with time-consuming pictures, but colour as such was used to draw attention and show status only in the most prominent room. In Allison & Sear 2002, 66-86, the paintings in this house are further analysed with focus on their motifs, chronology and detailed painting style, suggesting the existence of groupings – “workshops” of painters working together.
92 Barbet, Tuffreau-Libre & Coupry (1999, 78) identify the organic substance alizarin in paint found in a Pompeiian house.
93 Lime as a binder can be used with all its lime content dissolved in water, as in paint for frescoes, or with the addition of dispended, undissolved lime particles that makes the surface more durable and also restricts the gamut of possible colours to those containing some whiteness.
scales of traditional earth pigments in linseed oil paint. The survey shows that ochres and iron oxide pigments can give a chromaticness of maximum NCS $c=55$, that is, visibly about halfway between grey and an imagined colour with maximum intensity (see Figure 5). High intensity for these pigments also goes together with a considerable blackness, which means that strong and clear colours cannot be made from earth pigments. Paints based on such pigments could, however, be made more chromatic through mixture with small quantities of other, more expensive, mineral pigments.

Fig. 5. Nuance variation of traditional red iron oxide pigment in linseed oil paint with different content of white pigment, shown in the colour triangle of the Natural Colour System (NCS). W= white, S=black, C=nuance with maximum chromaticness. Hue variation between Y80R and R, which means a somewhat yellowish red colour. After Fridell Anter & Svedmyr 1996.

8. Case study: the facades of Via dell’Abbondanza

8.1. Presentation and evaluation of the source material

Vittorio Spinazzola’s excavation of Via dell’Abbondanza was done in 1910–1923 but not published until 1953 (Spinazzola 1953). It covers both sides of the street, including the relevant facades of the following insulae:

- Reg I insulae 6, 7, 8, 9, 11, 12 and 13 (Spinazzola calls the three latter Reg II insulae 1, 2 and 3)
- Reg II insulae 1 and 2 (by Spinazzola called Reg II insulae 4 and 5)

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94 Fridell Anter & Svedmyr 1996.
95 For a presentation of the Natural Colour System (NCS) see Hård, Sivik & Tonnquist 1996.
Spinazzola discusses the colours and pictures on facades in chapters VI–X (volume 1, 125–252), including several photos in black and white. Note 225 (p. 634) lists the colours of the lower zones of facades and facade paintings (insegne) and note 226 (p. 635) lists painted or otherwise decorated shop counters. Spinazzola’s work also includes a large number of sketched and/or painted plates, a good 40 of which show facades in a manner that could be relevant for this survey. These plates are of five types:

A  Black and white scale drawings Nos. LXI–LXXX
B  Close-up colour photos of paintings Nos. XI–XII, XIV–XV
C  Colour photos of newly excavated facades Nos. VI, XIII
D  Sketched street perspectives in black and white Nos. LV–LX
E  Sketched and painted colour depictions of facades, both single doorways or houses and longer street sections96 Nos. I–X, XVI, XVIII

Types A, B and C aim at documenting the excavated facades and can be assumed to be the most reliable of the plates. The scale drawings (type A) most often inform about the scale and mark out what in the drawing is found and what is a reconstruction.97 They show the existence of plaster, possible division in different plastered zones, orthostats, pictures and decorations and messages painted onto the facades.

Types D and E aim at illustrating the possible form and colouring of the buildings, based on the evidence of scale drawings and excavation notes. Thus, they involve several elements of speculation, which means that they are less valuable as source material. The black and white perspectives (type D) show possible heights and volumes of buildings and most often suggest a schematic horizontal zoning of facades, in a way that does not always agree with the plaster findings shown in the scale drawings. Plates of type D are regarded as sources only for the question of whether or not the facade was plastered, and thus they add nothing to the information supplied by other sources.

In the painted reconstructions of houses and street sections (type E), there is normally good agreement with the scale drawings (type A) for those parts of the facade that are indicated there as excavated (most often the ground floor). Normally there is also good agreement between the plates and Spinazzola’s published notes on the facades and their colours. Thus, I have con-

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96 Painted by A. Saranica and G. Luciano.
97 “Nel prospetto sono indicate in tratteggio le strutture esistenti, e a pura linea le arti di restituzione”, Spinazzola 1953, tab. XVI and others.
sidered the painted plates (type E) as reliable source material regarding fa-
cade colour and decoration.

The facades described and depicted by Spinazzola still exist along the
street, although in different stages of decay. I have surveyed the plaster and
paintings visible today and compared them with Spinazzola’s descriptions
and plates. Not surprisingly, much of what had been excavated has since
been lost, but there is still much agreement between my notes of the present
condition and Spinazzola’s reports from 80 years earlier. In a few cases I
have, however, found things that were not reported by Spinazzola.98

8.2. Processing
For the analysis of Spinazzola’s facade information, the relevant part of Via
dell’Abbondanza has been divided into eleven convex spaces. See Figure 6.
Table 1 presents Spinazzola’s information about the facades within each of
these convex spaces. For each of them, the doorways on the south side of the
street are presented from west to east, followed by the doorways on the north
side from east to west. For each doorway there is information on which parts
of the Spinazzola material have been used, to enable the reader to judge the
reliability of the information. My own observations are included only when
they add something not already found in Spinazzola, and are then marked
with *. Pictures mentioned by Fröhlich 1991 are also included, and when
they add something to what I found in Spinazzola they are marked with **.

In a few cases I have found a lack of consistency within Spinazzola’s own
material, marked with ?? in the table. In those cases I have used my own
observations for judging how to interpret Spinazzola. See Figures 7 and 8.99

For the different parts of the facade I have used the terminology illus-
trated in Figure 1.

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98 See Table 1, where my findings that do not correspond to Spinazzola’s reports are marked
with *

99 Examples of my analysis when Spinazzola (1953) gives inconsistent or vague information:
Space A5: I 11,1-3 (previously II 1,1-3). Note 225 reports a black lower facade zone to the
right of entrance 1 and at entrance 3. Tab. III shows a red lower zone along all the facade
entrances 1-6. Page 248 shows a black and white photo and reports that the lower zone was
red on both sides of entrance 1. I have found traces of red paint around entrance 2. I prelimi-
narily conclude that the lower facade zone was red and that the note about a black lower zone
refers to some other place. See Figure 7.
Spaces A7 and A8: I 12,3-5 (previously II 2,3-5). The complicated facade has three taberna
entrances. Spinazzola believed that they lead to the same interior unit, an assumption that has
been proved wrong in later excavations. Note 225 reports a red lower facade zone at entrances
3-4, below the large balcony. For entrance 3 note 225 also reports a yellow lower zone with
imitation marble. Tab. V shows a red lower zone under the balcony west of entrance 3, but
this zone changes to yellow marbling some 80 cm west of entrance 3, continuing to entrance
4. The height of the lower zone is about 180 cm all the way, unanimously shown by tabs. V
and LXXVI and the text p. 155. I preliminarily conclude that the lower part of the facade
around entrance 3 and between 3 and 4 was yellow marbled. See Figure 8.
Fig. 6. Convex spaces along part of Via dell’Abbondanza, from west to east.
8.3. Results

The street section excavated by Spinazzola includes about 110 doorways, more or less evenly distributed between the north and the south side. Spinazzola’s texts and plates give some sort of facade information for about 100 of these, that is, around 90%. Sometimes the information tells only that the facade was plastered and whether the plaster was divided into horizontal zones.

All known facades were plastered, except possibly one building that had a tufa stone facade (III 3,1-2). On the majority of known facades (at least 75%), the facade of the ground floor was divided horizontally into two zones, and there is only one house (I 6,4) where it is clear that the plastered facade did not have such a division but instead had light *opus quadratum* on the entire facade.

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**Fig. 7. Spinazzola 1953, tab. III, showing I 11,1-3. See note 99 for discussion.**

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100 House III 3,1-2 (on the north side of *space* A9, Spinazzola 1953, tab. LXVII) has what Spinazzola calls a *samnitian facade*, that is, a wall built from large tufa blocks. My observation *in situ* reveals traces of paint or thin plaster on the tufa stone, which implies that the stone might have been covered by a surface layer.

101 West of entrance IX 11,1 (*space* A2) there is a large street-shrine painting on white ground and no horizontal division, and tab. I in Spinazzola (1953) suggests that the wall on the other side of the entrance also lacked a division. There are also about 26 entrances where no conclusions can be drawn about a possible zone division.

*Boreas 33*
The height of the lower zone varied between 140 and 300 cm over sidewalk level and most often stayed within the interval 150–200 cm, that is, at or slightly above eye level. According to the coloured plates, the upper zone was practically always light in colour. There is only one example (IX 13,4-6, space A5) where the colouring of the upper zone is presented as different, having a chequered pattern in white, red, yellow and green. When something is reported about the upper floor or floors, they are shown as plastered with a light colour.

The lower zone was darker and often also more chromatic. Most often the lower zones were red (about 70% of the facades that are known to have been divided), and the rest of them were yellow, black or what I interpret as unpainted (rustico, cocciopesto, laterizio).

The lower zone could be horizontally divided into orthostats, and sometimes there was also a further horizontal division, creating a plinth zone that could also be divided into orthostats. Orthostats have been shown for about 20% of the facades that are known to have had a zone division, while for several other facades it cannot be established now whether orthostats existed or not.

There are differences in elaboration between lower zones of different colours. All of the black lower zones found are divided into orthostats, which

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102 Heights were taken from Spinazzola’s scale drawings and were sometimes checked in situ. The precision is rather low, with a margin of error of up to 20 cm.
implies that black was used for relatively lavish houses. At one house with a yellow lower zone the yellow is used for imitation marble, a more expensive treatment then painting with a single colour. For red lower zones both an orthostat division and simple unicoloured painting have been found, and their relative commonness cannot be established.

In the upper zone several buildings had paintings of divinities or heroes and there were also a few small sanctuaries with altars and paintings in the lower zone. Such street-shrine paintings tended, however, to be placed not facing the thoroughfare but rather just around the corner to adjoining alleys.

The majority of facades also carried messages, such as election slogans, written with dark paint on the whitish upper facade zone or on white splashes made for this purpose on the darker lower zone.

8.4. Concluding hypothesis

The main hypothesis of this study is that the colour pattern shown in Via dell’Abbondanza is also valid for other Pompeiian streets. This pattern can be summarised as

- The ground floor of the vast majority of facades is plastered and horizontally divided into two zones, the division most often placed 150–200 cm above the sidewalk.
- The lower zone is red for a majority of the facades, but can also be yellow, black or unpainted.
- Black and yellow lower zones tend to be used on more elaborate facades, including orthostats and/or marbling.
- The upper zone is whitish for the vast majority of facades, but patterned upper zones do exist.
- Houses with tufa facades or only exhibiting whitish plaster in opus quadratum are rare but do exist.
- The upper zone can include larger or smaller pictures of deities, heroes and suchlike.
- There are many painted messages on the facades.
- Street-shrine paintings tend to be placed in smaller alleys, near the crossing with a main street.

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103 My joint sources tell about such paintings in ten places on the north side of the street and in four on the south side. Some of them include a pair or a set of several paintings. On the north side they are concentrated to a few blocks (IX 7- IX 11) and the large armatorium in III 3.m. This might be, but is not necessarily, a result of less careful excavations. On the south side the facade pictures are fewer but more evenly distributed.

104 My joint sources tell about two lararium paintings on the north side, both facing the main street (Fröhlich 1991, Kat. F66 and F71) and four directly around the corners of southern alleys (Fröhlich 1991, Kat. F4, F7, F8 and F17).
9. The facades of three chosen reference streets

For the three reference streets I have gathered information about facade colouration from all the available sources. Each axis has been divided into a series of convex spaces, in the same way as in other parts of the project *Pompeii: life in the urban space*.

9.1. Stabiana axis

The facades of the Stabiana axis are presented in Table 2. It shows that information about facade colouration is completely missing for large parts of the street and is usually fragmentary when it does exist. There is colour information for only about half of the convex spaces along the street, and in most instances the existing information does not enable a more specific understanding. The observed facades are of five types:

- Plastered facade horizontally divided 150–200 cm up. Lower zone dark (red, or in some cases possibly another dark colour), upper zone whitish. More than half of the known facades.
- Plastered facade with multicoloured orthostats in lower zone, light upper zone. Less than a quarter of the known facades.
- Plastered facade completely light, unicoloured or imitating masonry with large stones. Less than a quarter of the known facades.
- Visible tufa stone facade that might also have been covered with lime wash or thin plaster. A few of the known facades.
- Possibly a few plastered facades with light lower zone and darker upper zone.

Pictures have been reported on only three facades along the Stabiana axis. The taberna entrance of V 6,1 was flanked by pictures of Mercurius and Bacchus, placed directly above the red lower zone of the facade. A tincture workshop in VII 2,11 had a picture of a man carrying cloths hanging from a stick, an obvious reference to the activity in the workshop. The northern facade of insula V 6, not directly facing the main street, had a large street-shrine painting on white ground. As so few of the facades are presented at

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105 The full series of convex spaces are shown in Weilguni (in this volume), section 4.2.2, fig. 20-21.
106 See spaces S7, S9, S10, S11, S12, S15, S24, S25, S31, S34.
107 See spaces S6, S7, S13, S14.
109 See space S28.
110 See spaces S41 and S43. Note that the only existing evidence for these facades is the cork model in Naples.
111 A large lararium, mentioned earlier, is also documented on the south side of insula XI 2, facing the adjoining street Vicolo di Balbo.
all in the source material, it can be assumed that several paintings of the living street were never documented during excavation.

Inscribed or painted messages were common along the entire axis (in average more than one message per 4 metres).\footnote{Laurence 1996, 98.}

As for the distribution of colour along the Stabiana axis, very little can be said due to the scarcity of source material. There is, however, a gathering of light unicoloured facades (stuccoed or visible tufa stone) along the western side of the axis, near its crossing with Via dell’Abbondanza (spaces S28–S31). Facades of the same type continue along both sides of Via dell’Abbondanza westwards towards the Forum.\footnote{Pirson 1999, 59ff. However, also here there were buildings with a red plastered lower zone, traces of which can still be seen on VIII 4,2-6 (Casa di Diana).} Here, it appears that the light unicoloured facades refer to old and solid tufa buildings that represent wealth and tradition and allude to the neighbouring civic centre, as will be discussed further in section 13.1.

The hypothesis to be tested is that the well-documented use of colour along Via dell’Abbondanza is also valid for other parts of Pompeii. For the Stabiana axis, the available information does not contradict this hypothesis, but is too scarce to give it strong support.

9.2. Mercurio axis

The facades of the Mercurio axis are presented in Table 3.\footnote{The full series of convex spaces are shown in Weilguni (in this volume), section 4.2.3, fig. 22-23.} The table shows that information about facade colouration and possible pictures or messages is completely missing for the section south of the Forum and very scarce for the section directly north of the Forum. For other parts of the axis there is information for at least 50% of the facades, and for a few facades the sources give a more specific picture.

One of these is the large Casa dei Dioscuri (VI 9,6-9) a few blocks north of the Forum. Its facade was depicted by the artist Pasquale Marina Venero in 1843, shortly after its excavation.\footnote{PPM Suppl. 1995, 780f.} See Figure 9. This house is also shown in detail in the cork model in Naples, and it happens to be one of the few that still have a rather intact exterior rendering. All these sources give the same information: the facade of Casa dei Dioscuri is divided into a base zone, about 2 metres high, and an upper zone up to a cornice just under the roof. The base zone was divided into red orthostats with blue borders, and the upper zone consisted of an imitation masonry wall with large rectangular “stones”. The “stones” were white, as if cut from travertine or marble, and the joints between them were marked in low relief and painted blue. The cornice has a leaf relief, as if baked with pastry tins, and was painted with
blue and red on a white background. This facade was made during the last decades before the eruption, but its style is labelled as an imitation of the first style, thus referring to the earlier, republican era.116

Fig. 9. Facade of Casa dei Dioscuri as depicted by P.M. Venero in 1843.

The known facades along the Mercurio axis are of the following types:

- Stuccoed facade horizontally divided 150–200 cm up. Lower zone reddish, upper zone whitish. This feature appears on the columns of Tullius’ Portico one block north of the Forum, on the Forum baths opposite the street and possibly on some other facades.117
- Stuccoed facade with red or blackish orthostats in lower zone, light upper zone, sometimes with ashlar work. The most common type among the documented private houses along this axis.118
- Stuccoed facade completely light, imitating marble orthostats or masonry with large stones (Jupiter temple and possibly one or two private houses).119

116 PPM IV, 862; see Weilguni (in this volume), fig. 39 for a photo of Casa dei Dioscuri in its present state (right side of the picture).
117 See spaces M4, M9-M11.
118 See spaces M1, M2, M3, M4.
Visible tufa stone facade (one private house).\textsuperscript{120}
Marble cladding on arches and buildings for civic and/or religious use.\textsuperscript{121}

Pictures on facades have been reported in only two places along this axis. One was placed next to the main entrance of the Casa dei Dioscuri, discussed above. It depicted Fortuna and Mercurius, a choice of deities that seemingly refers to the owner’s occupation as a successful merchant.\textsuperscript{122} The other building with facade paintings (VI 7,8-11) is situated across the street from Casa dei Dioscuri. Here there was a whole set of paintings showing different deities and a scene interpreted as a religious procession for carpenters.\textsuperscript{123} The taberna inside the painting is not, however, considered to be a carpenter’s workshop, but rather a shop for perfumes or drugs.\textsuperscript{124}

As the facades of the two northern blocks of the axis are rather well documented, it is likely that other pictures would have been reported if they had existed. This leads to the preliminary conclusion that this part of the axis did not have a dense occurrence of pictures. Painted messages, on the other hand, were common on the facades in this part of the axis.\textsuperscript{125}

Where the axis passes the Forum area the facades were mainly of marble, and the Forum also contained many marble statues that would have been at least partly painted in different colours (see section 7.3).

The hypothesis to be tested is that the well-documented use of colour along Via dell’Abbondanza is also valid for other parts of Pompeii. For the private houses along the north part of the Mercurio axis (spaces M1–M5), the available information partly supports the hypothesis and suggests further specification. As in Via dell’Abbondanza, the vast majority of the facades were divided into a darker (usually red) lower zone and a whitish upper zone. But here, in contrast to Via dell’Abbondanza, most of the lower zones were divided into orthostats. On the Via dell’Abbondanza this feature seemed to indicate wealth and/or status, and the hypothesis is now strengthened as Via di Mercurio was a street with many large houses belonging to wealthy families.

The official and/or ritual buildings facing the Forum (spaces M13–M24) show another pattern, with light marble cladding or whitish profiled stucco over the whole facade. This is completely different from what was found in the study of Via dell’Abbondanza.

\textsuperscript{119} See spaces M2, M4, M14-M15ab.
\textsuperscript{120} See space M4.
\textsuperscript{121} See spaces M6, M8, M13, M18, M20, M22.
\textsuperscript{122} Fröhlich 1991, Kat. F39.
\textsuperscript{123} Fröhlich 1991, Kat. F38.
\textsuperscript{124} Eschebach & Müller-Trollius 1993, pl. 78.
\textsuperscript{125} Laurence 1996, 98.
9.3. Fauno axis

The facades of the Fauno axis are presented in Table 4. The table shows that there is very scarce evidence for the colours of the facades along this street. The available information suggests that most of the alley was dominated by whitish facades, but that these were often divided into an upper and a lower zone with different plaster materials. No pictures or messages have been reported on the walls along the Fauno axis. As such features, especially messages, are generally well documented even in early excavation reports, it is likely that the alley had few or no pictures or messages.

The hypothesis to be tested is that the well-documented use of colour along Via dell’Abbondanza is also valid for other parts of Pompeii. The findings on Vicolo del Fauno do not support the hypothesis. Instead they suggest that divided facades with red lower zones were not common on the back sides of large houses, which instead were plastered a unicoloured white.

10. Testing the hypothesis

We now return to the main hypothesis of the study, presented in section 8. According to this hypothesis, the colour pattern shown on Via dell’Abbondanza is also valid for other Pompeian streets. As already discussed, this pattern could be summarised as

- The ground floor of the vast majority of facades is plastered and horizontally divided into two zones, the division most often placed 150–200 cm above the sidewalk.
- The lower zone is red for a majority of the facades, but can also be yellow, black or unpainted.
- Black and yellow lower zones tend to be used on more elaborate facades, including orthostats and/or marbling.
- The upper zone is whitish for the vast majority of facades, but patterned upper zones do exist.
- Houses with tufa facades or exhibiting only whitish plaster in opus quadratum are rare but do exist.
- The upper zone can include large or small pictures of deities, heroes and suchlike.
- There are many painted messages on the facades.

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126 The full series of convex spaces are shown in Weilguni (in this volume), section 4.2.4, fig. 24-25.
127 Laurence (1996, 99) places Vicolo del Fauno in the category with messages occurring less often than every 12 metres, which could also mean that there were no messages at all.
128 The cork model in Naples might show darker lower zones on some facades, but due to the state of the model this has been impossible to control further.
Street-shrine paintings tend to be placed in smaller alleys, near the crossing with a main street. Below, all the evidence gathered for Pompeian facades will be summarised to test this hypothesis.

10.1. Horizontal division

The survey of the reference streets, the model in Naples, and observations of the plaster remaining in Pompeii all clearly show that most facades were plastered and had a horizontal zone division that varied in height among the different houses but most often was 150–200 cm above sidewalk level. Such a division existed even when both zones were left unpainted or simply whitewashed, and in those cases the lower zone protruded slightly more from the facade and could also be made from a different type of plaster.\(^{129}\)

I have found only a few facades that lack this division. They were elaborate, with whitish ashlar work imitating or covering older facades of regularly hewn tufa stone.\(^{130}\)

10.2. The colour of the lower zone

When the lower zone was painted in a single colour it was always red, although the red nuance could differ within the limitations given by available pigments.\(^{131}\) A more elaborate treatment of the lower zone often included orthostats, that is, standing rectangles framed by simple lines or more sophisticated base-relief imitations in different colours. There could also be plinth zones with orthostats of another colouring. The basic colours in these features were red, yellow and black, and other colours were used only for minor surfaces.

A few documented facades were subdivided and decorated according to other schemes than the strict orthostats.\(^{132}\) These facades show some resemblance to the paintings of flowers and foliage that have been found on the walls of private gardens, or that occasionally create an illusion of a garden in a space without real plants and trees.\(^{133}\)

\(^{129}\) For instance, facade of Casa del Fauno towards Vicolo del Fauno, spaces F5-F7 in Table 4.
\(^{130}\) VIII 4,17-21 (see space S30). I 6,4 (see space A1). Own observations in the necropolis outside Porta Nocera and Porta Erconalo and in the newly excavated block just outside Porta Marina (Terme suburbane). In two 19th-century paintings Casa di Pansa (VI 6,1) is shown with stuccoed opus quadratum (painting by F. Duban in École nationale 1981, 233; Gell & Gandy 1827, pl. 44).
\(^{131}\) The model in Naples shows a few facades that possibly could have a white lower zone and a darker upper zone. They are specifically discussed in section 11.2.
\(^{132}\) Two such examples are found in insula VI 10, facing the Mercurio axis. At entrance 7, the red lower zone was decorated with subtle candelabras, plants and stars. At entrance 2 traces of a similar decoration can still be seen, including candelabri vegetali (PPM IV, 1031) and baskets of flowers. See Table 3, space M4 for both.
The horizontal division with a red lower zone was also common on portico and peristyle columns in buildings of various types, facing the street as well as enclosed spaces. The same is true for pilasters framing doorways or in other ways adorning a facade – if the facade had a red lower zone it tended to continue over the pilasters, thus giving them a horizontal division.

10.3. The colour of the upper zone

Above the horizontal division, almost all facades were whitish. The regular occurrence of this feature is confirmed in one of Spano’s excavation reports, where he notes that a facade has “the usual whitish plaster” (solito intonaco bianchiccio) above a high base (zoccolo). My interpretation of Spano’s note is that the facade above the lower zone was most often whitewashed without any subdivisions or decorations.

There are also many examples where the upper zone had whitish ashlar work in stucco. This has been found both when the lower zone was elaborated with multicoloured orthostats and when the lower zone was unicoloured red.

Only a few documented facades had upper zones that were not whitish. Some of them were chequered in different colours. Others were fully covered with paintings showing heroes or gods.

134 Portico of Tullius along the east side of Via del Foro (Mercurio axis), Temple of Apollo VII 7 (Niccolini & Niccolini 1854-1896, vol. 4, suppl. tav. 47) as well as private peristyles in, for instance, VI 16,7 (Zanker 1998, photo p. 171).
135 See, for instance, the entrance pilasters of Casa dei Vettii, VI 15,1.
136 Spano 1910, 378, referring to the south side of insula V 7.
137 Gell 1837, vol. 1, tav. XXXVIII, Casa del Poeta Tragico (VI 8,5). Horizontal division at over 2 m height. Lower zone with orthostats in red, white and yellow. Upper zone light stuccoed ashlar work imitating marble. Casa dei Dioscuri VI 9,6-7, presented above (Mercurio axis).
138 The outer wall around the Isis temple, VIII 7,28, is believed to have been uniformly red up to about 2 m, and above that white opus quadratum. (Recent reconstruction model of Isis temple, shown in the National Archaeological Museum, Naples). Grave monument in the necropolis outside Porta di Nocera depicted in the late 1800s, with red zone up to about 2 m, above that whitish ashlar work (Niccolini & Niccolini 1854-1896, vol. 4, suppl. tav. 47).
139 Spinazzola (1953) shows such a facade at IX 13,4-6 (already discussed). Similar facades have also been found at VI 7,4-6 (facing Vicolo del Fullonica, Spinazzola 1953, 150), IX 5,17 (facing an unnamed street south of Via di Nola, Spinazzola 1953, 150; cork model in Naples) and the newly excavated block just outside Porta Marina (Termel suburbane, own observation). There is also slight evidence that the south end of insula VI 1 (facing Via delle Consolare) could have had such a facade (Gell & Gandy 1827, tav. 27, black and white drawing).
140 See Table 1, spaces A1, A5 and A10.
10.4. Other facade materials than plaster

Facades of tufa stone typically belong to the large and expensive houses of the Hellenized Oscan aristocracy during the second century BC\textsuperscript{141} but are also found on public buildings from the same time, such as the \textit{Termae Stabianae} and the Basilica.\textsuperscript{142} The tufa facades had carefully hewn blocks and elaborate door frames, often with decorated capitals. It is reasonable to assume that at least some of them were originally unplastered,\textsuperscript{143} but they could also have been covered with fine white stucco, alluding to marble.\textsuperscript{144} At the time of Pompeii’s destruction many of the tufa facades had been plastered, sometimes as a necessary means of covering earthquake damages repaired with other material than tufa.\textsuperscript{145} There were, however, a few buildings that can be assumed to have visible tufa facades.\textsuperscript{146}

On the buildings and arches around the Forum there were also a number of marble facades, whereas private houses used marble sparsely and only indoors.\textsuperscript{147} The marble facades will be further discussed in section 11.3.

10.5. Pictures and messages

The occurrence of pictures along Pompeiian streets is very difficult to determine, as many of them are likely to have been lost already during excavation (see section 6.2). The large number of reported pictures on the facades along Via dell’Abbondanza is not matched along the reference streets or anywhere else in Pompeii. Several pictures have, however, also been found along Via di Nola – Fortuna – delle Termi, which just like Via dell’Abbondanza was a thoroughfare leading to a city gate,\textsuperscript{148} and along Via degli Augustali – Soprastanti, a central street with many shops.\textsuperscript{149} The Stabiana axis was a thoroughfare with many shops, especially in its middle section. As the information on facades is very scarce, little can be said about the picture frequency on this thoroughfare, but the evidence from other streets implies that streets of this type had fairly many pictures.

More than half of the pictures reported by Fröhlich faced one of the four streets mentioned above, whereas the others were scattered in different

\begin{itemize}
\item \textsuperscript{141} Zanker 1998, 33f.
\item \textsuperscript{142} Richardson 1988, 96, 100.
\item \textsuperscript{143} Casa della Fontana Grande, VI 8,20-22 (see space M4) has large messages painted directly on the tufa stone.
\item \textsuperscript{144} Pirson 1999, 59; Adam 2007, 100.
\item \textsuperscript{145} E.g. Casa del Fauno (VI 12,2), Casa di Pansa (VI 6,1) and the southern facade of \textit{Termae Stabianae} (VII 1,8).
\item \textsuperscript{146} III 3,1-3 mentioned by Spinazzola (1953) as \textit{fronte sannitico} (tab. LXVII). VI 8,20-22, which in the model in Naples is shown as specifically different from its northern neighbour with stucced ashlar work.
\item \textsuperscript{147} Fant 2007, 340.
\item \textsuperscript{148} Fröhlich 1991, Kat. F20-29, 31, 40, 41, 47.
\item \textsuperscript{149} Fröhlich 1991, Kat. F48-53, 55, 59, 62.
\end{itemize}
places throughout the town. This implies that the dense frequency of pictures was characteristic for the streets with a thoroughfare and/or busy commercial activity and not valid for the rest of the Pompeian streets.

Based on the evidence from Via dell’Abbondanza, I posed the hypothesis that street shrines, and their adjoining paintings including serpents, tended to be placed just around the corner of a thoroughfare rather than facing the main street itself. Fröhlich characterises eleven paintings as street-crossing shrines and another ten as pure serpent pictures. Out of these, three street shrines and four serpent pictures clearly face a minor street, whereas two street shrines and no serpent pictures face the most important street in a crossing. Thus there is slight support for the hypothesis.

The occurrence of messages along different streets has been analysed by Laurence. Messages on facades were frequent along Via dell’Abbondanza, on the entire Stabiana axis and the Mercurio axis north of the Forum, whereas very few messages have been reported along the Fauno axis and the Mercurio axis south of the Forum (Via delle Scuole). For the Fauno axis this pattern is supported by my survey and also by the fact that several other alleys with few doorways have shown no or few messages. For the southern Mercurio axis I find it likely that the proximity to the Forum would lead to more messages and that the lack of reported messages derives from the excavation priorities that noted nothing about the facades. Thus, I conclude that an abundance of messages, as on Via dell’Abbondanza, was characteristic only for certain streets and not valid for all of Pompeii.

11. Colour as a marker of status and function

11.1. Colour and status

The painting and decorating of house interiors was certainly an indicator of the social status and ambitions of the house owners and it can be assumed that also the exteriors were used to exhibit status and wealth. The large houses with rich interior decoration often had elaborate facades with orthostats in the lower zone and sometimes also imitation ashlar work in the upper zone. Several such houses can be seen along the northern part of the Mercurio axis, notably Casa dei Dioscuri (presented above).

The orthostats were often painted to imitate, or allude to, richly coloured marble. The colours used for orthostats were mainly black and red, and as

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151 Laurence 1996, 96-100.
152 Most of the facades facing Via delle Scuole were excavated already in the early 1800s. (Eschebach & Müller-Trollius 1993, 355f., 366-368. Facade information is totally lacking for this street.)
black was not used for unicoloured surfaces the black colour itself became a marker of more costly design.

Sometimes the marbling could be very rough, bearing only vague resemblance to real marble. Such simplified marbling could be yellow and/or red,\(^{154}\) and in other instances black was combined with white or yellow.\(^{155}\) The latter is often referred to as zebra striping, and in interiors it has been considered to be characteristic of servants’ quarters and other less representative parts of a house.\(^ {156}\) This notion has been questioned by Corrado Goulet, who discusses a number of interior finds and also a few exterior ones in contexts that cannot be labelled simple or as used only by servants.\(^ {157}\) Maiuri states that such striping was a favourite theme on the fronts of houses and shops of rustic character in Pompeii and Herculaneum.\(^ {158}\) My survey does not, however, show many examples of this type of marbling on Pompeian facades, and among the few cases is the large Casa di Meleagro (VI 9,2/13) which had splendid interior decorations and which, according to Richardson, was a house designed especially for summer dinner parties.\(^ {159}\) I draw the conclusion that such a decoration on a facade was not a simple feature, but instead demonstrated greater wealth and representation than did a unicoloured red facade.

The few unicoloured white ashlar-work facades and the possibly even fewer facades with visible tufa stone alluded to the traditional aristocracy and their large houses from pre-Roman time, and can thus be considered as markers of prosperity and solidity.\(^ {160}\) The unicoloured red lower zones, on the other hand, were so common that they can hardly have been markers of anything special, and I have found very little evidence that this feature was used for more prestigious buildings.

11.2. Colour and function

Pictures on the facade served as signs for shops and workshops. This was true for the rather common small paintings of Mercurius (protector of commercial activity) or other deities and heroes, and even more so for those paintings that specifically referred to the activities inside the doorway. There have been found paintings of potters, joiners, fullers, carpenters and tincture workers as well as drinking parties and references to specific trades such as

\(^{154}\) Found in Vicolo delle Pareti Rosse, on a large private house later changed into a bakery (VIII 6,3). See photos in *PPM* VIII pp. 685f.

\(^{155}\) IX 5,6.17 as shown in the model in Naples; Casa di Meleagro (VI 9,2).

\(^{156}\) Richardson (1988, 318) calls it a “common utilitarian finish”.

\(^{157}\) Corrado Goulet 2001-2002. She mentions the exteriors of V 4,11 (Casa di Lucretius Fronto) and Casa dell’Ara Laterizia in Herculaneum (III.17).

\(^{158}\) Maiuri 1958, 420-22, 479.

\(^{159}\) Richardson 1988, 322.

\(^{160}\) Zanker 1998, 35 shows a reconstruction of a street in the Hellenized Oscian town of Pompeii, 2nd century BC.
In one surviving instance a taberna opening expresses itself with pictures all around, even above the opening, a feature not reported from anywhere else in Pompeii. Also the often brightly painted façade reliefs discussed in section 7.1 must have served as markers of specific activities, in addition to their function of bringing luck and fertility.

Many shops also announced themselves by the activity itself. During those hours when shops and workshops were open, their activity and goods were clearly visible from the street, and retail sellers were likely to use at least part of the sidewalk for displaying their goods. Many fast food places (popinae and cauponae) and also some other shops had solid counters facing the street, and several of these counters were clad with multicoloured marble pieces or decorated with colourful patterns or pictures.

There is also some evidence that façade colour as such has denoted the function of the space behind the doorway. Some taberna openings were painted red higher up than the usual lower zone, up to or even above the top of the opening. Such tabernas have been found at VI 1,5 (a large hall for serving food and drink, near Porta Ercolano), I 2,19 (a lupanar, caupona and thermopolium) and I 12,1-2 (a pastry bakery and shop with two red benches outside for waiting customers). Although the evidence is very scarce it can be hypothesised that such extra high red wall zones could indicate places connected with food and pleasure.

The cork model in Naples shows a few façades on which the lower zone seems to be light and the upper zone dark, that is, the opposite pattern from all other façades. This applies to I 1,1 and I 1,6-9 at the south end of Via Stabiana, and VI 9,1 at the northernmost end of Via de Mercurio. Two of these places were hospitia, that is, houses where travellers could eat and stay the night, and the third place (I 1,1) was an eating place neighbouring a hos-

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161 See Fröhlich 1991, 351, for the motifs of such paintings.
162 IX 7,1, see space A1 in Table 1. The taberna is believed to be a fuller’s workshop, but as only the façade has been excavated nothing more can be said about its function or size.
163 Realistic or stylised phalluses and divinities with extra large male attributes could serve as bringers of luck, fertility and prosperity in many different situations and should not, as is often done, be interpreted as pornography or advertisements for brothels.
164 Laurence (1996, 125f.) tells that the activity of workshops and shops began early in the morning and that some stayed open until evening, perhaps with a short midday break. Popinae and drinking places opened some hours before noon and could remain open all night. This need not mean that all shops and eating places were open at the same time, but most were probably open during most of the day.
165 Spinazzola (1953, 635, n. 226) presents the decorated counters found along Via dell’Abbondanza. Similar counters have been found, and can still be seen, in many places throughout Pompeii.
166 PPM IV, 4, tav. 1; cork model in Naples.
167 Eschebach & Müller-Trollius 1993, 17; colour seen in cork model in Naples.
168 Eschebach & Müller-Trollius 1993, 62. See Table 1, space A6.
169 See Table 2, spaces S41 and S43.
170 See Table 3, space M1.
Colour in the Pompeian cityscape

pitium with unknown facade colour.\textsuperscript{171} This leads to the tentative hypothesis that this rare colour combination could express the function of a \textit{hospitium}.

11.3. The colour of public buildings

Several of the most elaborate public buildings were veneered with marble. Marble as a facade material was first used at the temple of Fortuna Augusta, built in early Augustean time (around 15 BC).\textsuperscript{172} After that, marble was used for the facades and porticoes of several impressive public buildings facing the Forum, as well as on the large arches erected on its north side and further up the Mercurio axis. All buildings along the east side of the Forum had marble facades,\textsuperscript{173} as did the Comitium\textsuperscript{174} and the three municipal offices at its south end.\textsuperscript{175}

The use of white and multicoloured marble, in combination with light travertine, distinguished the Forum buildings from the rest of the town and was no doubt associated with a wish to adhere to a more Roman life-style, which included the cult of the emperor.\textsuperscript{176} Possibly the prominent marble buildings were brightly painted and had gilded pediments and details, but most of the marble was probably left unpainted.\textsuperscript{177} Marble was also used inside the large theatre, which was rebuilt some 70 years before Pompeii’s destruction, but there is no evidence that it also had a marble facade.\textsuperscript{178}

With regard to private houses, and in most cases also public buildings, marble was too expensive to be used for facades, but stuccoed buildings from the time of Augustus and his successors often assumed features imitating marble and thus a connection with the grandeur of the Roman Empire.\textsuperscript{179} The large palaestra near the amphitheatre was stuccoed light, evidently as an imitation of marble,\textsuperscript{180} and the south and east facades of the Eumachia building, marbled towards the Forum, had elaborate white stucco.\textsuperscript{181} The towers of the city wall are likely to have been plastered light, at least in some cases with some ashlar work, whereas the wall itself would have been at least

\textsuperscript{171} Eschebach & Müller-Trollius 1993, 13, 14, 188.
\textsuperscript{172} Zanker 1998, 82f. The temple is situated one block north of the Forum, facing the Mercurio axis, see \textit{space M8}.
\textsuperscript{173} Dobbins 2007a, 173.
\textsuperscript{174} Richardson 1988, 146.
\textsuperscript{175} Fant 2007, 340.
\textsuperscript{176} Zanker 1998, 101, 117.
\textsuperscript{177} Zink & Piening 2009.
\textsuperscript{178} Richardson 1988, 216 ff.; Zanker 1998, 107f.
\textsuperscript{179} Zanker 1998, 117.
\textsuperscript{180} Zanker 1998, 117. The ancient painting of a fight near the amphitheatre shows the palaestra as light in colour, apparently stuccoed (National Archaeological Museum, Naples, ref. no. 112222).
\textsuperscript{181} Photos in \textit{PPM VII}, 313ff.
partly unplastered, showing yellowish stone.\textsuperscript{182} Also the gates were most certainly plastered, but it cannot be known if they were totally white, as not even the early depictions of them show more than scattered traces of light plaster.\textsuperscript{183}

Thus, it is evident that marble distinguished several public buildings from other buildings, and it also seems that light facades with ashlar works were more common on public than on private buildings. There were, however, also other features. A few public buildings had painted pictures. The armatory, facing Via dell’Abbondanza, had large multicoloured pictures of deities and war trophies above a high red socle,\textsuperscript{184} and the water castellum near Porta de Vesuvio had a picture of a statue painted on the plastered facade, built with a shallow arch motif.\textsuperscript{185}

12. Colour in the streets of Pompeii

The total colour impact of the streets did not, of course, depend only on facades but also on other materials and features along the street. This section discusses those features that were built and relatively static. Their importance should not be overestimated, however, as they would often have been overrun or even hidden by people moving along the street or participating in commercial, ceremonial or other activities. A street shrine or a water fountain could, for example, have been noticed for the people gathering around it rather than for the structure itself.

12.1. Street and sidewalk paving

Most streets were covered with large irregular slabs of dark lava, giving a dark grey colour that would turn almost black in rainfall.\textsuperscript{186} Also stepping stones were most often made from lava, and in street crossings the curb stones of the sidewalk were very often of lava a few metres into every street,

\textsuperscript{182} In a painting by G. Gigante from 1859, Torre XI, at the north end of the Mercurio axis, is clearly shown white plastered (cover picture of Coarelli & Pesando 2006 ). Another 19th-century painting shows Torre XII near Porta Ercolano as light stuccoed with two layers of ashlers at the height of the door top, and below and above them flat light stucco (Gell 1837, vol. 1, tav. LXXXIV). Traces of white ashlar work can still be seen on the top east side of Torre X. Also the sole ancient picture on the wall shows white towers whereas the rest of the wall appears unplastered with large visible stones (National Archaeological Museum, Naples, ref. no. 112222).

\textsuperscript{183} Porta di Ercolano. Gell & Gandy 1827, tav. 27. The cork model in Naples shows the outer facade of Porta di Ercolano light stuccoed with a black lower zone.

\textsuperscript{184} See Table 2, space A10.

\textsuperscript{185} Fröhlich 1991, Kat. F36.

\textsuperscript{186} The materials of Pompeian streets are presented in Gesemann 1996, 55-61.
even when they were otherwise made from various other types of stone. This means that the street was typically dark.

Sidewalks, on the other hand, could be made of various materials. The owner of the building facing a street had the responsibility to maintain its sidewalk, and this resulted in sidewalks that varied along a street. Sometimes they were not paved at all, but offered a mud surface that could vary between light beige and brown depending on wetness. More elaborate sidewalks were covered with pinkish *cocciopesto* or beige-greyish *caementum* mixtures, or showed patterns formed by differently coloured stones or even small marble pieces. A pattern of white dots on a blackish background could act as an easily observed manifestation of a specific house, and could also have the purpose of preventing night walkers from stumbling. In at least one example such white stones were formed into a text outside the entrance.

Borders between units could be marked with stone slabs across the sidewalk, and some entrances had white thresholds that sometimes protruded into the sidewalk with an extra step. Travertine paving could be used to enhance a specific entrance or building. At the Forum, the central surface was covered with large, white, limestone slabs.

### 12.2. Fountains and other features in the street

Fountains for public water distribution were a common feature in Pompeian streets. Typically they were placed in the sidewalk, protruding somewhat into the street and thus allowing passage on all sides. Most of the fountains were built from black lava blocks according to an apparently standardized pattern. They formed right-angular basins about 1 metre high, with water running down from a hole in the somewhat higher back side, which also had a relief of an animal or deity, different for each fountain. A few fountains were instead built from lighter stone, thus drawing special attention.

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187 Own observations. The importance of curbstones for the perceptual structuring of urban space is discussed in Weilguni 2011.
188 Pirson (1999, 65) refers to Lex Iulia Municipalis (*CIL* I, 593) on this matter and discusses how the sidewalk could be used to enhance both the subdivision of the street and the unity between adjoining units with the same owner. The sidewalks of insulae VI 7 and VI 9 facing Via di Mercurio have been restored with unifying pink cocciopesto, but I find it likely that they were originally different, as part of the individual expression of adjoining houses.
189 The sidewalk outside VI 12,2 (Casa del Fauno) shows the greeting HAVE in white stone.
190 The southern entrance of *Terme Stabiane* is marked with a travertine paved sidewalk. The northern sidewalk along the Temple of Fortuna Augusta is made from whitish pebbles.
191 Richardson (1988, 210) argues that the Forum was never paved completely with limestone, whereas Zanker (1998, 104) refers to Maiuri (1942, 27-28) arguing that the whole surface was paved with such stone, probably in the early imperial period. Dobbins (2007a, 173ff.) strongly argues that the Forum in AD 79 was in the process of splendid reconstruction after the earthquake, which implies that the open space was, or at least was intended to be, fully paved with the type of slabs still visible in certain parts.
192 There were 43 fountains. They are presented in Eschebach & Schäfer 1983.
193 One fountain was made of white marble, three of light travertine and three of tufa.

*Boreas* 33
Towers for providing water pressure were placed here and there along the sidewalks, either as freestanding elements or protruding from the facade near a street corner. Today most of them show few remains of rendering, but the building techniques strongly imply that they were originally plastered.\(^{194}\) We cannot know, however, if they had a specific design, if they were all alike or if their appearance varied, perhaps in correspondence with the adjoining facades.

Street shrines were placed here and there in the town, and it can be assumed that they were often, if not always, accompanied by the already discussed paintings on white background and thus clearly visible. In some places near the Forum there were standing slabs of white travertine that blocked wheeled traffic and were visible from afar.\(^{195}\) In and around the Forum there were also marble statues, at least partly painted in a variety of colours and standing on bases exposing light travertine, marble or elaborate stucco.

13. Concluding discussion

13.1. The spatial aspect of colour

What role did colour have in the urban space of Pompeii? The discussion below is based on the knowledge so far obtained and can be seen as a set of hypotheses to be further tested.

A first question regarding the role of colour in urban space is whether it serves as an indication of a regional subdivision into blocks or areas of different character. So far, no findings imply such a division, apart from the apparent difference between the Forum area and the rest of Pompeii. It appears as if streets of very different colour character could cross each other or run at different sides of the same insula. This can be seen as another aspect of Laurence’s conclusion that the land use in Pompeii was a mixture of functional categories, where residential areas were not separated from areas of retailing or production and where no areas were exclusively associated with craft workshops or productive gardens.\(^{196}\)

There may not have been regions of different colour character, but it is very obvious that there were streets of different colour character. Also, as discussed above, the function and status of the street seem to be directly mirrored in its colouring. The colours and materials of buildings, pavements and other features could help an occasional visitor to understand the differ-

\(^{194}\) The tower east of insula VI 14, facing the Stabiana axis, still exhibits traces of plaster on a brick construction (own observation).

\(^{195}\) Weilguni (in this volume), section 6.6.1. and fig. 42.

\(^{196}\) Laurence 1996, 68.
ence between a busy commercial street and the equally busy civic centre, and between a back alley and a pompous street with wealthy private homes.

The Forum was clearly singled out by its multitude of grand buildings clad with light coloured marble or imitation-marble stucco. This colour character also included Via dell’Abbondanza eastwards to Via Stabiana, a street section that offered a striking contrast to the varying forms and colours along the more eastern part of the street. The uniformly light facades included the large Stabian baths and expressed that this street belonged to the civic centre, dominated by large-scale public functions and monuments. In the east the magnificent marble-clad Holconian tetrapylon marked a border against the busy commercial life of Via Stabiana and the eastern part of Via dell’Abbondanza. Also in the adjoining part of Via Stabiana the proximity to the civic centre was visible through the light back side of the bath complex, although that side had only a couple of minor bath entrances.

If colour clearly denoted the status and function of the street, it did not as clearly denote the function of the specific building. Rather, the chosen colours, features and materials seem to be indicators of status and wealth, either public or private such. 197 The Forum area included buildings of different functions (markets, temples, civic functions etc) but all of them have facades of real or imitated marble, and several grand private houses were stuccoed according to the same ideals. Large and impressive facade paintings are found on the armatorium 198 as well as on workshops and private houses, 199 and the entrances to public baths were visually incorporated into the rows of shops and workshops surrounding them. 200

When it comes to a specific building the colouring of both the facade and the sidewalk in front of it often followed construction boundaries, which in many cases coincided with ownership. When they did not coincide, there might be a tendency to let colour express ownership. Pirson shows the example of Casa di Menandro (I 10,4-6) where the ownership and interior spatial unity did not coincide with the original construction units, and where facade decoration mirrored the ownership rather than the construction. 201

Another example where ownership and interior spatial unity were deliberately expressed in the facade is the previously discussed Casa dei Dioscuri

197 Wallace-Hadrill (1994, especially chapter 2) discusses the notions of public and private in the Pompeian context.
198 III 3,6 facing Via dell’Abbondanza (space A10).
199 IX 7,1 and IX 7,5-7 facing Via dell’Abbondanza (space A1). The buildings behind these facades are unexcavated but are assumed to be workshops for dyeing and felting of textiles, as well as one or two private houses.
200 The east facade of the Forum Baths and attached tabernae had a red lower zone, probably over the whole insula (cork model in Naples). The Central Baths were still under construction, but what was finished implies that the bath entrance might be meant to have the same unplastered brick facade as its attached tabernae, thus expressing the whole complex as different from most other buildings. The main side of the Stabian Baths had a light tufa stone facade that made it look very similar to a grand domus with tabernae, Pirson 1999, 146.
201 Pirson 1999, 64.
Towards the main street, Via di Mercurio, the uniform facade decoration united two buildings with separate entrances but internal communication. They were of different ages and had originally been separate, but in AD 79 they were owned and used by the same family. The striving to express unity was not, however, fulfilled in the southern and eastern facades, which faced narrower alleys (Vicolo di Mercurio and Vicolo di Fauno) and lacked representative entrances. The southern facade had an ordinary horizontal division about 10 cm higher than on the main facade, and the eastern facade was even simpler. Also the nearby Casa del Fauno (VI 12,2) had an elaborate main facade and simpler facades towards the side alleys, which indicates that it was not important that a house should express itself uniformly in all directions.

13.2. Methodological evaluation

In this study I have used the convex spaces of the street as the units for analysis. One important reason for this is that the study is part of a larger project analysing several aspects of public urban space. When it comes to colouration as such, these units have not proved to be very adequate. The detailed use of colour is apparently tied to the ownership and/or interior configuration of the buildings, and the spatial subdivisions of the street often do not mirror these factors. On the other hand, the subdivision of streets into smaller units has made it possible to find and analyse differences within each axis.

13.3. Colours along a walk through Pompeii

To conclude this article, some important colour aspects of the cityscape will be presented by showing how they might have been perceived by a pedestrian walking along different streets in the summer of AD 79.

We enter the Sarno Gate in the east and walk along Via dell’Abbondanza. Along the first few blocks we see closed walls on both sides, revealing some greenery on the other side but high enough to hide the gardens and vineyards from further examination. But soon the street changes character, leaving no doubt that this busy thoroughfare is also an important district for crafts and

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202 Weilguni (in this volume).
203 Laurence 1996, 88ff. in his analysis of street activity and public interaction, uses larger units that follow the conventional naming of the streets and that divide the longer streets into two or three roughly equally long sections. This gives some idea of the similarities and differences between different parts of the town, but threatens to obscure possible differences within each street as well as similarities over the border where a street gets another name (e.g. the Mercurio and Stabiana axes discussed in this article and the long axis named Via delle Terme – Via della Fortuna – Via di Nola).
commerce. A large building on our right side exposes enormous paintings – this is the armatorium, a storage place for weapons.

The street is paved with dark grey stone, and every few blocks it is narrowed by a large water fountain, lava black and glittering wet in the strong sunlight. We walk on the raised sidewalk and stay close to the wall, to enjoy the shadow of the roofs, balconies, textile sunshades and protruding upper stories that stretch out at varying heights over our heads. Up to our eye level, or even well above it, the houses on both sides of the street are painted in rather dark colours. This helps to form a perception of a defined street space, enclosed on both sides and stretching towards infinity both backwards and forwards. Each house has its own individual appearance, and yet there is strong unity due to the more or less constant height of the socles and their limited colour scale in above all earth colours.

Above this defined space we can see a stretch of wall, reaching up to a variety of protruding structures hiding the upper parts of the houses. The walls above the coloured base are most often whitish and have small, unevenly placed windows. The street is narrow and we can hardly perceive the full height of the houses, but when we can, they resemble most of all a number of boxes stacked on top of each other. Some houses distinguish themselves with colourful paintings placed high up, or with a regular upper floor with open colonnades.

But most of the lively colours are confined to the base zone, which is largely red but also has other colours, mainly black and yellow. There are lots of large openings into workshops and shops, whose interior colouring becomes part of our view, and now and then we almost stumble over goods displayed on the sidewalks. Beside the shops there are pictures of heroes and deities, or strongly coloured reliefs of phalluses or other things bringing luck. Food shop counters glitter with pieces of coloured marble. In the corners of adjoining alleys white fields draw our attention to small altars, and when we come closer we find that the white background carries painted serpents, plants and deities in contrasting colours. Other white fields seem to be more temporary, painted with messages telling us whom to vote for in the next election. As we are not free male Roman citizens we need not bother much about those…

We cross another street of similar appearance, clearly leading from a city gate in the valley to another gate up the hill. In front of us we now see a large arch-like structure standing across the street on four large pillars. This monument was erected by the wealthy Holconian family, who spared no effort to make it grand and impressive and placed their own marble statues at its foot. The tetrapsylon reminds us that we are now approaching the civic centre of the town. Here the facades are uniformly built and stuccoed in a light colour with recurring regular elements. Also the materials of the street reveal that we are coming close to the centre of power: White travertine slabs mark the entrance of the public baths, and instead of the lava fountains
for public water there is one of white marble. Even the sidewalk is splendid, with a colourful mixture of different stones.

And so we reach the Forum itself, and are stunned by all the whiteness. The square is covered with white stone, and around it there are temples and other official buildings, stuccoed light or covered with marble veneer in different light colours. Luckily there are also colonnades, offering shadow and protecting our eyes from the overwhelming brightness. Walking along them we can admire the host of white marble statues of important people, adorned with painted clothes, hair and facial features. This part of Pompeii wants to mirror the splendour of Rome itself!

We pass under two grand arches, covered with white as well as multicoloured marble and carrying statues of emperors on horseback. And so, we find ourselves in the residential area of the wealthy and powerful. The sidewalk is pink from cocciopesto, or covered with small black stones dotted with white ones. The street is wide, and we can clearly comprehend the grandeur of the houses. Some of them have ancient tufa facades, while others are plastered in imitation of whitish masonry walls with elaborately painted base zones in red, black and yellow. There are few shops and few advertisements. Instead we are offered views through the high open doors of the houses, where we catch glimpses of their interior paintings and gardens. Some treetops can be seen over the high garden walls, and in the forefront is the white tower in the city wall. In the far distance we see the green slopes of Vesuvius, happily unaware of the disaster it will bring to us and our town.
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Tables

The following pages include Tables 1, 2, 3 and 4, showing facade colouration along the studied axes. Each table is divided into a number of sections, where the convex spaces are presented from west to east (Table 1) or from north to south (Tables 2, 3 and 4).

All notes regarding tables are given on this page.

Notes to Table 1. Facade colouration along Via dell’Abbondanza.
Own observations noted only when they add to or contradict Spinazzola’s information.
* Denotes discrepancy between my observations and Spinazzola’s.
** Denotes incongruence between Fröhlich and Spinazzola.
?? Denotes inconsistency within Spinazzola’s material.
For plan of convex spaces, see Figure 6 in section 8.2.

Notes to Table 2. Facade colouration along the Stabiana axis.
For plan of convex spaces, see Weilguni (in this volume), section 4.2.2, fig. 20-21.

Notes to Table 3. Facade colouration along the Mercurio axis.
* The model in Naples shows white plaster on both sides of fauces entrance 18 and red lower zone south of entrance 19. Not reported by any other sources.
** The model in Naples shows dark red plaster around entrances 8 and 9, possibly also 10 and 11. Not reported by any other sources.
*** The model in Naples shows very high lower zone around entrance VI 10,2, contradicted by own observations in situ.
For plan of convex spaces, see Weilguni (in this volume), section 4.2.3, fig. 22-23.

Notes to Table 4. Facade colouration along the Fauno axis.
* For the west side of V 9, the model in Naples shows light plaster, often divided into upper zone and lower zone, on different heights for different parts of the insula, but with no traces of colouring. The locations of different division heights have not been specified.
** For the doorless facades of Casa del Labirinto (spaces F3a and F3b) and Casa del Fauno (spaces F5-F7), the model in Naples shows horizontal division with lighter upper zone and darker lower zone. Today no traces of colour in situ.
For plan of convex spaces, see Weilguni (in this volume), section 4.2.4, fig. 24-25.
Table 1:1. Facade colouration along Via dell’Abbondanza, spaces A1-A3.

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<tr>
<th>Convex space no.</th>
<th>Insula</th>
<th>Unit opening no.</th>
<th>Description of visible facade</th>
<th>Plastered facade</th>
<th>Horizontal division</th>
<th>Lower zone up to (cm)</th>
<th>Orthostats</th>
<th>Lower z. dominant</th>
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<td>A1 I 6</td>
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<td>Plaster red lz, decorated counter</td>
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Table 1:3. Facade colouration along Via dell’Abbondanza, spaces A10-A11.

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Table 2.1: Facade colouration along the Stabiana axis, spaces S1–S12.

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<td>&quot;Fourth style, richly decorated&quot;</td>
<td>Yes</td>
<td>Yes ?</td>
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<td>X</td>
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<td>Red lz, imitation stone uz</td>
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<td>X</td>
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<td>Red</td>
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<td>X</td>
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<td>Plaster divided</td>
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<td></td>
<td>Yes</td>
<td>Red</td>
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<td>X</td>
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<td>E 2</td>
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<td>Yes</td>
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<td>Yes</td>
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Table 2:2. Facade colouration along the Stabiana axis, spaces S13-S22.

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<th>Horizontal division</th>
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<th>Orthostats</th>
<th>Lower z. dominant colour</th>
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<td>300</td>
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Colour in the Pompeian cityscape
Table 2:3. Facade colouration along the Stabiana axis, spaces S23-S31.

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<th>Orthostats</th>
<th>Lower z. dominant colour</th>
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### Table 2.4. Facade colouration along the Stabiana axis, spaces S32-S46.

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<td>No/Yes</td>
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<td>W 24-23 Light plastered, protruding horiz. plint z.</td>
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<td>Yes</td>
<td>Yes</td>
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<td>Yes</td>
<td>Red Light</td>
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<td>Plastered, possibly light lz, dark uz</td>
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<td>Red Light</td>
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<td>Spaces inside gate, not relevant</td>
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Table 3:1. Facade colouration along the Mercurio axis, spaces M1-M4.

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<th>Unit/opening</th>
<th>Description of visible facade</th>
<th>Plastered facade</th>
<th>Horizontal lower division</th>
<th>Lower zone up</th>
<th>Lower orthostats</th>
<th>Upper z. Special feature</th>
<th>Own obs.</th>
<th>Model reproduction</th>
<th>Excav. publ.</th>
<th>Escheb.</th>
<th>Other</th>
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<tr>
<td>West/East</td>
<td>VI 7</td>
<td>W 19</td>
<td>Plastered, divided, red l. z.*</td>
<td>Yes</td>
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<td>Red</td>
<td>Yes</td>
<td>Yes</td>
<td>High</td>
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<td>VI 19</td>
<td>E 2</td>
<td>Plastered, light lz, dark uz</td>
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<td>Light</td>
<td>Yes</td>
<td>Yes</td>
<td>Red</td>
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<td>Yes</td>
<td>High</td>
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<td>Light</td>
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<td>Yes</td>
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<td>E 1</td>
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<td>Light</td>
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Table 3:2. Facade colouration along the Mercurio axis, spaces M5-M15.

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<th>Unit/opening no.</th>
<th>Description of visible facade</th>
<th>Plaster/facade</th>
<th>Horizontal Lower zone; Upper zone</th>
<th>Ortho-stat</th>
<th>Lower z. domino/ni dominant</th>
<th>Special feature</th>
<th>Source: Own Mode</th>
<th>Artistic Ex: excav: publ.</th>
<th>Esche b.</th>
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<td>M5</td>
<td>Vl 8</td>
<td>17-18</td>
<td>Yes</td>
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<td>Vl 10</td>
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<td>Vl 9</td>
<td>E 4-12</td>
<td>Macellum, marble facade</td>
<td>No</td>
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<td>White marble colonnade</td>
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Table 3:3. Facade colouration along the Mercurio axis, spaces M16-M26.

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<th>Unit opening</th>
<th>Description of visible facade</th>
<th>Plastered (Yes/No)</th>
<th>Horizontal division to upper zone</th>
<th>Lower zone upper zone</th>
<th>Orthostats (Yes/No)</th>
<th>Lower z. dominant feature</th>
<th>Upper z. dominant feature</th>
<th>Special feature</th>
<th>Source(s)</th>
<th>Model</th>
<th>Artistic reproduction</th>
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<th>Edshu.</th>
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<td>VII 9</td>
<td>Inside Macellum</td>
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<td>M17a</td>
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<td>Marble colonnade</td>
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<td>M17b</td>
<td>E 3 Outside Imp. cult building, NO FACADES</td>
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<td>M18</td>
<td>VI 9 E 2</td>
<td>Wall to temple Geni. Aug.</td>
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<td>M20</td>
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<td>VIII 2 E</td>
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<td>M26</td>
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<td>Plaster also on tufa</td>
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Table 4. Facade colouration along the Fauno axis, spaces F1-F8.

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<th>Lower z. dominant colour</th>
<th>Special feature</th>
<th>Sources</th>
<th>Model</th>
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