THE GRAIN OF SPACE IN TIME

The spatial/functional inheritance of Amsterdam's centre.

54

Stephen Read
Delft University of Technology

54.1

0 Abstract

The most obvious way that history is embedded in cities is visually through the styles and fabric of its buildings, and the history of a city as a piece of architecture is often considered through a notion of layering — cities seen as townscapes composed of the overlaid fragmentary remains of previous historical states defined by architectural style and period. Another approach would be to see spatial structure as being produced by and conditioning modes of use in historical sequence. In these sequences, the space and its configurational structure related to and modified by one mode forms the inherited circumstances faced by the next. The spatial modification and expansion of the city is conditioned by the interaction between inherited spatial circumstance and contemporary usage and everyday culture. Historical studies and plans are used to trace the spatial/functional legacy written into the spatial layout of the centre of the city of Amsterdam by everyday processes and spatial patternings at the city's beginnings.

Keywords: urban centre, Holland, configuration, history

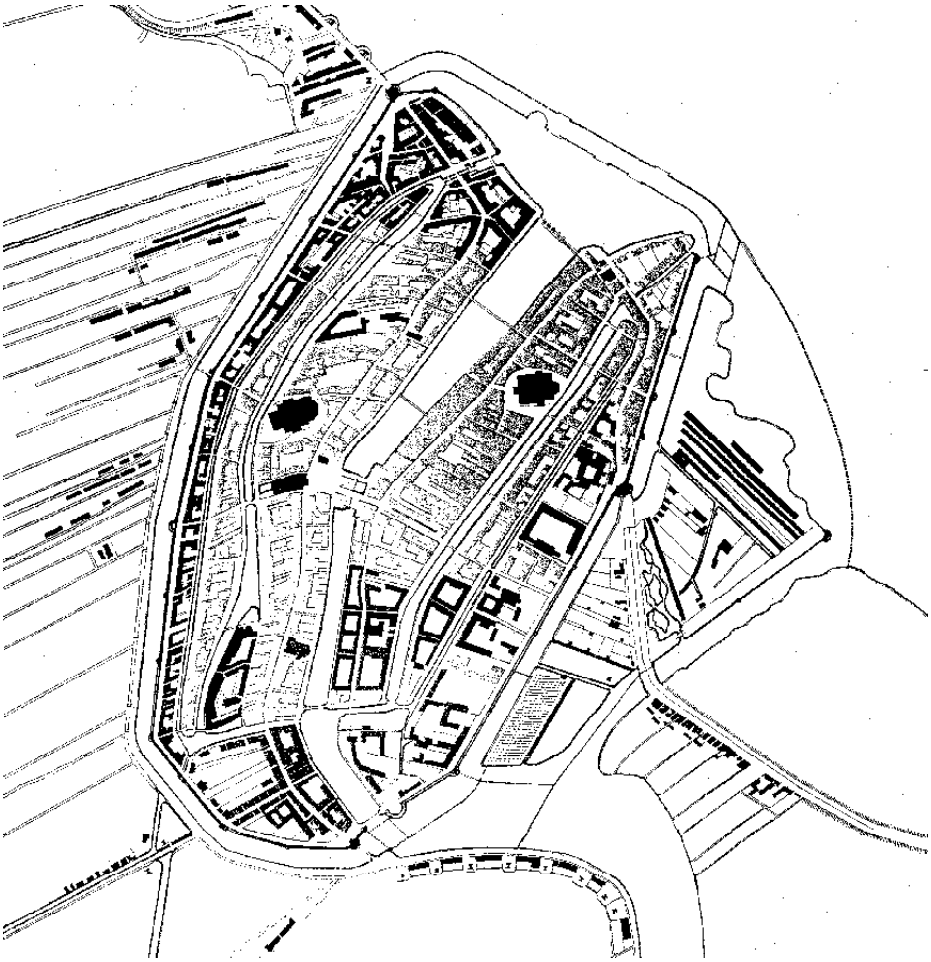
Stephen Read
Valgroep Volkshuisvesting/Stadvernieuwing
Faculteit Bouwkunde
Technische Universiteit Delft
Berlageweg 1, 2628 CR Delft, Netherlands

1 Introduction

The treatment of history as a thing simply of the past, its events neatly set out in chronological sequence and with all its pieces definitively in place presents us with a view of the social and the cultural as the product of processes already ended, a view we can all too easily project on the present making formed wholes out of processes that are forming and formative. Certainly some pagenerating in the compounded system of interrelationships and flows, ever changing social orders, cultural rituals and institutional configurations over time — new social and cultural forms and relationships arising out of parts and hybrids of others. But, it is proposed that spatial structure involves more than a local typological patterning of space and that it may instead be seen as a product of the unique system of relations configured within the pattern of space of the city as a whole — and that while the processes giving rise to social orders and their spatial patternings are diverse and changeable, seen geographically, the systems of relations of which orders are composed seem often to tend to stability, producing structures that are more obviously things of space and place than they are of time. Here the city is a thing of flow and connection, but subtly structured — marked by a ceaseless social and cultural transformation which nevertheless often configures itself in space in a remarkably constant way. The activities and lived cultures of our central cities are different today to the way they were 50 years ago and those of 50 years ago are different to those of 50 years before that — but (and this can sometimes be a big but in the context of modern centres) — given that the spatial pattern is much the same as it was in the previous period, the geometries and hierarchies of the social/spatial patternings found in one period often seem to reflect ones that were there before.

The dynamic relationship between everyday life and spatial patterning and structure is not determining, but rather about potential and opportunity — and that includes the opportunity to use existing structures (with their inbuilt and well known legibility and coherence) in new and creative ways. Social practices are not "determined by built form ... for they have the unfortunate habit of escaping their moorings in any fixed schema of representation. New meanings can be found for older materialisations of space and time. We appropriate ancient spaces in very modern ways, treat time and history as something to create rather than accept" (Harvey, 1989 p. 204). Sennett talks about 'economic space'; "In mediaeval Paris, the flexible use of space appeared in conjunction with the appearance of the corporation, an institution with the right to change its activities in the course of time. Economic time unfolded by following up opportunities, taking advantage of unforeseen events. Economics prompted a conjunction of functional use of space and opportunistic use of time." (Sennett, 1994 p. 188). The location in this conception becomes much more than simply the historical concretions and scenographic surfaces of one point in the space of the city, but also includes the vectors and linkages of connection and movement which are exploited within the economy and culture of the time, and which tie a particular place with the extended collection of other places in the city. Space becomes more about the summing of these many and diverse opportunities for movement and connection through the network of the urban grid and about the emergence of structure from this summation. The attempt here to trace the effect of space and its configuration through time on the life and culture of the city is motivated by more than simple historical curiosity — it is proposed that an historical/spatial perspective is helpful in understanding the potentials and problems around the structuring of the flux of everyday cultural and economic life in the modern centre.

There are, it can be argued, broadly speaking two phases in the growth and development of the geometry and spatial configuration of the centre of Amsterdam. Initially, in an inhospitable and dangerous landscape the inhabitants of Amsterdam looked to the sea for their livelihood — establishing a clear frontage for the growing city right on the water's edge and a back against the surrounding landscape from which little came except by boat along the river. It will be argued that the powerful spatial centrality established at this time was reinforced by the lack of attention given originally to connection to the edge in what was after all a very small settlement whose edge was seen very much as a bulwark against a hostile nature, and included little in the way of substantial land-bound connection with the outside except along the sea dykes to the west and east and the river dykes to the south. With the expansions of the city — first in the 17th century and to a much greater extent in the late 19th and 20th centuries the difficulties of this spatial legacy became apparent as it became necessary to expand the settlement to a scale which required better internal city-scale movement routes, and the inadequacies of linkages between centre and edge of centre became apparent — leading incidentally to a situation and urban functional character today strongly affected by the fact that the centre is relatively disconnected from the fabric which grew around it while being well connected to the regional movement network. This article attempts to trace the emergence of some aspects of the particular functional logic of the spatial network of the very



54.3

Figure 1a. Amsterdam in 1544. After a map drawn by Cornelius Anthoniszoon.

Figure 1b. The centre of Amsterdam today
1:Singel,
2: Nieuwezijdsachterburgwal
3: Nieuwezijdsvoorburgwal
4: Nieuwendijk/Kalverstraat
5: Damrak/Rokin
6: Warmoesstraat/Nes
7: Oudezijdsvoorburgwal
8: Oudezijdsachterburgwal
9: Kloveniersburgwal
10: Damstraat
11: Rozengracht
12: Dam.

centre of Amsterdam before its own internal contradictions became apparent — that is up to the 16th century — and to trace the strongest effects of this spatial legacy on the present day functioning of the city centre (figures 1a and 1b).

2 Space Syntax

An approach to urban spatial analysis which starts from the idea that it is topology, rather than distance, which is the basis of the organisation of movement within the city has been developed at the Unit for Architectural Studies, University College London (see Hillier & Hanson, 1984). 'Space syntax' traces shortest virtual paths through a computer simulation of the spatial grid of a city, the 'axial map', using as its distance variable units of topological rather than metric distance. In other words it measures the length of a path trajectory in terms of the number of corners within that trajectory. Another feature is that it considers the continuous space of the network to be 'partitioned' not at every intersection, as is done with certain other models of urban space at this scale, but only where specific trajectories change direction. The method can be adjusted to consider different scales of trajectory — measured again in terms of the number of corners traversed, from those limited only by the size of the model itself to trajectories that are much shorter — and the structure that emerges varies as the range (considered in numbers of corners) changes. This corresponds with the real experience of moving through cities where different spaces may be used dependent on the length of journey being undertaken. It corresponds also with the experience of dual or even multiple centres within urban areas where different spaces seem to form centres which relate to different scales of the city. The examples are numerous — Tottenham Court Road and Charlotte Street in London, or Ferdinand Bolstraat and Frans Halsstraat, or De Lairessestraat and Johannes Verhulststraat in Amsterdam for example. These examples have very distinct characters which clearly relate to a particular scale of their surroundings — they appear to be woven by movement or the potential for movement into their surroundings at different scales. It is suggested that an idea of 'place' and local centredness dynamically attached to the point of view of the subject moving through it which emerges from this conception of multilayered overlapping scales within the city is one that resonates with the everyday experience of city space far better than a simple bounded 'urban village' idea.

The computer model aggregates all possible trajectories within the scale range decided, and ascribes values to spaces on the basis of their shortest topological distance (number of corners) from all other spaces within the range being considered. This value can also be thought of as an index of the 'shallowness' of spaces with respect to the other spaces within the range being considered and the value derived (after a process of standardisation which allows for the effect of the size of the system on the value) is called that space's index of 'integration'. Integration measured to the limits of the model itself is called 'global integration', and integration measured to a range of 3 corners is called 'local integration'. These integration values have been shown to correlate with observed densities of various sorts of traffic in the equivalent spaces of cities and the basic method has been tested in a number of cities (e.g. Hillier et al, 1987; Hillier et al, 1993; Peponis et al, 1989; Read, 1999) and has been used successfully for some time as an urban design tool, predicting changes in pedestrian flow at the scale of the local design intervention. The model's

predictive capacity suggests something about a principle of space use within the city. In general — and in relation to those spaces immediately around them — it is those spaces which are 'shallower' (in terms of numbers of changes of direction) — or more 'integrated' in relation to the spaces within their connected spatial environment which are best used. It suggests also that there are differential accessibilities within a non-uniform, non homogeneous network of fine-scaled space in the city leading to grain and hierarchy and 'lines of least resistance' through the city's fine-scaled spatial matrix.

3 16th Century Amsterdam

Amsterdam is a product of its surroundings in more ways than one. The first settlers at the mouth of the Amstel scraped an existence from some fishing, herding and farming in an extremely inhospitable environment. The original landscape was marshland, which the early farmers and herders drained in a rudimentary way by criss-crossing it with ditches. Unfortunately as well as the intended consequence of drying the land sufficiently to allow some agriculture, this caused the peat to contract and subside. A concurrent rising of the sea level meant that large parts of the landscape were soon reclaimed by the water — but as large inland lakes and as flooding from the sea. A more integrated and large scale response was required if people were to continue occupying the region — and in the beginning this was to build simple barriers in the form of dykes in front of potential flooding. Dykes were even built behind flooding, whereupon the flooded land could be allowed to dry out and the first reclamations took place. The dam on the Amstel river (pre-dating 1270) was just such a water control measure — preventing surges from the sea from rushing back up the Amstel and flooding over the already constructed river dykes — which included at the mouth of the river on its east side the extended artificial mound that supported the early settlement of Amsterdam. It was already clear by 1300 that the poor land conditions were not going to allow the population of the city to survive by agriculture alone, and fishing, shipping and trading established themselves early on as alternative economic activities. Privileges were granted early on by the regional feudal lord, allowing the occupants of the city to levy taxes on ships passing up the Amstel and trading in the town — as well as setting up a relatively autonomous city government which was able to pass laws and run the new settlement with an eye to the advantage of its inhabitants and especially its traders and shippers, the wealthiest of which soon came to occupy the highest civic posts. Amsterdam's precarious existence depended on the wits and initiative of its inhabitants and rulers and before long they were undercutting the competition and shipping goods for merchants from Antwerp, Bruges and the Hanseatic cities. From here it was a short step to shipping goods for themselves and full-blown competition with the Hanseatic League (Kistemaker & van Gelder, 1982; Kistemaker, 1993).

From the beginning Amsterdam's trader rulers and inhabitants were more interested in commerce and profit than in shows of power, and getting goods ships and people in and out of harbours and markets was more important than ostentatious spatial and symbolic gesture. The term 'organic' however does no justice to the processes of formation and use that played themselves out in the city's early development. Certainly Amsterdam did not grow around a structure established simply by movement routes freely traversing the landscape. Waterways provided surer means

of transportation, boating was second nature to such a water-bound people, and the dykes that contained the waterways became the preferred routes for land-bound travel. Water and water-levels also made a profound impact on the world-view and thinking of the early settlers in a very direct and forceful way. In spite of the measures taken to guard against the sea, flooding occurred with relative frequency in the 15th and 16th centuries and a sense of being barricaded against an unpredictable wilderness must have been a factor — the city walled itself off against not only human raiders, but also against the threat posed by nature (Schama, 1991). The city was the haven, land and water made safe, and later came to include more and more of the surroundings — so that today we talk about a continuously urbanised landscape where all land, even agricultural land, is part of an integrated man-made system designed for human profit and convenience. In the city, geometries were established in the first instance by processes of water containment and management — and the spatial geometries of land-based movement were constrained to a very high degree by dykes, canals, sea and river walls and moats. The crossings and bridges which transected this primary pattern had to establish spatial/configurational relations between places, transforming it from a set of geometries constructed in the first instance for something else into a land-based movement network serving culture and economy. Clearly notions like centre and edge are likely to play a part in establishing a movement network — especially in a settlement dedicated to getting goods and people from outside to locations where trading takes place. In a settlement that quickly expanded after 1200 or so from being located on one bank of the river to spreading itself over two banks, the major point or points of connection between the two banks were likely to be highly significant for an idea of centre as were the locations of the gates likely to be important for defining connection between centre and edge. However the control of water was the primary determinant and the small size of the settlement must have meant that the pressure to optimise this system for land movement, was in the first instance at least not great. The fit between space and culture/economy is clearly relatively loose and people 'make do' very satisfactorily in less than ideal situations. The pressure to hold the sea back and to keep an eye on the economic basics, concentrating everyday attention on the harbour and trading stalls — as well as the lack of a day-to-day administration with an eye to its aristocratic estate — may have contributed to the lack of a vision or image of a larger extended future city. In any event, this city of quays and markets, canals, bridges and harbours, governed by institutions close to its citizens formed a particular civic environment which was to have a formative influence on later state institutions. It formed also a spatial environment whose grain, directionalities and resistances were to play a formative role on the functioning and character of the centre from then right down until the present.

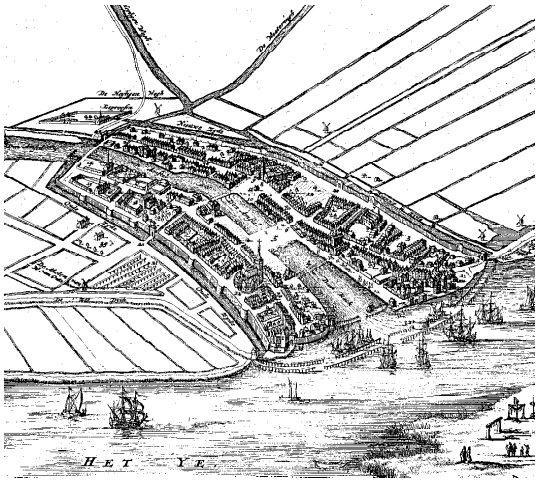
4 Land and Water Geometries and Movement Structure

The shape of the river and the sea-front were generators of the form of the first infrastructural interventions. Besides the dam and the dykes alongside the river, by 1340 two extra waterways (the Oudezijdsvoorburgwal and Nieuwezijdsvoorburgwal) had been built parallel to the river as moats immediately outside the wooden palisades that protected the city from aggressors. These waterways also clearly carried some of the flow of water — the path of which had been partially blocked by the

dam on the Amstel — towards the sea. They may also have allowed some controlled access for ships and boats to the other entrances to the city as well as to the Amstel behind the dam and to the interior waterways of Holland. A map of the early settlement drawn by van Hartoghvelt in the 17th century (figure 2a) from unspecified sources and representing the city sometime in the 14th century, shows the dam to be located significantly further north than its later location at the first elbow in the course of the Amstel. Despite the uncertain provenance of this map, it is plausible in that the dam was in the first instance built purely for water control and before the settlement had grown much beyond the elbow. It also happens to be on a direct route from the gate marked A in figure 2a. It in any event serves to demonstrate the strategic importance of the elbow for the settlement — as a point where the spaces of the Damrak (the outer harbour — see figure 1a) and the Rokin (the inner harbour) intersect. By 1544 this Dam was located at the point of this intersection (figure 3b). In the 14th century the settlement beyond the elbow probably consisted only of relatively peripheral church-related institutions and gardens, and the most structurally important spaces were probably still on the old (east) side. The map indicates that the quay on the new (west) side of the Damrak had not yet been built. The axial map of the settlement at this time shows this spatial structure (figure 2b). By the time of the first reliable map, that of Cornelius Anthoniszoon in 1544 (figure 3a), the settlement had expanded in two clear stages, adding a another onion-like layer of built fabric and a canal at each stage (Oudezijdsachterburgwal and Nieuwezijdsachterburgwal, and the Singel and Kloveniersburgwal). By this date the spatial pattern of the centre of the city had been more or less set — and excepting a few adjustments and interventions survives to the present. It is clear from what is known about activities in the settlement at this time that the waterways that had become interior to the settlement, were used to get goods to market — for example the flower, wood, fruit and hop markets on the Nieuwezijdsvoorburgwal, the butter, cheese and fish markets on the Dam, timber at the bottom end of the Oudezijdsvoorburgwal, and flax and haberdashery on the Kloveniersburgwal (v d Hoeven, 1985). This is besides the boatloads of goods being transported into and out of the attics and cellars of merchants and shippers who's combined houses and workplaces lined the quays and waterways. It seems likely that water traffic added much to the activity in the town as a whole, and activity on the water must have certainly matched or exceeded that on land as far as tonnage was concerned. The picture that emerges of life in 15th and 16th century Amsterdam is in fact of an extended harbour (with its frontages drawn deep into the town itself) with the bustle and noise of loading and unloading and buying and selling — virtually all of it happening on or near the water.

Land-based movement and activity had to adjust itself to the engineering of the canals and quays with its clear geometries perpendicular to the sea-edge and parallel with the river in front of and behind the Dam (figure 3c). There were only two streets in fact parallel to the river (passing through and past the Dam at their midpoints) which were not also quays (the Warmoesstraat/Nes on the east side and the Nieuwendijk/Kalverstraat on the west side). The spatial structure of the town as far as land-based movement was concerned (figure 3b), constrained by the geometries of the extended harbour, looked nothing like the 'deformed wheels' of organic settlements like Apt (Hillier, 1988). In fact a peculiar inversion of a characteristic geo-

54.8



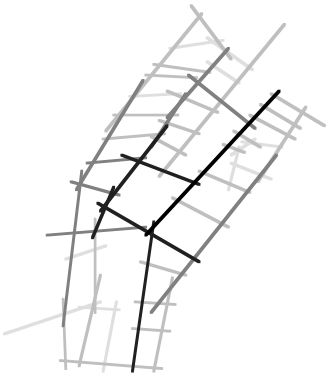
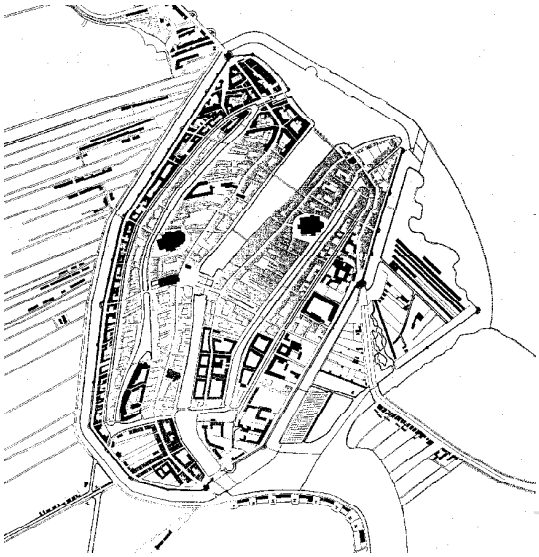


Figure 2a. Amsterdam as it was purported to be around the middle of the 14th century. Drawn by van Hartoghvelt in the 17th century from unspecified sources.



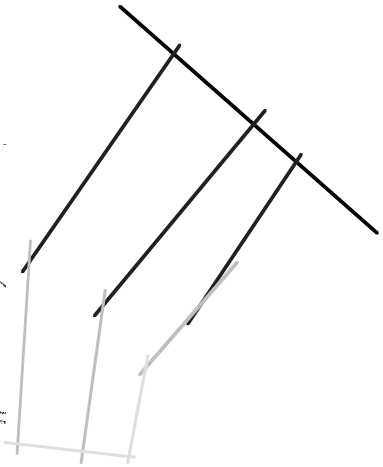
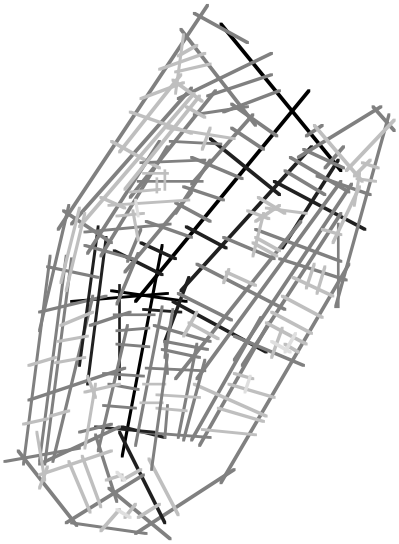


Figure 2b. Axial map (land-based movement) of Amsterdam in the mid 14th century (global integration).

Figure 2c. Axial map (water-based movement) of Amsterdam in the mid 14th century (point depth from sea-front).

Figure 3a. Amsterdam in 1544. After a map drawn by Cornelius Anthoniszoon.



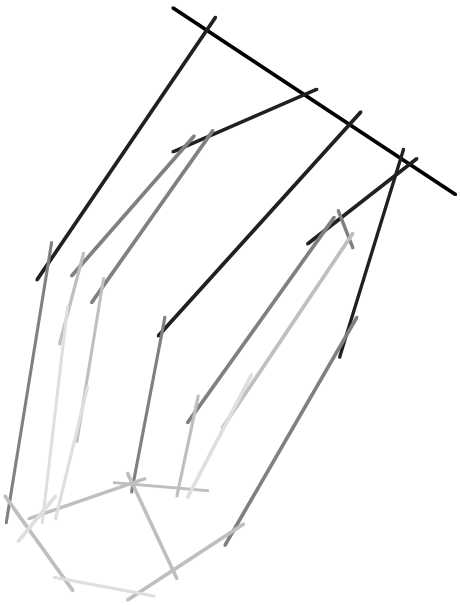


Figure 3b. Axial map (land-based movement) of Amsterdam in 1544 (global integration).

Figure 3c. Axial map (water-based movement) of Amsterdam in 1544 (point depth from sea-front).

metric property of most cities that have grown over time seems to have taken place. It has often been noted (see for example Engels on Manchester; Engels, 1996) that most cities tend to have fast radial routes passing through the periphery, bypassing much of the city's more local activity and incident and going straight to the centre. The examples are many — Edgeware Road, Tottenham Court Road in London; De Lairessestraat, van Woustraat, and Ferdinand Bolstraat in present-day Amsterdam. These radials tend to be direct with long sight-lines and few bends and the spaces in the interstices of these radials in contrast tend to have shorter sightlines and to be less continuous in terms of a consistent directional series connection with other spaces. What we see developing in Amsterdam at this time reverses this basic principle, setting the fast, continuous, long sight-line routes of the city (designed to be direct with respect to water-borne access from the sea front) tangentially with respect to the centre and filling in the radial connections in a make-shift, rather haphazard way. This reversal of a taken-for-granted urban spatial/geometric logic is made still more unusual in that the long straight spaces alongside the quays often end in a rather confused and indeterminate way, reinforcing the argument that they were never intended to be used primarily as movement routes and were instead a set of static work places set out in layers with respect to the harbour on the river and extending the frontage of the harbour and distributing it through the city. These extended harbour frontages are at their closest points all within 350m of the Dam.

The next stage of the development of the centre is still consistent with respect to this general pattern — putting the practicalities and geometries of planning and making an extended harbour above the fine-grained optimisation of a land-based movement system. The rapid increase in the volumes of trading in the early 17th century meant a rapid increase in the numbers of the merchant class, who generally worked, lived and stored their goods in the same building, ideally at the water's edge. The next extension of Amsterdam was intended to accommodate this increase and was formulated along the same principle of direct access by boat to a quay in front of the immediate destination of the goods. The map in figure 4a shows the situation around 1625 with the beginnings of the 17th century ring of canals around the medieval centre. The logic of this arrangement with respect to getting water traffic into the city from the sea-front is obvious (figure 4c), but by now more attention was being paid to the radials which were distributed in a rational manner at regular intervals and directed towards the centre — although anyone using them would still have to negotiate the older layout before reaching the central spaces (figure 4b).

It is this older mediaeval layout that — notwithstanding the strong tangential spaces of the 17th century canal rings — do the most to establish the particular functional characteristics of the very centre of Amsterdam. Within the bounds of the 16th century walls, a geometric pattern based on strong continuous spaces parallel to the river has been established, crossed by a scatter of much more fragmented spaces perpendicular to the river (figures 5a, 5b, and 5c). Even at the Dam itself, these perpendicular spaces never form a continuous sequence which cross from one side of the 16th century city to the other. It was in fact only in the early 20th century that a continuous clear sightline was established up the Damstraat to the Dam itself — but by this time the continuous route from the Dam down the

54.10

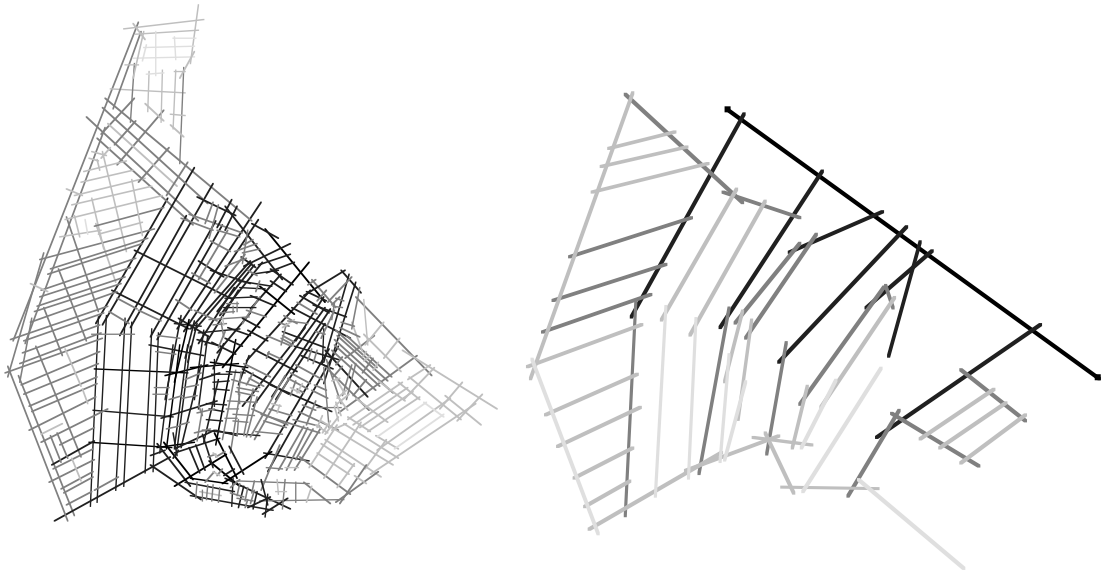


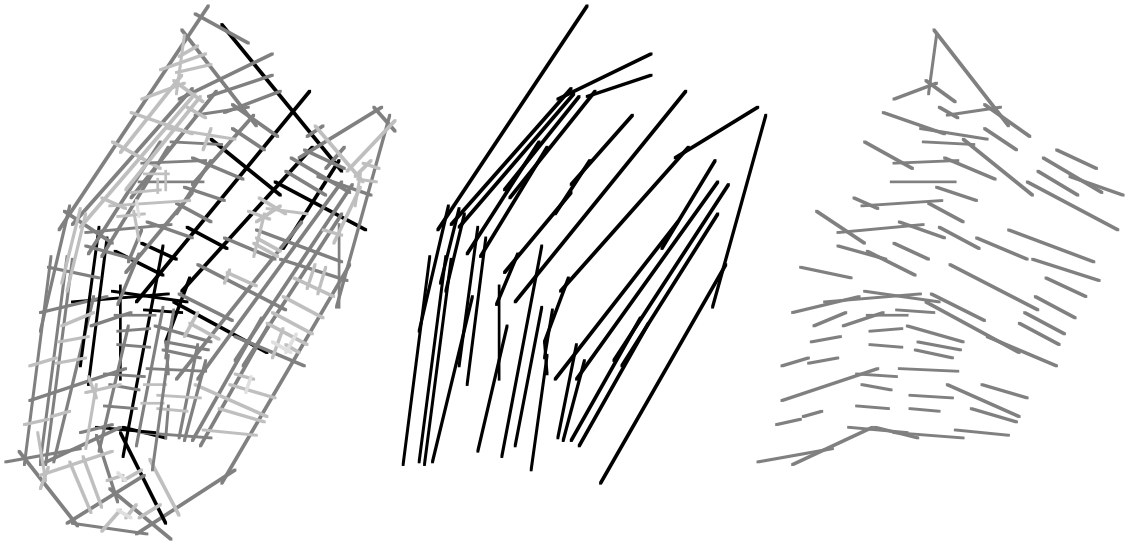
Figure 4a. Amsterdam about 1625. After a map drawn by van Berkenrode.

Figure 4b. Axial map (land-based movement) of Amsterdam about 1625 (global integration).

Figure 4c. Axial map (water-based movement) of Amsterdam about 1625 (point depth from sea-front).

Rozengracht had long been blocked by the building of the much larger new city hall on the Dam in the 17th century.

Comparing the integration measures of the spaces and series of spaces parallel to the river with those perpendicular to the centre illustrates some of the consequences of these grid characteristics for the movement structure of the centre. The sets of spaces that comprise the Singel, the Nieuwezijdsachterburgwal, the Nieuwezijdsvoorburgwal, the Nieuwendijk/Kalverstraat, the Damrak/Rokin, the Warmoesstraat/Nes, the Oudezijdsvoorburgwal, the Oudezijdsachterburgwal and the Kloveniersburgwal in 1544 have each been taken and an average taken for their local and global integration measures. The same was done for the sets of spaces that cross and connect the Singel with the Nieuwezijdsachterburgwal, the Nieuwezijdsachterburgwal with the Nieuwezijdsvoorburgwal, the Nieuwezijdsvoorburgwal with the Nieuwendijk/Kalverstraat and so on. The process was repeated for the equivalent spaces today, and the results are presented as west to east integration profiles in figures 5a to 5d with the averaged integration measures of the spaces parallel to the river represented by the black line graph and the averaged integration measures of the spaces perpendicular to the river represented by the grey line graph. There have been some detailed local changes to the configuration of spaces in the centre between 1544 and the present day but the basic shape



54.11

and geometry remains substantially unchanged. The most significant changes include the infilling of the waterways of the Nieuwezijdsachterburgwal, the Nieuwezijdsvoorburgwal and the Rokin, and some changes to the connections of some of the long routes parallel to the river, especially on the west side, with other spaces which pass over the old boundary of the 16th century city. But by far the most significant change is of course that the spaces which existed in 1544 are supplemented now by a global configuration more than 15 kilometres across, and with many of its major routes focused on the centre — as compared with a highly contained configuration less than a kilometre across in 1544.

Figure 5a. Axial map (land-based movement) of Amsterdam in 1544.

Figure 5b. Land-based movement spaces aligned with the river.

Figure 5c. Land-based movement spaces perpendicular to the river.

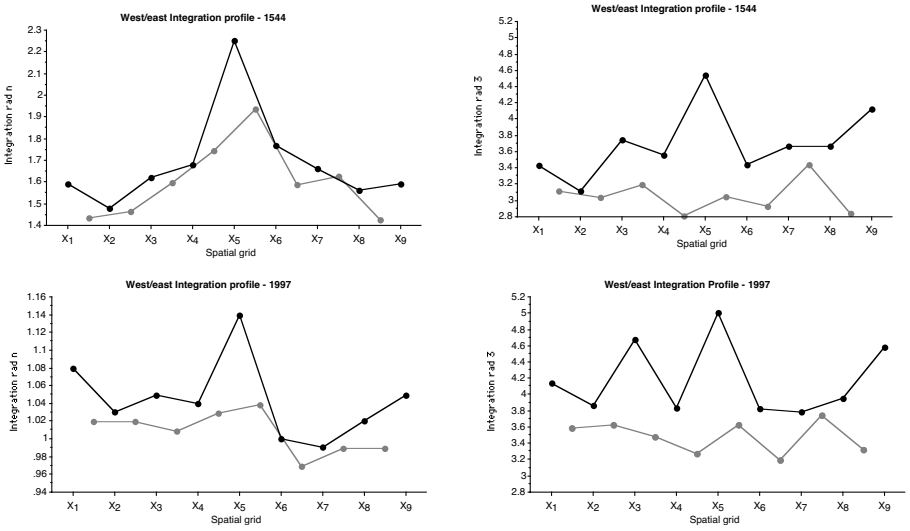


Figure 6a. Profile of global integration measures from west to east in 1544. The black line graph represents the sets of spaces parallel to the river and the grey line graph represents the sets of spaces that cross and connect them.
X1; Singel,
X2; Nieuwezijdsachterburgwal,
X3; Nieuwezijdsvoorburgwal,
X4; Nieuwendijk/Kalverstraat,
X5; Damrak/Rokin,
X6;Warmoesstraat/Nes,
X7; Oudezijdsvoorburgwal,
X8; Oudezijdsachterburgwal,
X9; Kloveniersburgwal.

The west to east global integration profiles for 1544 and the present day both demonstrate the stronger integration properties of the spaces parallel to the river as compared to those that cross and connect them. This effect is more marked now (figure 5b) than it was in 1544 (figure 6a). In the middle of the 16th century the global integration measures of the spaces parallel to the river were probably affected by the fact that they were awkwardly connected to other land-bound movement routes. By the end of the 20th century the Nieuwezijdsvoorburgwal had been filled in, linked to important city-scale routes, and appropriated as a major public transport and car route leading to the Central Station and the traffic connectors in

Figure 6b. Profile of global integration measures from west to east in 1997.

Figure 6c. Profile of local integration measures from west to east in 1544.

Figure 6d. Profile of local integration measures from west to east in 1997.

front of and behind the station. The Nieuwezijdsachterburgwal (renamed Spuistraat) had also been filled in and achieved a similar connecting function but with less traffic. Besides these two streets, the Singel and Kloveniersburgwal also played a new connecting role in line with the changed significance of the centre due to its relationship with a much larger configuration. The Damrak and Rokin remained the major spaces in the centre, and were now the chief connecting spaces between the station and the city to the south while the west to east connections were still fragmented and discontinuous. These changes are reflected in the black line graph in figure 6b — and the increase in the gap between the graphs representing the spaces parallel to the river and those perpendicular to the river reflect the more marked north-south directionality of processes of movement in the centre.

These effects are even more apparent in the west to east local integration profiles for 1544 and the present day (figures 6c and 6d) where the difference in integration values between north-south and west-east spaces is very marked. Here the big increase in the integration value of the Nieuwezijdsachterburgwal reflects its new role as a traffic artery. The relatively low integration values of the Warmoesstraat/Nes, the Oudezijdsvoorburgwal and the Oudezijdsachterburgwal reflect also the relative segregation of the 'Walletjes' red-light district area — a little urban backwater, which if it was not so close to all the city and regional connectors and transport terminals would surely have been an urban residential area.

5 Conclusion

The geometry, connections between and disposition of the elements of the city and the patterns formed by processes of economic activity and lived culture in late mediaeval Amsterdam formed a reflexive mutually interacting unity. The processes of the modern city centre are vastly different to those of 1544 but sufficient of the shape and underlying spatial/configurational structure of the 16th century city remains for there to be a substantial connection in terms of shape and pattern of process and activity across four and a half centuries. The key to this connection across time is the way that the shape of the urban spatial grid is an element of and a structuring force on the activity it supports. Social processes occur in space and are constrained by the concrete spatial context with its particular possibilities of connection and interaction, by the way that spaces connect in an extended system of relations with other spaces, and by the particular permeabilities, directionalities and resistances that are a product of this system. The material and social conditions affecting the first occupants of the site of the centre of Amsterdam and the first key interventions they made in the landscape have conditioned the growth, shape and activity of the city from then to the present day.

The centre of Amsterdam presents particular problems and opportunities which are to a substantial degree the result of this spatial context — and the opportunities for making changes and interventions in the detailed patterns of activities which play themselves out there are also substantially constrained by this inherited context. In the light of this view of context, it becomes easier to understand the particular patterns of connection of the centre with the rest of the city, as well as the spatial logic of activities within the centre and their patterns and locations. The particular structure of spatial connection with the rest of the city is a clear result of inherited

spatial permeabilities and especially resistances. By far the strongest city-scale connections from the centre are to the south — with the grain of the early spatial development. Connection to the west and east — especially to the west — is much weaker, and where it is strongest it still follows the directionalities of the old sea dykes. The spatial grain of the city as a whole has been affected so profoundly that west-east connection at the scale of the whole city tends to pass to the south of the old centre. A topical consequence of these grain effects is that, with the development of a new business area on the southern edge of the city, the districts immediately to the south of the centre are benefiting from being at the point where these two bands of spatial permeability — that from the centre south to the new business zone, and that from west to east — cross.

Within the centre, the red-light district occupies the largest area which is not dominated by a particular directionality. This relatively segregated, relatively marginal urban backwater is at one and the same time out of direct sight of the 'respectable' city of shoppers and business people, and highly strategically located and accessible with respect to the station and city and regional movement routes — and is highly accessible as an attraction to the hoards of tourists who descend on Amsterdam each summer. The patterns of shopping in the centre also locate themselves in those inherited spaces which offer them the best opportunities. Here the distribution of shopping activity reflects one aspect of a pattern of activity in the 16th century, where some of the activity of the main harbour along the Damrak was delegated to the extended harbour system set out in a system of layers parallel to the Damrak. The Damrak/Rokin is by far the most integrated series of spaces in the central city, but does not have the capacity to accommodate all the shopping. The main system of shopping is layered towards the west of the Damrak, the first layer (the Nieuwendijk/Kalverstraat) being the most intensely used. The Nieuwendijk/Kalverstraat, though much less integrated than the Damrak/Rokin, is at the same time highly accessible from it and forms a shopping and moving system in combination with it. Several other spaces also are a part of this shopping system whose spatial/functional logic connects it through time to the noise and bustle of a long forgotten 16th century harbour.

6 References

Engels F, 1845 "The great towns" Reprinted in LeGates R and Stout F (eds) 1996 The city reader (Routledge, London)

Harvey D, 1989 The condition of postmodernity (Blackwell, Oxford)

Hillier B, Hanson J, 1984 The social logic of space (Cambridge University Press, Cambridge)

Hillier B, Burdett R, Peponis J, Penn A, 1987 "Creating life: or, does architecture determine anything?", in; Architecture and Behaviour, vol 3, no 3 (Editions de la Tour)

Hillier B, 1988 "Against enclosure" in; Teymur N, Markus TA, Wooley T (eds) Rehumanising housing (Butterworth, Oxford)

Hillier B, Penn A, Hanson J, Grajewski T, J Xu, 1993 "Natural movement: or, configuration and attraction in urban pedestrian movement", in; Environment and Planning B, Planning and Design, vol. 20 (Pion)

Hoeven C van der, Louwe J, 1985 Amsterdam als stedelijk bouwwerk: een morfologiese analyse (SUN, Nijmegen)

Israel J, 1995 The Dutch republic: its rise, greatness, and fall, 1477-1806 (Oxford University Press, Oxford)

Kistemaker R, Gelder R van, 1982 Amsterdam: the golden age, 1275-1795 (Abbeville Press, New York)

Kistemaker R, 1993 "Amsterdam 1300-1700: van 'geringhe vissers' naar 'kleyne wereldt'" in; Taverne E, Visser I (eds) Stedebouw: de geschiedenis van de stad in de Nederlanden van 1500 tot heden (SUN, Nijmegen) pp. 78-92

Meischke WA, (ed), Zo groeide Amsterdam 1275-1975 (Cloeck en Moedingh, Amsterdam)
Peponis J, Hadjinikolaou E, Livieratos C, Fatouros DA, 1989 "The spatial core of urban culture", in; Ekistics, vol 56, no 334/5
Price JL, 1998 The Dutch republic in the seventeenth century (St Martin's Press, New York)
Read S, 1999 "Space syntax and the Dutch city", in; Environment and Planning B, Planning and Design, vol. 26 (Pion)
Schama S, 1991 The embarrassment of riches: an interpretation of Dutch culture in the golden age (Fontana Press, London)
Sennett R, 1994 Flesh and stone (Norton, New York)
Taverne E, Visser I, (eds), 1993 Stedebouw: de geschiedenis van de stad in de Nederlanden van 1500 tot heden (SUN, Nijmegen)