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Title: The Manhattan row house as an exemplar of urban adaptability: 1874-2011
(Theme: 1. Innovation in building typology)

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1. Introduction

This paper discusses the flexibility of the row house typology following transformations of this building type which occurred throughout Manhattan’s urbanisation process. Changes in the internal structure of the basic unit will be considered, but it is the intention of this discussion to raise furthermore another aspect of this building type’s urban adaptability: its relation to the streetscape and the corresponding local socio-spatial relationships.

Bill Hillier (1989) has suggested that, while historical processes have an effect on the morphological process of urban grid growth, the latter is 'lawful in itself' and leads to the morphological regularities of spatial systems. Accordingly, this paper examines whether the same applies to the morphological and constitutive properties of the organisation of built form and in relation to the street domain. To understand, namely, the relations between individual buildings, lots, entrances, and the type of urban blocks structured by their aggregation in reference to the synthesised streetscape.

When considering the formative conditions of the streetscape, the block scale becomes rather significant (Firley, 2009; Marshall, 2009; Panerai et al., 2004): the urban block can be considered as a fundamental unit, constituted by sub-units/buildings. At the block scale the properties of individual units are aggregated to form an associative intermediary between the building and the city scale. Hillier (1989 p. 9) notes: ‘… the more urban type of order found in these towns, arises to a considerable extent, from the transformation of the urban block – that is, the rules of aggregation are assigned to the block rather than the individual building’.

This discussion extends beyond the building unit of the row house per se. Rather it considers the rules of aggregation of Manhattan’s row housing schemes, relating the unit to the whole row and looking at relations of proximity, functional constitution and architectural rhythm while taking into account two parameters: the way the building lot relates to the block and street configuration, as well as the way the built form (and mainly the façades) relate to the streetscape.

It will be argued that the row house has allowed for socio-spatial emergence and heterogeneity over time, productvely supporting and organising diversity patterns and conflicting land uses – which are considered as indispensible ingredients of urbanity (Hanson & Hillier, 1987). The row house typology, not only as a unit but moreover as an aggregated complex of urban form, seems to have absorbed historic changes and appropriated them in its built form in an innovative way; and a living proof of this is in places like West Village, Manhattan which have managed to maintain liveability as a constitutive part of everyday living.

2. The persistence of the type

The eighteenth century New York row houses started as mixed-use dwellings, combining residence and workspace. It was in the early years of nineteenth century that single-family row housing started to fill in neighbourhoods like Tribeca, Soho and Greenwich Village (Dolkart, 2009 p. 9). At that time, Manhattan faced a pressing need for housing the population
influx that was drawn to the city by the development and prosperity of the domestic and foreign trade (Lockwood, 1972 p. 6). The city's continuously increasing densities and land values increased tendencies towards maximum land exploitation, allowing for the party-wall row house to become the most popular type of dwelling. Early row houses were usually built on 25-feet-wide lots, a width size that decreased gradually over time to 20-feet, 18-feet, 14-feet and even 12½-feet-wide lots (ibid. p. 143). The established building depth of the time was thirty-five to forty feet. Despite being fitted in such minimum dimensions and facing light and ventilation restrictions due to the building adjacencies, the row house presented an efficient form of spatial organisation.

A typical row house floor plan (Figure 1) was organised in two zones: a narrow circulation zone that included the stairs and the hall, and the zone of the aligned front and rear rooms (Lockwood, 1972 p.16; Davis, 2006 p. 151; Dolkart, 2009 p. 31). This narrow-wide functional zoning was also imprinted in the building façade, with the door being located at either side of a trilateral horizontal window organisation. Whilst informed by the English terraced-house form, the row house had Dutch influences on its morphology: the building entrance was elevated from the ground level and accessed through a set of steps, called the stoop. In the Dutch buildings, the elevation of the ground floor served to protect the interior from the floods (Lockwood, 1972 p. 10). In the case of New York, the elevation was adapted with a slight increase in height, so as to provide natural light and ventilation to the basement's front room. In this way, the lot was fully exploited to include the basement as part of the family's residence (Dolkart, 2009 p. 16).

These nineteenth century row houses were initially intended for single-family use. Asides from the separation of circulation and occupancy spaces in two zones, living activities were also ordered by function. The family's informal daily activities (dining room, kitchen) were located in the basement. The more formal activities, like the front parlour, were placed in the elevated ground floor and accessed via the ascending stoop (the formal dwelling entrance). Lastly, the upper floors were reserved for bedrooms. In general, the main rooms of the house faced the street, keeping a visual connection between private and public life. (Lockwood, 1972 pp. 14-19; Dolkart, 2009 p. 31)

From the 1830s onwards, commercial activities started to move northwards, invading the residential neighbourhoods of single-family row houses. By the 1860s many of the affluent residents had moved to the northern parts of Manhattan away from the emerging commercial district, while leaving room for the poorest to move into formerly prosperous neighbourhoods such as Greenwich Village, Gramercy Park, Chelsea, Turtle Bay and the East Side. At the same time, these areas started to become popular for young professionals seeking proximity to their jobs and the city centre and in search for cheap rents. In addition, the row house started to lose its middle and upper class residents because of its increasingly being viewed as being technologically and stylishly timeworn.

3. The flexible floor plan

These constant social changes and urban migrations revealed the need for flexible housing design and for appropriations that would satisfy the continuously shifting modes of urban living within the city of New York. The row house typology responded to this challenge with transformations that addressed many levels: the building use, the new densities, the floor plan, the building façade, the new building codes, the cost of refurbishment and the needs of both new households (single living, work-live spaces etc.) as well as old-fashioned ones (middle and upper classes). Dolkart has shown how in the early years of twentieth century, single-family row houses were transformed into multi-dwellings, into apartment studios for young professionals and artists, as well as into mixed-use buildings with stores on the basement, providing solutions to the various demands of the housing market. Howard Davis points out that even the tenement building originates from the row house typology (Davis, 2006 pp. 151-153). The author explains that in the case of the row house ‘the building culture allowed these transformations to take place’. Davis proceeds in arguing that ‘tradition and innovation are not contradictory but complementary concepts’ with one being the either side of the other.
Figure 1 shows the transformation of the row house from single- to multi-occupancy. Space syntax analysis of the floor plan in Depthmap software (see Turner, 2001) reveals aspects of a flexible spatial layout. Spaces are organised based on axes of symmetry. This enhanced the adaptability of the configuration to changeable domestic needs: symmetrical distribution of integration values indicates the equal handling of units in the front and rear of the house, therefore their functional purpose was interchangeable over time. The main staircase and corridor remains in all versions the integration core (red) of the plan, providing access to symmetrically integrated rooms - and consequently to (up to four) symmetrically organised residential units – per floor.

Figure 1. A typical single-family New York row house and its floor plan alterations towards multi-occupancy.
4. Cross-scales organisational consistencies: the plan, the façade, the lot, the block

The Commissioners’ plan of 1807-11 established an underlying template of regularity for the development of the Manhattan street pattern and plot configuration. This worked across scales: the shape of Manhattan Island, the blocks’ orientation, the long established trade routes and connections to the harbour, as well as important historic arteries of the grid (like Broadway), were all taken into account for the layout of the city grid. But the provision of the Commissioners exceeded beyond the gridiron plan: the subdivision of the block islands in lots was also subordinate to a pattern of fixed dimensions (both in width and depth), which organised the land - and respectively the built volume - in a unified way.

One contributing parameter to this systematic organisation of built form was the fact that in the early nineteenth century very few houses were built for a particular family and its specifications. The professional builder usually erected rows of at least three or four houses on speculation and, as time went on, was responsible for a greater and greater portion of the city’s row houses’ (Lockwood, 1972 pp. 26-27). These craftsmen followed a ‘routine’, a standard and well-understood ‘type’ in the building process, both in terms of design and of construction. Considering the dual zoning of the row house floor plan (based respectively on a trilateral zoning of the lot’s width), it can then be understood that regularity based on a given template was a planning characteristic that stretched across all constitutive parts of the Commissioners’ Manhattan; from the city grid, the block and lot configuration and up to the building scale. The configurational properties of the two-dimensional organisation of the urban units were also imprinted in the morphological characteristics of the built form (Figure 2). Doorways, stoops and the identical window treatment - along with the approximate lot sizes - strengthened the presence of an organisational rhythm in New York’s residential streetscape of row houses.

Figure 2. Perry St. West Village, Cross-scales consistencies and the rhythm of the streetscape: the regularity of blocks, lots, façades. (The historic footprint is marked with red to highlight transformations)
In the later years of building development in Manhattan this architectural consistency was lost. By the early decades of the twentieth century apartment buildings, tenements, commercial-residential buildings and single-family residences were all brought together as part of the same street vista. The architectural practice and the land and building industries had by then started to take a lead in the building market, providing building solutions to particularised functional and cost requirements. Moreover, industrialisation and specialisation in construction allowed for richness in building materials and techniques and - consequently - in architectural styles. Diversity became a formative force of the urban scenery in downtown neighbourhoods of New York and the need grew for row houses to adjust to multiple new morphological and functional particularities.

The next section shows how the organisational principles of the historic row house blocks operated in the case of the Village as a guide, as an organising template for the transformations of the typology. It is argued that the implicit rhythm assembled in a unified system the newly introduced inside-outside relationships and complex socio-spatial relations of proximity, allowing consequently for diversity without losing organisational consistency (nor necessarily morphological unity).

5. West Village: embedded diversity

At the turn of the twentieth century, West Village faced the pressure of changes occurring across the city. Up to this point two factors enabled the preservation of a substantial part of the historic row houses in the area. Firstly, the deviation of the Village's historic street pattern from the Commissioners' plan (via an angular shift from the north-south alignment) created a bulwark against the more intense citywide north-to-south urban flows. Secondly, the predominance of single-family ownership of row houses prevented their demolition for new developments. This substantiated the Landmarks Preservation Commission arguments for declaring the blocks with a remaining strong presence of row housing as parts of a Historic District. Consequently, when the extension of highly integrated streets (Seventh Avenue in 1914 and Sixth in 1918) and the subway construction significantly increased the neighborhood’s centrality, the subsequent higher densities and mixed land uses were inserted via a piecemeal transformation of individual buildings rather than mass redevelopment projects that took place elsewhere in the city. (For a more detailed analysis of the area’s historic transformations see: Palaiologou & Vaughan, 2012)

By 1961, the land zoning in the area had changed to include commercial and mixed uses alongside the more residential parts. Row houses were called to adapt to a variety of requirements in response to different types of transformations depending on their location within the Village. Space syntax studies have shown that the functional distribution of uses throughout the urban grid is dependant on the syntactic (space syntax) properties of the configuration of the street layout and the generated over time ‘multiplier effect’. Accordingly, analysis shows that row houses with non-residential uses are gathered in street segments (block frontages) presenting high syntactical values in integration and choice measures; namely presenting higher chances to attract pedestrian movement flows and generate phenomena of co-presence. These segments are either on the north-south citywide route connections or one turning away for them. On the other hand, for most of the interstices of the Village grid, residential uses predominate.

In each case historic transformations have imprinted on the façade of these buildings. When a commercial use is introduced in the building, the façade of the row house opens up to the street with large glass windows and direct entrances. For well-connected locations in the grid, row houses are found to squeeze up to three door entrances within the façade width in order to comply with the trilateral organisation of the façade: two ground floor commercial entrances and one residential entrance leading in the upper floors. For the less busy street parts, stores were embedded in the building layout, but tended to form part of the basement. In this case, stoops were not necessarily removed. The store was accessed through a descending staircase, while the elevated stoop entrance led to the upper residential parts of the building.
On the other hand, conversions of single-family row houses to multi-dwellings tended to involve stoop removal; besides this change, internal shifts in the floor plan were not made obvious in the building frontage due to the flexible underlying synthetic principles of the unit (both in plan and façade organisation). In general, in all cases the new inside-outside relations were architectural appropriations 'fitted to the case', giving an essence of informality and openness to the emerging neighbourhood’s socio-spatial morphological rules. On the whole, the pre-existing organisational logic in the historic built form aggregated these individual transformations within a unified and co-operative spatial system, creating rich and diverse street views.

Figure 3 illustrates the morphological diversity and frequency of entrances per row house, depending on the location of the building in the city grid: direct entrances appear denser and are gathered in street segments with high potentials for pedestrian flows (namely, high syntactical values) and citywide connections. The remaining historic ascending and descending stoops are located in the less busy street parts - which maintain a more local character. Namely, the properties of the city grid distributed the land uses, and the built form organised their interface with the public domain. Conflicting and diverse land uses operate in the Village in close proximity, in a flexible spatial organisational framework.

**Figure 3.** West Village, c.2011: Syntactic values and socio-economic diversity distribution patterns.
6. Tracing aspects of urban adaptability

In a constantly shifting urban realm, one continuing challenge is to create flexible built form. Through the example of the evolutionary pathways of the Manhattan row house typology and its endurance throughout the urbanisation processes of New York City, this paper aimed to trace aspects of urban adaptability that extend beyond the design of single the building unit.

The paper focused on the potential role of the relations between the formative urban units of a streetscape - namely the buildings, the blocks and the city grid - in historic transformation processes. Accordingly, the New York row house was shown to be both a flexible spatial layout in the building scale, as well as a co-operative function within the whole row as part of a block façade. The importance of the regularities observed in the row house organisation at the block scale was discussed in relation to the way the typology adjusted to historic changes and embedded newly introduced patterns of socio-spatial diversity in the historic built form.

From these observations, a question could then be raised as a point for further discussion: whether the organisation of the built form a priori sets the potential for flexibility in adjusting to historic change. And more particularly, does this potential for flexibility relate to notions of measure, scale and spatial rhythm? In other words, is there an underlying syntax in the rules of aggregation of the streetscape that, when applied, allow for the built form to afford transformations in response to historic change? Moreover, as might be suggested by Hanson and Hillier’s theory of structured non-correspondence (Hillier, 1987), could the design of architectural affordances lead to an inherently flexible built form that would allow for socio-spatial diversity to be reproduced probabilistically over time?

The examined case of West Village and the analysis of the row house typology showed how an inherent organisational logic across all constitutive parts of the urban scenery served as a precondition for responding to historic change. Internal changes in the building units allowed for higher densities while adapting to new modes of living; additionally, the challenge of the invasion of commercial uses and higher pedestrian flows in the area was handled through morphological and functional adaptations that opened the ground floor towards the public domain. The neighbourhood was reconfigured according to the cross-scale organisational consistencies of the historic built form. Considering the parts (buildings) within the whole (block), the newly introduced diversity patterns were eventually embedded in and supported by the co-operative and adaptable built structure that the row housing schemes presented over time.

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