CLOAK AND DAGGER THEORY

manifestations of the mundane in the space of eight Peter Eisenman houses

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0 Abstract

The architectural writings of Peter Eisenman tend to rely heavily on jargon and polemic statements. Even when Eisenman defines words for his readers, he uses terminology which itself requires some form of clarification. This has frustrated debate about his architecture because first, the words can mean at the same time different things to different people and second, the designs become 'moving targets' which are impervious to critical appraisal since the debate is conducted on Eisenman's own ill-defined terms rather than on any objective or analytical basis. It has been even suggested by Evans that this is a deliberate ploy on Eisenman's part to avoid such examination (Evans, 1992). The objective of this paper is to shift the focus of the debate away from his theoretical writings to the architectural objects themselves. Formal and spatial analysis of eight Peter Eisenman houses has been conducted. Based on this analysis, it is suggested that the apparent complex differentiations of form in 2 and 3 dimensions underlying Eisenman's designs leads to a distinctive and pervasive spatial homogeneity in each house - not spatial differentiation as has been implied. This results in each house being characterised by a well-defined genotype which incorporates the rigid separation of public and private function spaces and the integrating of the houses through stair and transition spaces. It is suggested that this occurs despite the rather elegant and simple formal rules of composition discernible in the design of the houses.

Keywords: configuration, design, deconstruction, Eisenman, housing

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1 Cloak and Dagger Theory

The houses of Peter Eisenman have been a source of endless fascination to many in the field of architecture for some time now. Eisenman's houses are unique not only because they appear to be formally and spatially quite interesting but also due to the sheer volume of written material about them. However, after reading the articles and books about these houses - and especially those by the architect himself - many are left with the feeling that they are no closer to understanding them than before all the written texts, diagrammatic representations, plans and elevations about them were digested. Why is this? We would suggest there appear to be two primary reasons.

First, Eisenman would have us believe that his theoretical writings are analytical in nature. Terminologies are used, references are made (often to Chomsky and de Saussure) and a design process is described which, at first glance, indicates some logical methodology at work. Eisenman attempts to reinforce this impression of an analytical basis to what he does by implying that these houses are derived in an objective manner, independent of the architect himself. For example, he writes a great deal about transformations or transpositions, i.e. references to movement.

'All of these elements, again, are moving simultaneously toward maximum interconnection and differentiation.' (Eisenman, 1981).

By writing about the formal composition of the houses in this way, as if the elements were moving of their own volition, Eisenman puts a perceptual distance between himself - the architect as creator - and the designs, that is the object as created (Evans, 1997).

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It is reminiscent of the old proverb that '*One day Science will finally scale the summit of the mountain and peer over the peak, only to discover that God was there all along*'. The relationship between Eisenman's architecture and his writing are much the same in that we - his readers - scale the mountain of his theoretical writings and peer over the peak, only to discover that Peter Eisenman was there all along. It is about Eisenman as the unseen creator or we could be facetious and say, Eisenman as God.

More than this however, Eisenman's theoretical writings manifestly fail to describe his design process in a clear or concise manner. We are unable to gain access to the way in which these architectural objects have been created nor is the design process itself easily reproducible. This is because his writings tend to rely heavily on jargon and polemical statements. Even when Eisenman does define words for his readers, it is usually only done using terminology which in itself requires further clarification - clarification which is never forthcoming. This has served to frustrate architectural debate about these houses because first, Eisenman's words can mean at the same time different things to different readers and second, his designs become 'moving targets' which are impervious to critical appraisal since the debate is conducted on Eisenman's own ill-defined terms rather than on any objective or analytical basis (despite Eisenman's implicit claims of analytical rigour). It has even been suggested by Evans that this was a deliberate ploy on Eisenman's part to avoid critical examination (Evans, 1992), like some sort of defence mechanism.

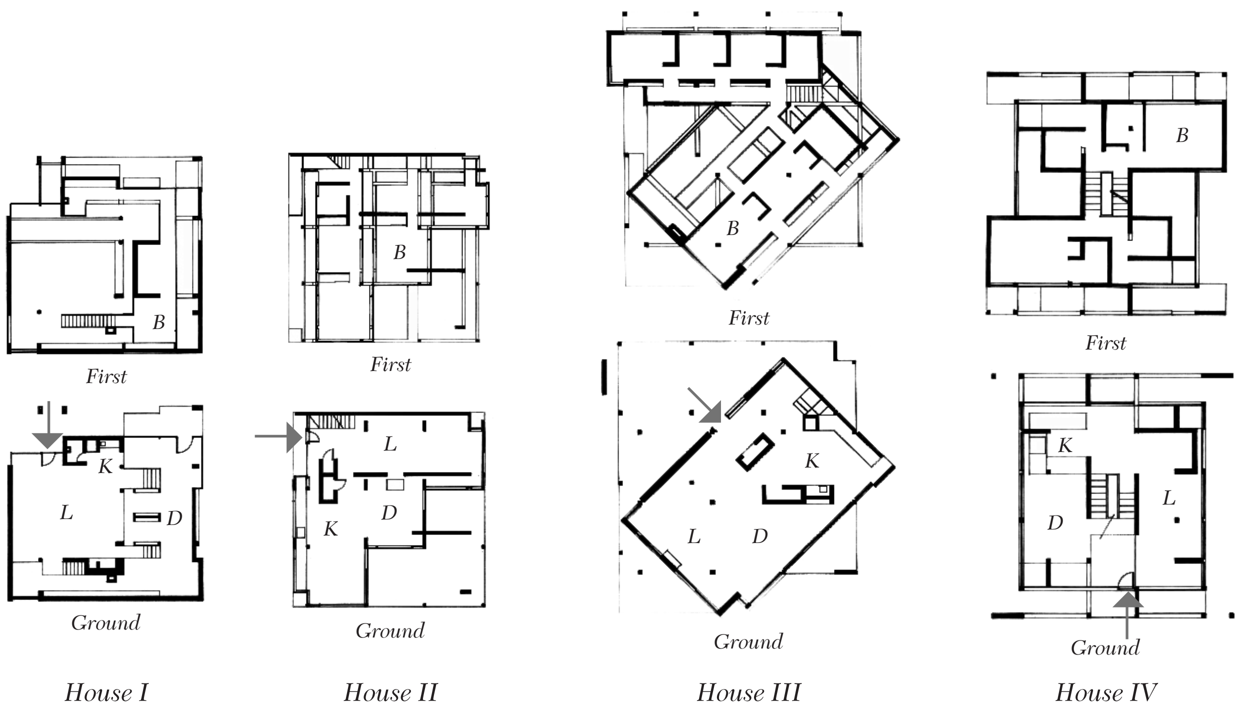

Figure 1a. Plans of four Peter Eisenman houses with the Kitchen (K), Dining (D), Living (L) and Master Bedroom (B) indicated. The main entrance is indicated by an arrow.

2 The Simple, the Elegant and the Obscured

What will be suggested in this paper is that Eisenman's theoretical writings are *rather less* than Eisenman would have us believe but that the actual objects themselves are *rather more* than Eisenman is willing to let on. First, his writing is not analytical but rather normative in nature. It follows a well-founded architectural tradition of presenting normative theories which, while perhaps useful in discussing a particular design or style, can not be objectively applied to discuss other types of architecture. It is because of this that his writings serve to perpetuate the myth of the 'architectural genius', in this case Eisenman. Eisenman would have us believe that his writings are analytical rather than normative in nature, but this is manifestly not the case.

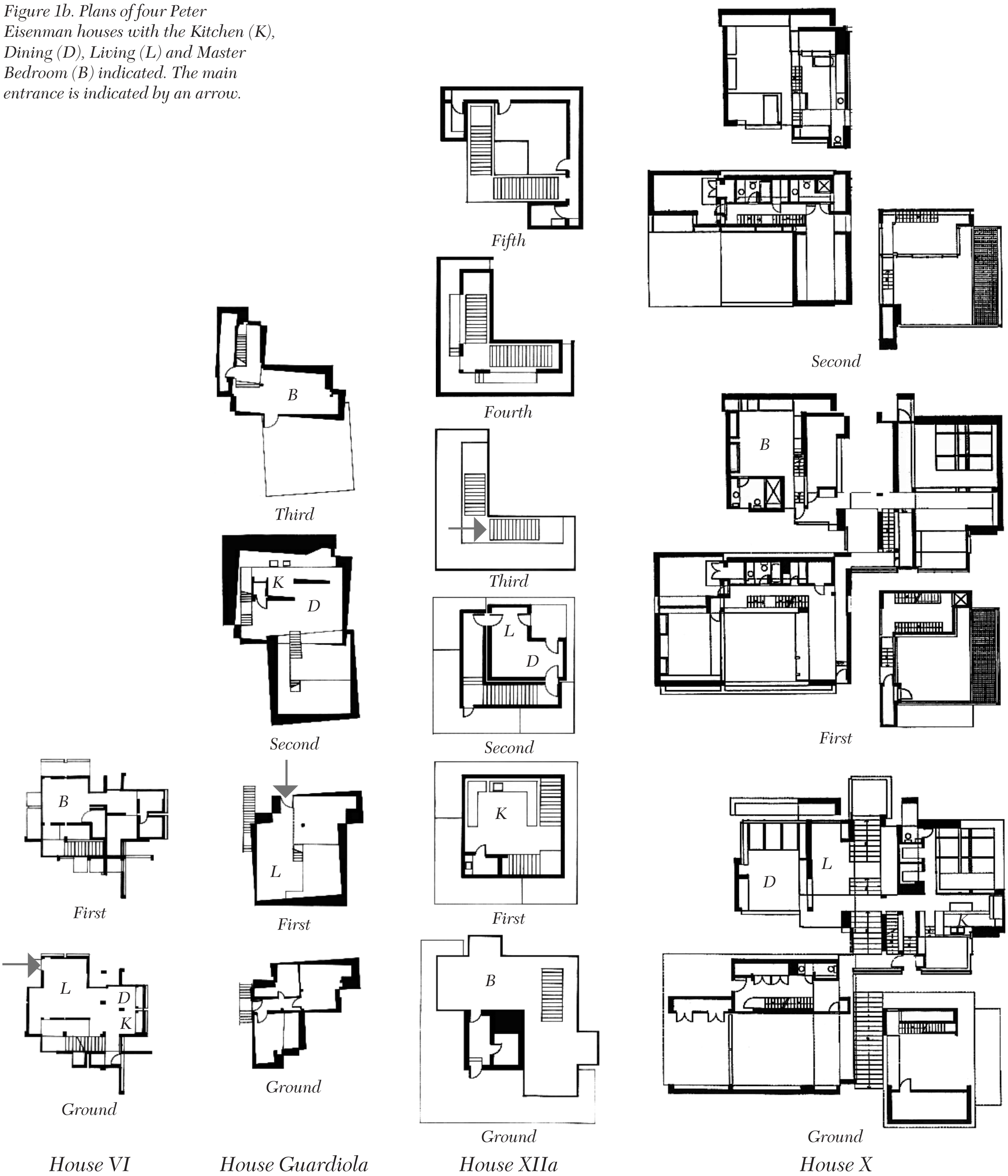

Figure 1b. Plans of four Peter Eisenman houses with the Kitchen (K), Dining (D), Living (L) and Master Bedroom (B) indicated. The main entrance is indicated by an arrow.

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Second, in describing this pseudo-analytical design process Eisenman is doing both himself and his architecture a disservice. This is because he obscures - rather than makes apparent - the simple and elegant compositional rules he applies to generate space and form in these houses. The way he goes about this we would suggest is innovative and a perfect example of what architecture should be about - innovation, or production, rather than reproduction (Hillier, 1996). At this point, let us be clear that we are not saying that Eisenman is successful in what he sets out to achieve - he is not. However the mere existence of his conjecture adds to our architectural knowledge much in the same way as does the refutation of that conjecture, both within this paper and by Eisenman himself.

What will be suggested in this paper is that these formal rules of composition are applied and 'almost' never violated. By 'almost' we mean that Eisenman does occasionally introduce random elements into his designs but this is never done in such as way as to make the initial formal rules secondary within the overall composition. When random elements are introduced they can be thought of as instances of local randomness, as opposed to these formal rules which appear to be global and consistent. The effect of these formal rules (and instances of local randomness when they do occur) is to set up a restricted random process, much in the same way as Hillier and Hanson have described with regards to settlement form (Hillier and Hanson, 1984). A few simple compositional rules are laid down within which Eisenman then uses his design sensibility to derive the eventual form of plans and elevations. The rules in themselves are not restrictive enough to significantly limit the architectural possibilities at Eisenman's command but are pervasive enough to characterise the houses with a common design rationale.

3 Eight Peter Eisenman Houses

We will make this argument in two ways: first, by presenting the results of a space syntax study of eight of his houses - House I, House II, House III, House IV, House

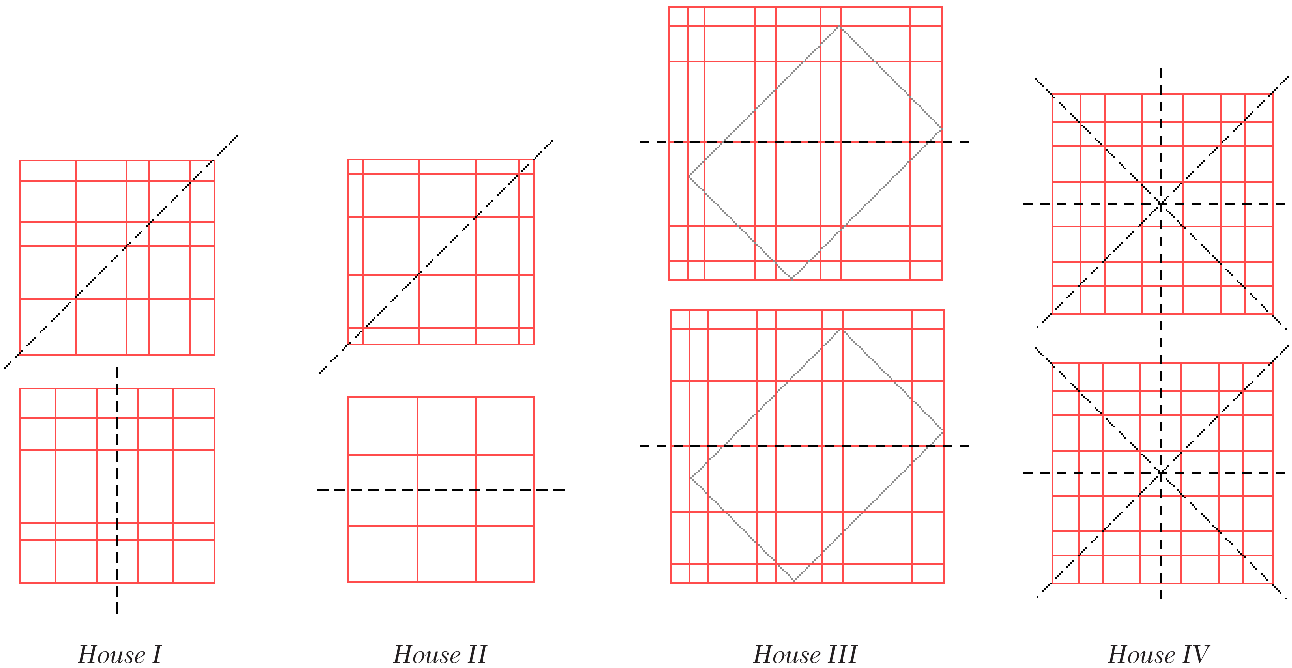
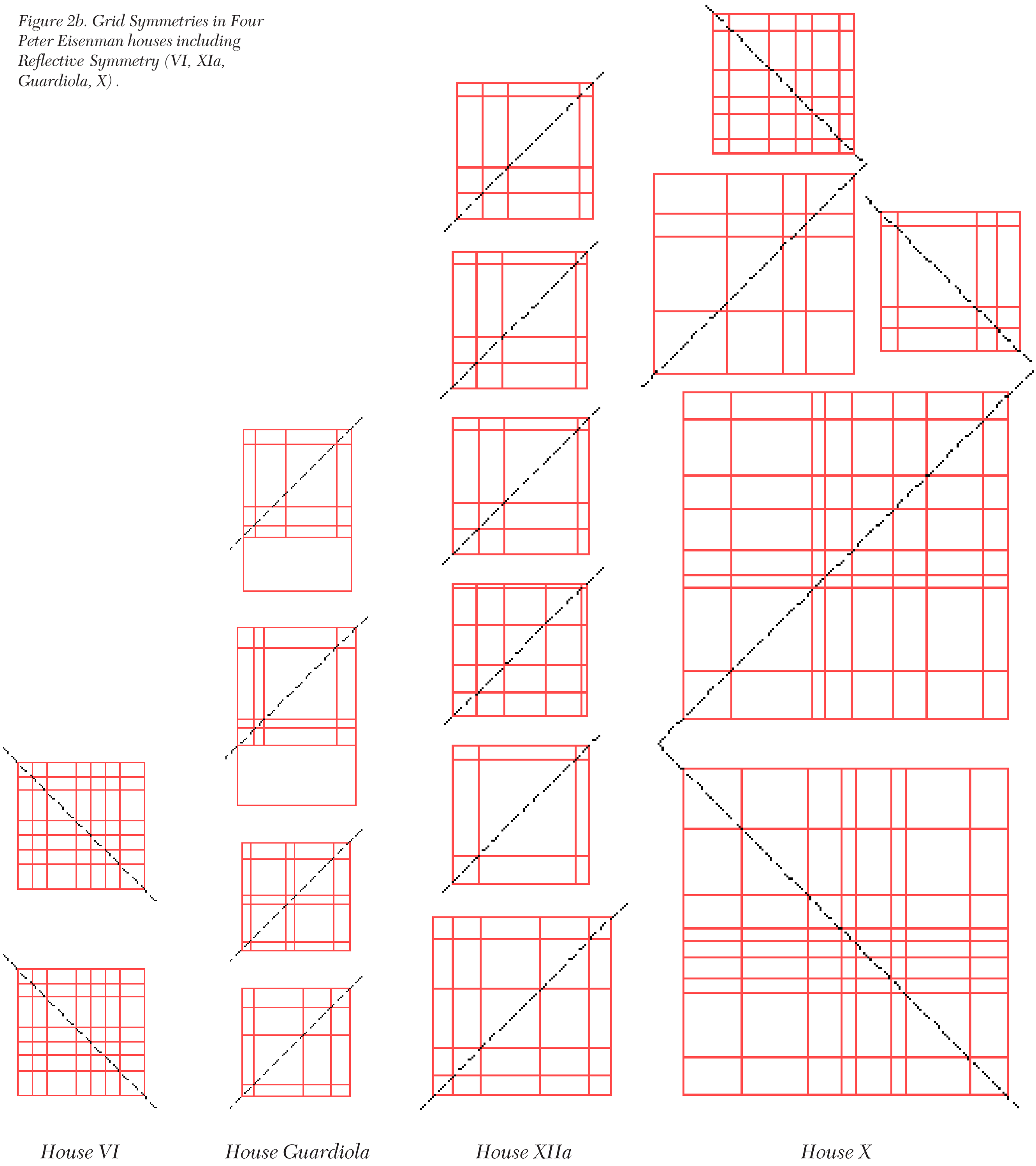


Figure 2a. Grid Symmetries in Four Peter Eisenman houses including Reflective (I, II, III, IV), Rotational (IV), Translative (IV) and Glide Reflective Symmetry (IV).

VI, House X, House XIa and Guardiola House (Figure 1); and second, by 'almost' completely diverting around his theoretical writings. In doing so we are, in a sense, allowing the houses to 'speak for themselves' by shifting the debate away from Eisenman's turf (i.e. his theoretical writings with all of its jargon and ill-defined terminology) to the architectural object itself. We say 'almost completely' because there are two ideas we want to pull out of his writing which are reasonably well-established, and have been articulated by Eisenman himself on several occasions.

Figure 2b. Grid Symmetries in Four Peter Eisenman houses including Reflective Symmetry (VI, XIa, Guardiola, X) .



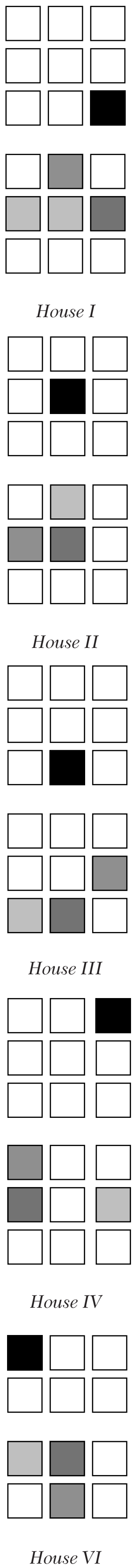


Figure 3a. Abstracted relationship of function spaces in five Peter Eisenman houses using a simplified grid.

First, is the idea that function does not in any way determine the form, that is the divorcing of form and function in these houses. This has previously been referred to as 'morphocentrisim' in contrast to 'anthrocentrisim', that is a form-centred view of the universe rather than a humanist view (Major, 1993). What does this imply? Let us suggest the following: that in doing a space syntax study of these houses we should not be able to discern any spatial or functional pattern to their structure, i.e. it should be random, both within the houses and across the sample. Second, is the suggestion by Eisenman that formal differentiation leads to spatial differentiation, what we could term a correspondence model of form and space. Intuitively this would seem to be an obvious truth due to the independence of the physical and the spatial in the built environment - change the physical attributes of a building (i.e. move a wall) you change the spatial pattern. This is something which we do everyday, for example in refurbishment. What should we then expect? Based on what Eisenman says, we would expect to find strong spatial differentiation in these houses, not only globally across the system but even locally from one space to the next. We can measure this by using 'difference factor' (Hillier et al, 1992). We want to keep these two ideas front and centre since they are so obviously a tenet of Eisenman's 'conjecture.'

4 Grid Mysticism

Let us begin by examining what is happening formally in these houses, i.e. how are these houses composed? First, we can see that there is in almost all cases a clear and simple rule applied in composing the plans of these houses - all elements must be in a parallel or perpendicular relationship to any other element. The only deviations from this rule are House III where a further addendum is added to the rule to include 45° relationships, and Guardiola House where the addendum appears to be any element can be in a 15° relationship with some other. Now the setting up of this parallel or perpendicular rule has an interesting consequence - grids. Let us suggest that if we examine the formal composition of these plans more closely we can see that they are all derived within a square grid composition (even House III and Guardiola House). What is constant is the grid and the square - proportions and metric distances in how the grid is subdivided are mutable, though in some cases there is consistency from floor to floor (Figure 2). In House III, a 'random' object is inserted, i.e. a plane at a 45° to the ordering grid. We would suggest that this object is random because it actually does not fit within the grid in any manner, either by rotation or subdivision. This grid morphology is also maintained in Guardiola House despite it non-geometrical appearance by firstly, shifting the grid lines in some cases 15° off-axis and secondly, adding a further random object at one edge of the grid - this random object is actually at a 1:2 proportion to the grid along one length and, obviously, 1:1 in the other.

Though the subdivision of the grid is mutable from house to house - and often from floor to floor - there appears to be one more restriction imposed by Eisenman. That is the grid in all of these houses (and on each floor) has a reflective (i.e. bilateral) symmetry composed along a diagonal axis from one corner of the grid to the opposite corner. And of course, if you construct a reflective symmetry like this along a diagonal axis and then subdivide an overlaid grid you are left with what Eisenman often describes as his main composition element - the 'el' shape. The exceptions are: the ground floor of House II where the reflective symmetry occurs parallel to the plane of the grid in one-dimension; and House IV which is perfectly symmetrical in that it possesses reflective, rotational, translative and glide reflective symmetries (Stewart, 1992). House X shows a greater complexity in that the reflective symmetry of the plan is rotated on the 1st floor by 90° in relation to the floors above and below it. In answering the question we started with, i.e. how are these houses composed, we have uncovered what we would suggest are some interesting and quite elegant rules. Square grid composition is constant - subdivision of the grid is mutable. All elements are in some predetermined angular relationship (usually parallel or perpendicular) with other elements. Each grid composition possesses at least one reflective symmetry, usually along a diagonal axis from corner to corner of the grid. However, let us be clear - this is not an objective or analytical design process. The rules are set but it is Eisenman making the design decisions. The variation from house to house arises from the mutable aspects - the grid subdivision, the rotation of the reflective symmetries along whichever axis, the difference in scale, and the introduction of 'random objects' - not from the rules themselves.

As an aside, these rules seem to make perfect sense to anyone familiar with Peter Eisenman's educational history. Eisenman completed his PhD at Cambridge University with Colin Rowe as his tutor. Anyone who has read Colin Rowe's 'The Mathematics of the Ideal Villa' will appreciate what appears to be an obvious influence from mentor to pupil (Rowe, 1982). In fact, House IV would appear to be a reinterpretation of the Palladian Villa typology, which also tend to possess reflective symmetry in plan.

5 Functional Differentiation, or lack thereof

Now, that we have a working hypothesis on Eisenman's compositional rules for designing these houses we need to ask, what is their impact on the spatial structure and other considerations such as function? At this point, keep in mind Eisenman's two principal ideas - the divorcing of form and function and the formal-spatial correspondence model. Let us continue with the grids for a moment. In most plans, we can make more readily apparent the physical relationship of functional spaces by representing a notional grid over the plan (most plans due to the geometrical nature of architectural drawings are reducible to grids in some form or another). We have done this for these eight houses and coloured the squares corresponding to the physical location of the primary function spaces - kitchen, living, dining and master bedroom (Figure 3). Are there any discernible patterns? Let us suggest that there are, in fact, two: first, in any house at least two of the 'everyday' function spaces (i.e. kitchen, living and dining) are in an adjacent relationship and in four of the houses all three are in such a relationship; second, in all cases the master bedroom is separated by a change in level from the everyday living spaces. Though this is not definitive, it could suggest a cultural influence in locating functional spaces: the adjacency of the main living spaces (especially in House I, House II, House III and House VI) is standard practice in most American design guidance and architecture education; and, the removal of the master bedroom from the everyday living space could indicate a public-private separation of function spaces, again often a constant in design guidance and architectural education.

We can examine this more closely in the convex break-up of the spaces (Figure 4). When we do so we can immediately see an effect of the strong formal differentiation

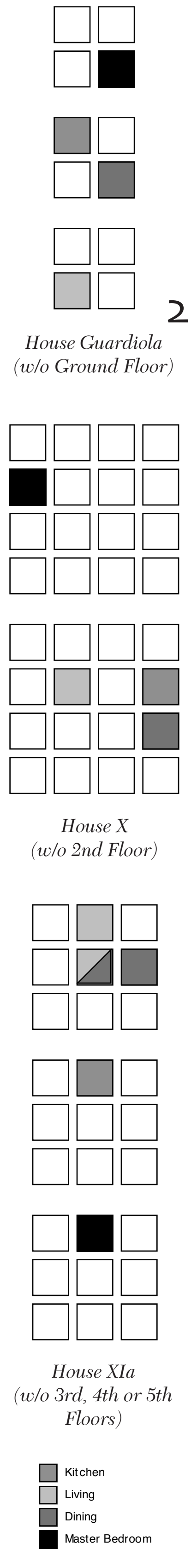


Figure 3b. Abstracted relationship of function spaces in three Peter Eisenman houses using a simplified grid.

Figure 4a. Convex integration of five Peter Eisenman houses with the main function spaces and entry space indicated.

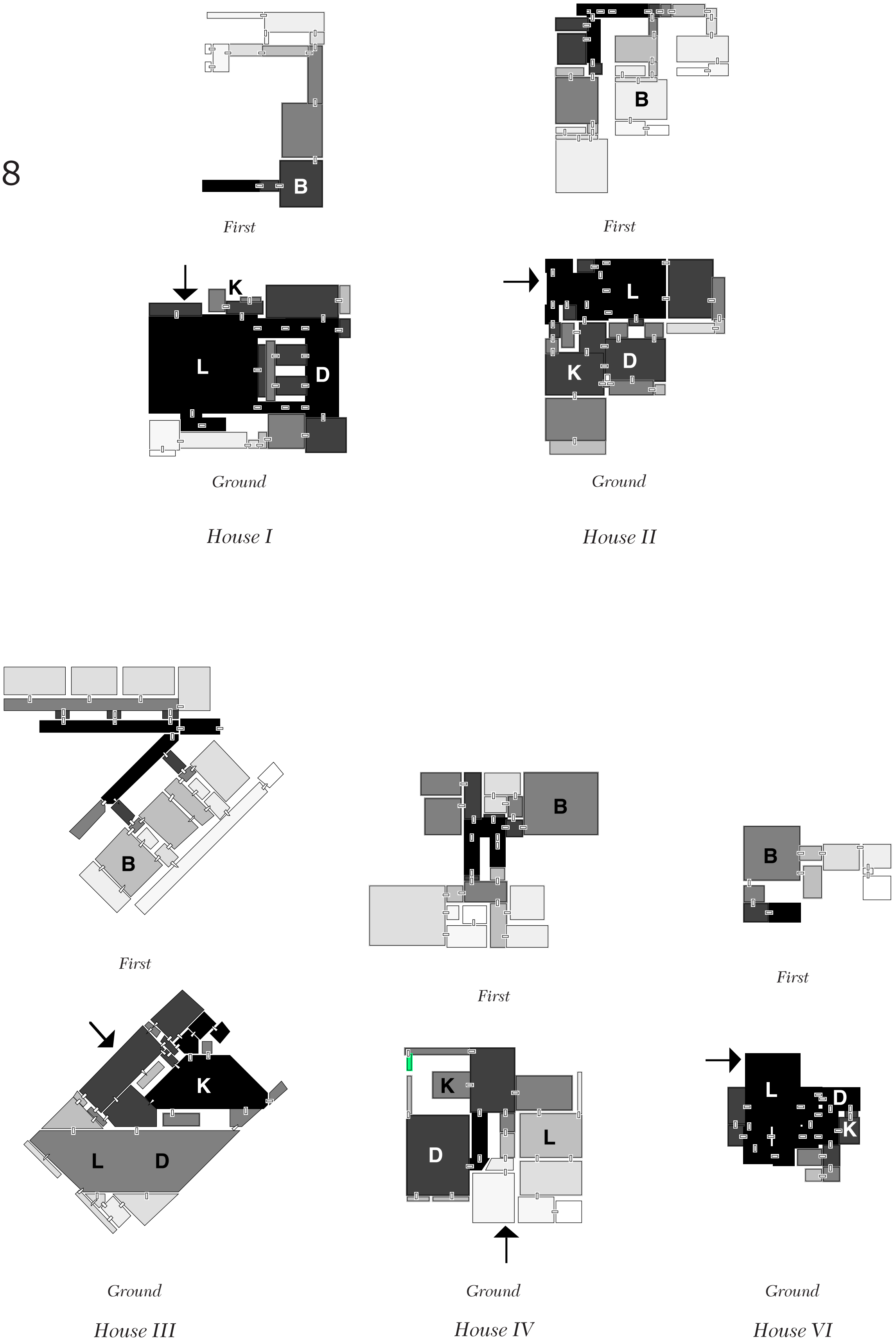
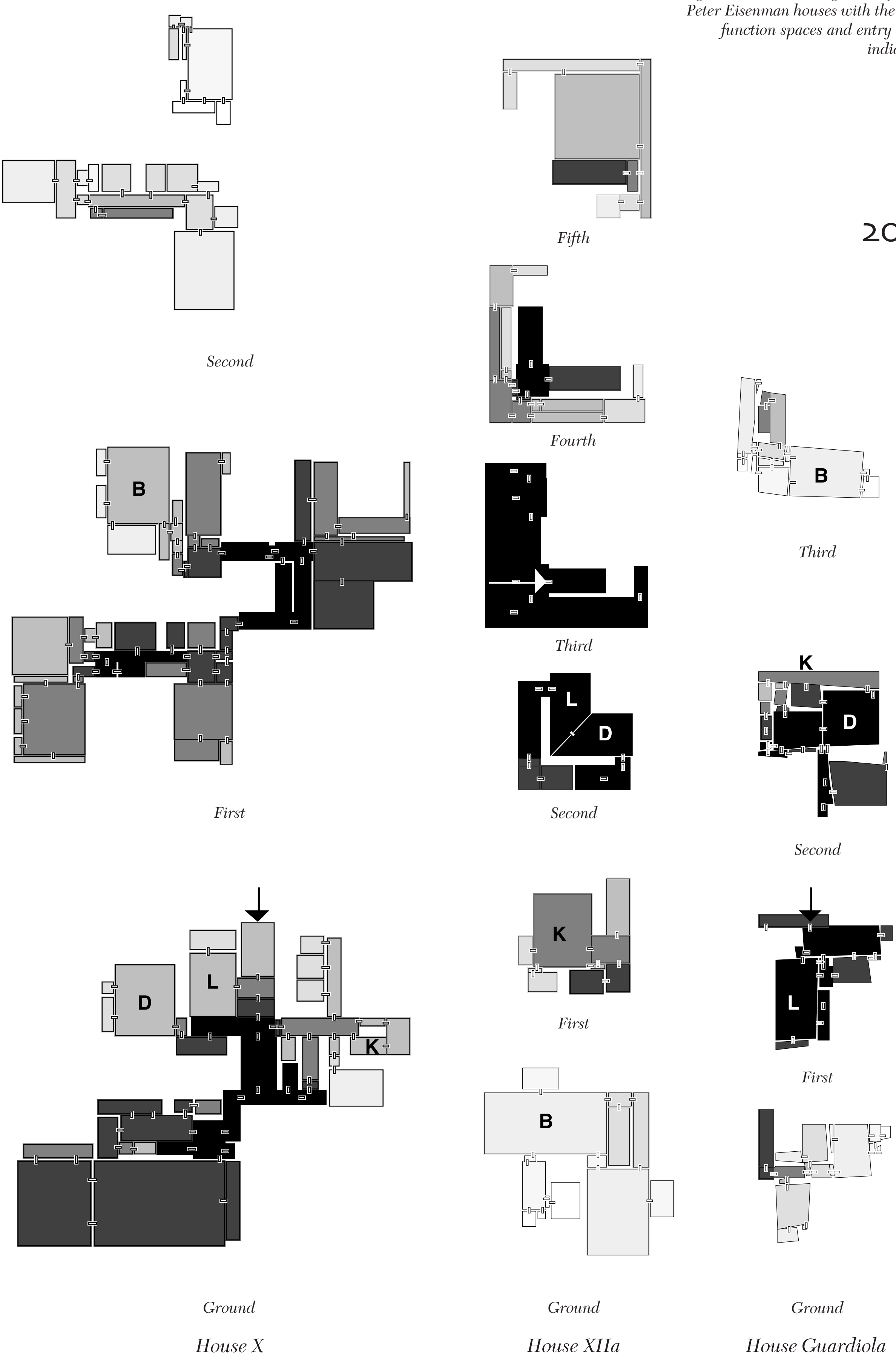


Figure 4b. Convex integration of three Peter Eisenman houses with the main function spaces and entry space indicated.



Eisenman builds into these houses - a quite complicated convex break-up meaning that each of these houses is characterised by a larger number or convex spaces, even though some of these houses are metrically quite small. Formal differentiation of the physical ‘stuff’ results in a complicated space convexity, that is these houses have a large number of spaces. If we run a global integration analysis we can begin to detect another common spatial characteristic to these houses - they are all integrated through the stairs. In addition, in most cases global integration is more focused on the ground level (or entry level) around some or all of the everyday living spaces. The master bedroom in most cases is segregated.

- In House I (39 spaces), integration is focused in the living and dining spaces whereas the bedroom appears moderately integrated due to its location immediate to the stairs linking the two levels.

- In House II (58 spaces), integration is focused around the living space and the stairs. The kitchen and dining spaces are also integrated though to a lesser degree and the master bedroom is very deep within the house, so it is less integrated.

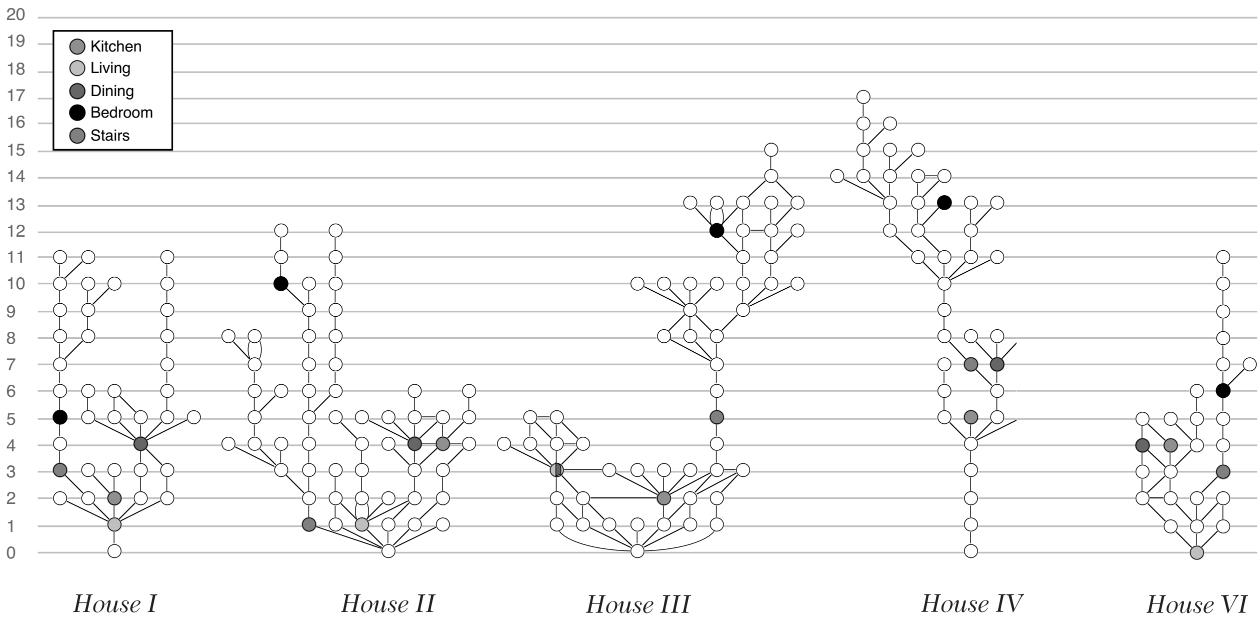
- In House III (55 spaces), integration is focused in the kitchen and the stairs, the living/dining is less so and the master bedroom is again deep within the house.

- In House IV (49 spaces), integration is more clearly focused on the stair links. Of the everyday living spaces, dining is the most integrated.

- In House VI (27 spaces), integration is clearly focused around the living space and stair links, dining and kitchen are less so.

- In House X (121 spaces), integration is focused at the ground level and first level along the primary ring in the house via to the two separate stair links between the two floors. The kitchen is the most integrated function space. The bedroom is moderately segregated.

Figure 5a. Justified graphs from the main entry space in five Peter Eisenman houses with the main function and stair spaces indicated.



• In House XIa (63 spaces), entry is via the third level. Because of this integration is strongly focused around the stair links (between 2nd, 3rd and 4th floors) and the living/dining spaces. The master bedroom is very deep in the house at the ground level.

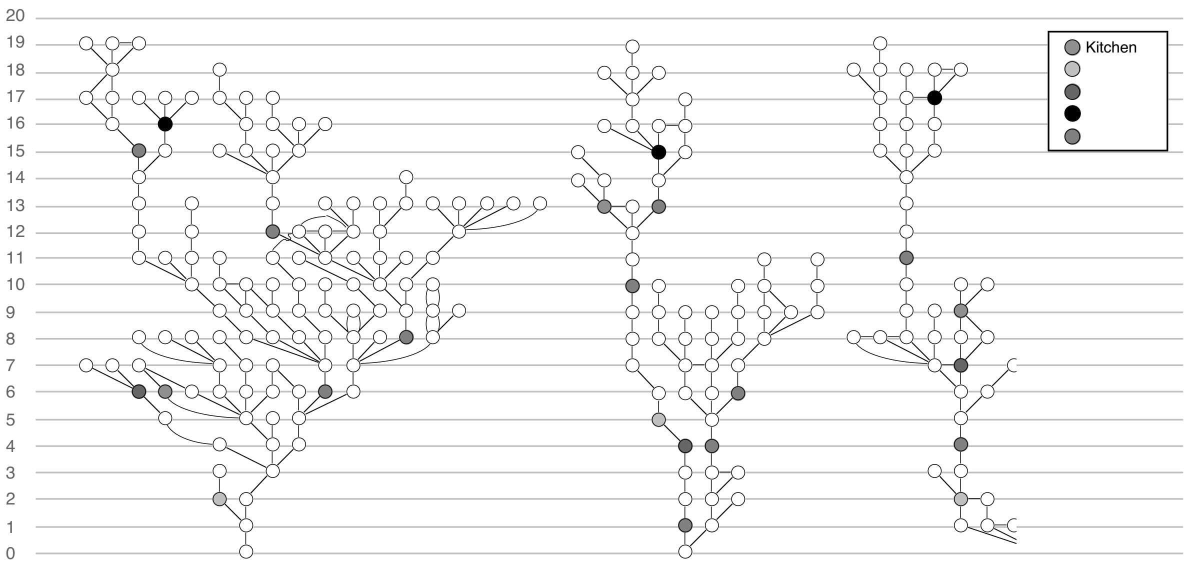
• In Guardiola House (67 spaces), integration is focused on the stair link between the 1st and 2nd level and the living and dining spaces (despite being on different levels). The master bedroom is segregated on the 3rd floor.

While the integration maps of the houses are interesting, they are not particularly useful in isolating the differences we are looking for - of more use is the actual numerical data. First, if we examine the order of integration of the functional spaces we can see that in almost all cases the stairs are the most integrated space, the exceptions being House I and House VI, and that the master bedroom is the most segregated space, the exception being House X (Table 1).

Table 1 - Order of Integration

House I
L (4.65) > D (4.17) > S (4.10) > K (3.86) > B (3.53)
House II
S (6.94) > L (6.13) > K (5.00) > D (4.98) > B (3.18)
House III
S (7.19) > K (6.49) > L (5.24) = D (5.24) > B (4.65)
House IV
S (5.99) > D (4.85) > K (4.12) > L (3.75) > B (3.22)
House VI
L (4.57) > S (3.78) > D (3.74) > K (3.31) > B (2.74)
House X
S1(12.99) > S2 (12.20) > S3 (9.17) > K (7.81) > L (7.46) > S4 (6.71) > B (6.33) > D (6.29)
House XIa
S3 (4.14) > D (4.06) > L (3.99) > S4 (3.91) > S2 (3.55) > S5 (3.48) > K (3.16) > S1 (3.12) > B (2.75)
Guardiola House
S1 (5.21) > L (5.05) > D (4.93) > O (4.46) > S2 (4.00) > K (3.92) > B (2.88)
Genotype
S < L = D = K < B

Figure 5b. Justified graphs from the main entry space in three Peter Eisenman houses with the main function and stair spaces indicated.



House X *House XIa* *House Guardiola*

The location of the everyday function spaces within the order of integration is less constant, sometimes it is the kitchen which is most integrated, sometimes the dining and sometimes the living. Taking this into account with the earlier diagram about the adjacency relationship of function space, let us now suggest a spatial genotype:

S > L = D = K > B

20.12 whereby there is a spatial equivalence between the everyday function spaces. The houses are primarily integrated through the stairs with the master bedroom strongly separated off from the rest of the spaces and segregated. At this point let us only suggest this genotype as a hypothesis since it is as yet unproven. However, if we examine the structure factor between the living, dining and kitchen spaces in each of these houses we can quickly find supporting evidence for the idea of spatial equivalency between the everyday function spaces (see Table 2).

Table 2

House	*k-spaces (thr)*	*Max Integ*	*Mean Integ*	*Min Integ*	*BDF m/m/m*	*Space/Link Ratio*	*SF l/d/k*
House I	*39 (40)*	*4.65*	*3.08*	*1.87*	*0.84*	*1.026*	*0.99*
House II	*58 (66)*	*6.94*	*4.37*	*2.50*	*0.80*	*1.138*	*0.99*
House III	*55 (73)*	*7.19*	*5.13*	*3.36*	*0.89*	*1.327*	*0.99*
House IV	*49 (50)*	*6.13*	*3.91*	*2.51*	*0.84*	*1.020*	*0.96*
House VI	*27 (31)*	*4.57*	*3.36*	*1.56*	*0.80*	*1.148*	*0.98*
House X	*121 (133)*	*13.51*	*8.13*	*4.78*	*0.79*	*1.099*	*0.99*
House XIa	*63 (67)*	*4.14*	*3.23*	*2.26*	*0.93*	*1.063*	***0.98***
Guardiola	*67 (76)*	*5.26*	*3.64*	*2.48*	*0.89*	*1.134*	*0.98*

As we can see in the data table the structure factor in every house is either 0.98 or 0.99, with the exception being House IV (the smallest) which is 0.96. This means that there is no functional differentiation between any of the everyday function spaces in

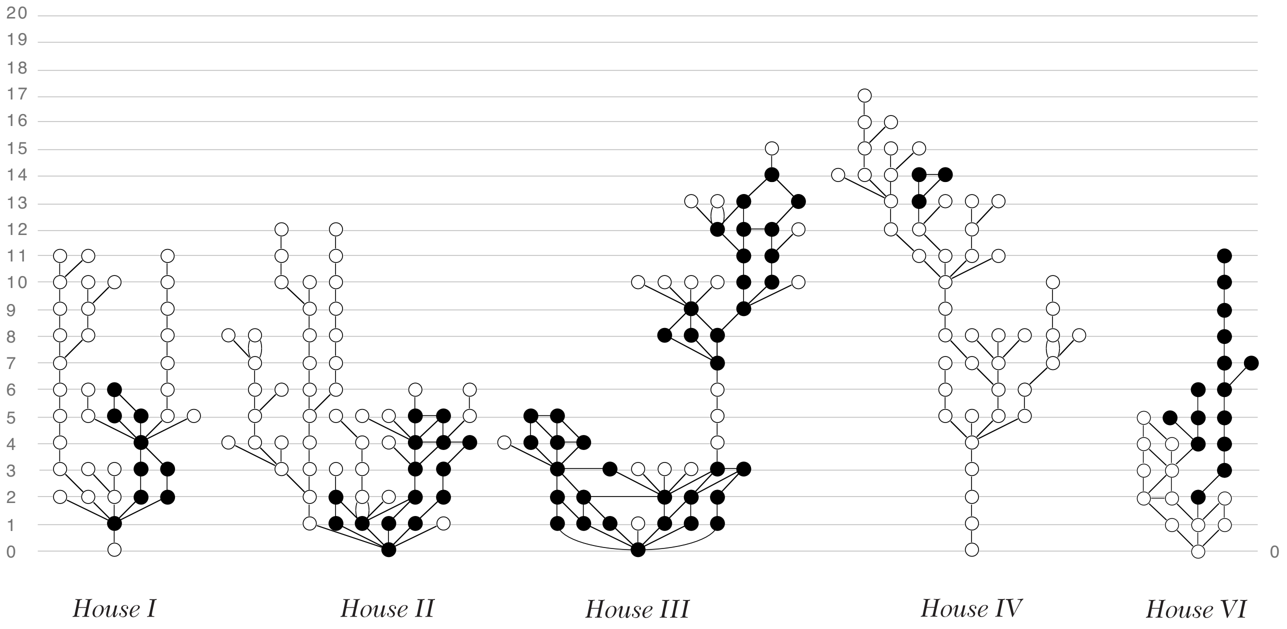


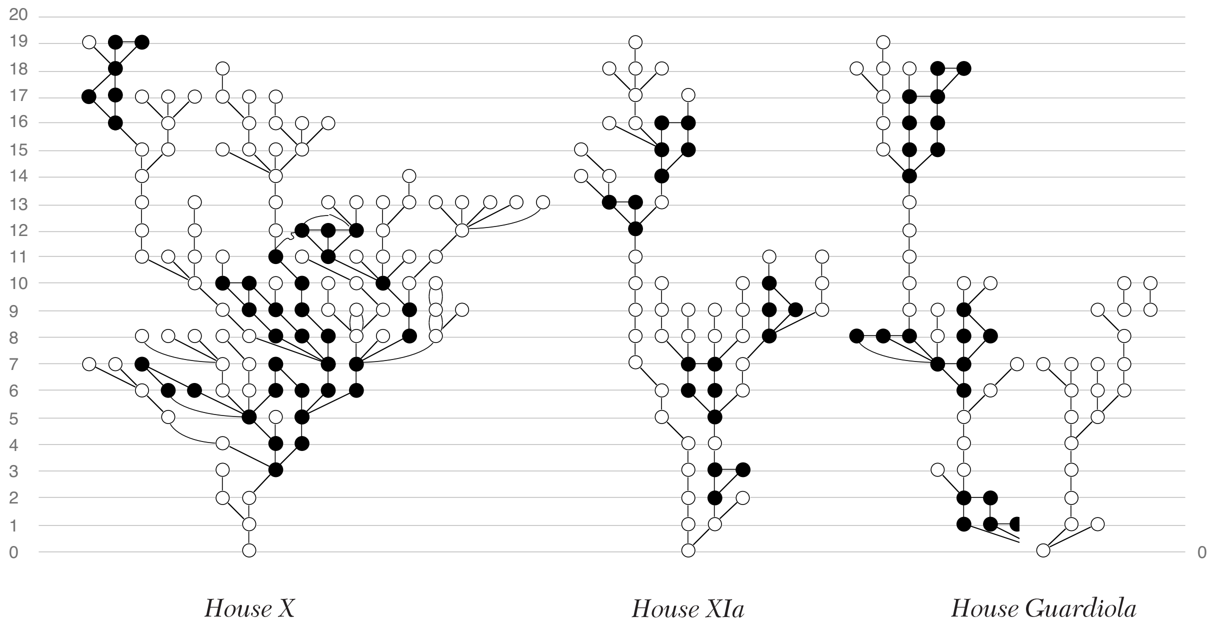
Figure 6a. Justified graphs from the main entry space in five Peter Eisenman houses with rings and trees indicated.

any of these houses. What we have is spatial equivalency. However, let us suggest more than this. What this actually means is a refutation of the claim that there is a divorcing of form and function in these houses - to be fair something which Eisenman later admits is false. Remember that earlier we suggested that if Eisenman were successful in divorcing form and function we would expect randomness, not pattern. This is a remarkably consistent pattern in all of the houses. Next, if we examine the base difference factor for the minimum, mean and maximum integration for all of the houses we can again see a strong consistency in the pattern from house to house, each between 0.79 and 0.93 with 5 of the houses between 0.79 and 0.84. The spaces in these houses are homogeneous and the effect of formal differentiation is spatial similarity. This spatial homogeneity, not differentiation as Eisenman suggests, would indicate that the correspondence model between form and space, while intuitively appears to be common sense, is false.

6 Rings and Trees

Why then should this be the case? Let us suggest that the effect lies in the complex spatial convexity we noticed earlier. We can see this more clearly by examining the justified graphs of these houses (all from the entry space, or if you like from the point of view of the 'visitor'). We can see that an effect of the complex spatial convexity is that most of the houses are characterised by deep and tree-like graphs. Each house does possess at least one ring and in almost every case an everyday function space can be found on one of these rings. The exception is House IV, which for all intents and purposes, is a sequence with one, small local ring located in the deepest part of the house. In Houses I, II, III and VI all of the everyday function spaces lie on a ring as does House Guardiola though the living space is located on a ring separate from the kitchen and dining spaces. Also, we can see that rings occurring in every house are isolated on individual floors. The only exception is House X, which has the only ring via two levels, that is incorporating separate stair links. We would suggest that this is necessary in House X due to its extreme size to prevent it from becoming a spatial labyrinth. House III is the most ringy house in the sample whereas House IV is the most tree-like. All of the houses are deep, especially for their size. The result of this complex spatial convexity is to introduce a large number of transition spaces to

Figure 6b. Justified graphs from the main entry space in three Peter Eisenman houses with rings and trees indicated.



each house, introducing more sequences, making them deeper and deeper as they get larger. Also, we can see another effect of this in that the master bedroom and its associated spaces all lie on a separate branch of the tree, confirming what we earlier hypothesised that each of these houses have a strong separation between public and private. This would seem to represent an obvious cultural and function consideration in the spatial design of these houses - or in other words form follows function or at the very least function has been located in a very culturally constrained manner. The spatial convexity of these houses is so complex and numerous that it would be incredibly difficult for a guest to find their way to the master bedroom.

7 Manifestations of the Mundane

The spatial pattern we have detected in these eight houses of Peter Eisenman is now readily identifiable - functional equivalency and adjacency of the everyday living function spaces, a strong public-private separation, and spatial integration through stair links and transition spaces. In fact, what we have just describe is one of the most common house genotypes to be found in the world, especially in speculative housing both in England and America. The complex differentiations in the second and third dimension underlying the design of these houses leads to a strong spatial homogeneity, not spatial differentiation as Eisenman has suggested. This results in a well-defined house genotype which incorporates rigid separation of public and private spaces, integration through stairs and transition spaces, and functional equivalency in the main everyday living spaces (kitchen, living and dining). Despite the elegant and simple rules underlying the formal composition of these houses, spatially they are houses of social reproduction rather than architectural innovation.

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