

'The book and the labyrinth were one and the same' – narrative and architecture in Borges' fictions

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The strong presence of architecture in Borges' fictions called for a study of their narrative structure. The intention was to examine the contribution of spatial models to his literature and the ways in which his stories can serve as tools to understand architecture. The analysis revealed a narrative strategy based on the relationship between the linear progression of the text, and a geometrical symmetry that relates all narrative elements beyond their temporal positions in the linear sequence. The depiction of space combines eye-level experience with panoramic description to express this relationship. The architectural models are drawn from specific historical, cultural and ideological contexts to reinforce the philosophical content in the fictions. The paper concludes that fiction and architecture create representations of reality based on a rigorous intellectual order and set within the infinite compounds of combinatorial possibility. At a more general level this study justifies the importance of a wider cultural framework for both architectural design and analysis. If architecture is an integral part of Borges' creations, it cannot exist in isolation limited in its own modes of operation.

If a straight line is the shortest distance between two fated and inevitable points, digressions will lengthen it; and if these digressions become so complex, so tangled and tortuous, so rapid as to hide their own tracks, who knows – perhaps death may not find us, perhaps time will lose its way, and perhaps we ourselves can remain concealed in our shifting hiding places. (Carlo Levi, from Italo Calvino's *Six Memos for the Next Millennium*, Vintage, 1992.)

Introduction

When architects refer to architecture they cast it as a mental activity that is concerned with aspects of form, space, programme and materials. When they speak about a building they describe it as narrative invoking a hypothetical viewer and a journey

through space. Thus while architecture is portrayed as an activity, a building is seen as something to be experienced. This experience follows a route and unfolds in time. For some architects spatial narrative is central not only to the ways in which they describe buildings but also to the ways in which they design. From Le Corbusier's notion of 'promenade architecturale' to Daniel Libeskind's Jewish Museum in Berlin, vistas are shortened or lengthened and routes are twisted or layered to achieve spatial drama and heighten suspense.

While architects are fascinated by narrative, writers are fascinated by architecture. From Daedalus' labyrinth to Edgar Allan Poe's houses, and Calvino's 'Invisible Cities', architecture has fed the popular imagination with an infinite list of haunted houses and cobblestone passages. But it is

not only popular culture it has supplied with spaces. Over the centuries it has served as the intellectual edifice where channels of thought in mathematics, cosmology, music, painting, and literature, intersect and poetically unite. In the 'Art of Memory' Frances Yates described how architecture was a model for memory from antiquity through architectural types that served as mnemonic devices (Yates, 1966). For the orator, recollection was possible through associations between moments in a narrative and a sequence through spaces in a building.

But whereas architecture has aided mnemonic orientation, it has also served as a model for losing one's bearings through a plot. In his fictions Jorge Luis Borges used chaotic plans composed of hexagonal rooms, bifurcating paths and symmetrical houses in his speculations about knowledge and culture. Influenced by Borges, writers such as Italo Calvino and Umberto Eco use the labyrinth, the castle and the city as settings and as themes for their narratives.¹ The impact of architecture on their work extends to the role of reading and writing in ordering experience. In 'Six Walks in the Fictional Woods' Eco uses the analogy of reading with walking suggesting that a story is an unfolding world that is experienced in sequence, piece by piece (Eco, 1995).

Narrative either based on successive actions in a story or on spaces that are seen sequentially is at the centre of creative imagination. There are creations in which fictional and spatial narratives are inseparable from each other – one cannot think of Joyce's *Ulysses* without thinking of Dublin, and we cannot think of Hoare's *Stourhead Garden* or

Terragni's *Danteum* (Kanecar, 2001) without thinking of Virgil and Dante. We might also say that there are no better examples to demonstrate that the relationship between architecture and narrative is other than a new subject.

However, no matter how much is known, how much has been already said, and most interestingly, how significant a study of literature to architecture is, Borges' fictions invite re-reading and therefore analysis, in the same way in which some buildings invite revisiting and subsequently scrutiny. Reading Borges, the architect can hardly fail to notice the feeling of being lost in the labyrinths of his plots, puzzled by the conceptual symmetries that link characters and events as well as by the architectural symmetries in the places inhabited by his characters. Seeing the growing attention that Calvino receives (Peponis, 1997), the critic can hardly resist going to the source of Calvino's inspiration, and attempt an analysis of the work of Jorge Luis Borges.

The questions that this paper addresses are: What is the role of architecture in Borges' fictions? Can a study of his work illuminate our understanding of architecture, or more generally, how can one form of structuring experience contribute to another? If literary thought can be represented through architectural models, can architectural thought find expression through the ordering mechanisms of literature? The answers to these questions will be explored through the study of three stories by Borges: *The Theme of the Traitor and the Hero*, *The Garden of Forking Paths* and *Death and the Compass*.

Background

Amongst poems, translations, essays and reviews, Borges wrote short fictions that strikingly encompass other books. The three stories examined here borrow from detective fiction and appeared between the early 1930s and the mid-1940s. Although different from each other, they are based on recurring themes, like blurring the distinction between the fictional and the real, between the instant of linear and cyclical time, between presence and omni-presence. In the examination that follows, these themes will eventually be discussed. However, the mode is descriptive before it becomes interpretative. The hypothesis is that if there is any connection between Borges' narratives and architecture, it lies in the ways in which they are constructed.

This connection, it will be argued, is achieved in three ways: first, by using architecture as a metaphor for navigating through the linear progression of his plots; second, by using architectural contexts that encompass the philosophical ideas that underline his stories; finally, by applying a narrative structure based on symmetry that enables us to grasp the narrative elements simultaneously beyond their positions in the linear sequence of the text. The task both in literature and architecture is to order experience. This depends on transformations that establish a simultaneous perception of relationships that are normally seen sequentially and develop over time.

The paper is structured in three parts. The first part focuses on the narrative structure of the fictions. The second part looks at how architecture is portrayed in the stories and at the role of spatial

models in the philosophical content of the narratives. The third part discusses the ways in which architecture can be seen as narrative.

The narrative structure of Borges' fictions

The Theme of the Traitor and the Hero

Borges opens *The Theme of the Traitor and the Hero* at the moment of its inception declaring his plan for a story and deciding on the time and location wherein it takes place. He then introduces the narrator, Ryan, the great-grandson of Fergus Kilpatrick, an Irish revolutionary who died mysteriously in a theatre in the midst of a victorious rebellion. Writing a biography of the hero, Ryan attempts to explain the enigma of his death. He thus discovers parallels that link the murder of his ancestor with that of Julius Caesar. A warning letter sent to Kilpatrick echoes a warning letter received by Caesar. Also, a burning tower in Kilgarvan mirrors a falling tower in a dream of Caesar's wife. Ryan's first interpretation concerns the workings of cyclical time. However, new evidence drives him away from this hypothesis: words spoken by a beggar the night of the murder were 'prefigured' by Shakespeare in *Macbeth*. Amazed by history copying history and history copying literature, Ryan eventually deciphers the enigma: Nolan, the oldest comrade of Kilpatrick, had 'choreographed' the murder. Following Kilpatrick's orders to find a traitor, whose name had been scratched out from a document signed by Kilpatrick, Nolan discovered that the traitor was Kilpatrick himself. Condemned to death by his comrades, Kilpatrick proposed to die heroically in order to save the rebellion and his

reputation as a hero. Nolan, who was also a translator of *Julius Caesar* and writer of large theatrical performances, plagiarised events and words from Shakespeare to stage the scene of the assassination. Kilpatrick died in heroic ecstasy, in a rebellion that was also a public performance, and amongst hundreds of actors. Coming to the end of a long chain of prefigured events, Ryan realises that Nolan's plot was planned so as to include the future discovery of the truth and that he perhaps, the writer of Kilpatrick's story, was also part of this plan. He decides to silence his findings aware of the fact that this might also have been foreseen.

It is apparent that behind a conventional patriotic fiction lies a complex structure of relationships and plot twists. Like most mystery stories, this fiction is composed as a diptych. The first part presents the enigma, while the second provides the resolution. A change of roles marks the transition from the first to the second part, the most important of which is Kilpatrick's new identity as a traitor (from hero) and Nolan's new role as the main mechanism in Kilpatrick's assassination (from executor of his orders). Another reversal concerns Ryan who is transformed from an author of Kilpatrick's biog-

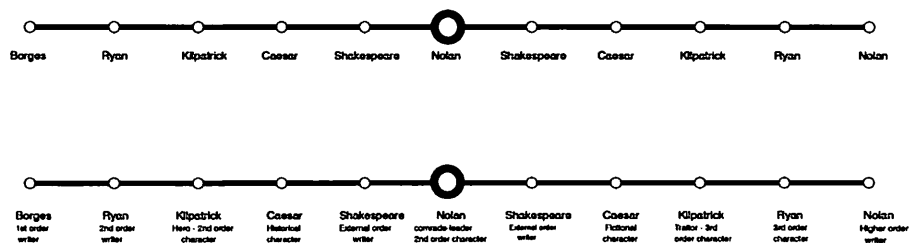
raphy and solver of an enigma to perhaps another instrument in Nolan's machine.

The geometric construction of the narrative

In order to study these transformations we map the story as represented by the main characters and according to the order in which they appear and reappear in the text. If we think of the fiction as a progression from beginning to end, we have a line that starts with Borges and finishes with Nolan (Fig. 1). Borges marks the first point on the line making his presence as a narrator explicit at the start, while Nolan ends it with his new identity as the maker of the plot. The points between Borges and Nolan stand for Ryan, Kilpatrick, Caesar and Shakespeare. This representation leads us to two observations. First, Nolan is also found at the centre of the line preceded by five points on the left and followed by five points on the right. Second, if we 'hinge' the line at its centre to form a diptych, all characters are mapped onto themselves, while Borges and Nolan (at the end) coincide with each other (Fig. 2).

This transformation captures the dual identity of Kilpatrick (from hero to traitor), middle-Nolan (from

Figure 1. Linear representation of the fiction according to the order in which the characters appear in the text.



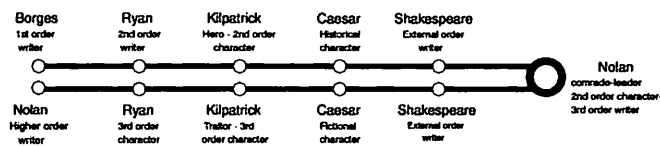


Figure 2. The line is hinged at the centre to form a diptych. The characters are all mapped into themselves. This transformation captures their dual identity in the story and shows that Borges (1st order writer) and Nolan (higher order writer) are mirror versions of each other.

comrade to leader) and Ryan (from author to character in Nolan's plot). It also suggests that Nolan is Borges, a proposition that stands firm since the fiction starts with Borges and ends with Nolan's appearance as a higher order author that includes also Ryan. As the end of a story brings us to the boundaries of the fictitious world Borges set clearly at the beginning, Nolan's re-appearance as an author at this point suggests an identity that is external to the fictitious plane. Borges and end-Nolan are mirror versions of each other in the same way in which the biography written by Ryan is a mirror version of the story designed by middle-Nolan.

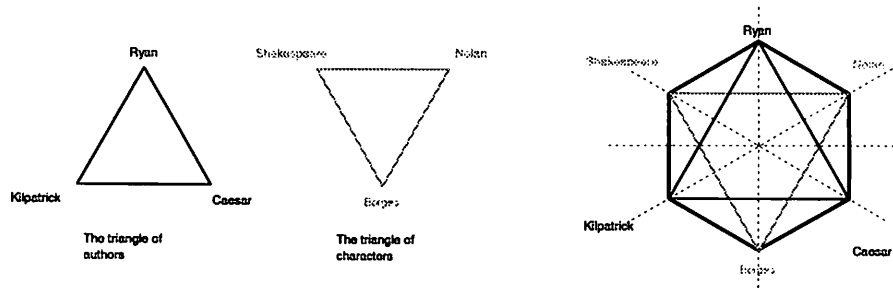
The idea of dual identities and the notion of a dual-fiction make us aware of some further relationships. If Borges and Nolan are authors, and if Ryan and Kilpatrick are characters with a dual identity in the author's plot, then how are the identities of Shakespeare and Caesar transformed from the first part of the diptych to the second? In part one Ryan discovers evidence surrounding Kilpatrick's death that is parallel to Caesar's death, an historical character. Then he finds out about Nolan and his translations of Shakespeare's plays. This discovery marks a passage from history to fiction with Caesar featuring as a fictional character. It is this identity that Nolan in plagiarising Shake-

spere, sees also in Caesar. Finally, both Ryan and Nolan see Shakespeare as a writer, the former solving the enigma, the latter launching his own story, the 'choreography' of Kilpatrick's death. So, Shakespeare is the only character whose identity stays invariant: author of *Julius Caesar*, a story of an external order.

The suggestions that Borges and Nolan are symmetrical authors of a higher order and that Shakespeare is an author of an external order imply the following: Borges, Nolan and Shakespeare belong to a class of authors, whereas Ryan, Kilpatrick and Caesar are characters in the authors' plot. Since each member has a similar identity to all other members in the same group, we can represent each class by an equilateral triangle (Fig. 3). However, 'authors' and 'characters' have a dual identity also. Ryan is a writer of Kilpatrick's story and character in Nolan's plan. Nolan is Kilpatrick's comrade and writer of theatrical performances. Finally, Kilpatrick's improvisations during the rebellion establish him as an emerging author, while he had appeared to be only a character.

The condemned man entered Dublin, argued, worked, prayed, reprehended, spoke words of pathos . . . Kilpatrick, moved almost to ecstasy by the scrupulously plotted fate that would redeem him and end his days, more than once enriched his

Figure 3. The two triangles are superimposed on each other forming a hexagon. Authors and characters become symmetrical.



judge's text with impoverished words and acts.' (Borges, 2000)

If we superimpose the two triangles we have the hexagon shown in Figure 3. This shape has four reflectional symmetries and six rotational symmetries. Group theory defines symmetry as a transformation that leaves a shape invariant. If the hexagon is reflected on its four axes or rotated six times by 60 degrees all vertices are mapped on each other and are therefore, interchangeable. This representation leads to the conclusion that there is only one class or otherwise every person is a phenotypical variation of the same genotype, the universal category of 'story maker' who bears the dual identity of author and character.

If all members are reduced to this genotype, can we re-construct the story from its generator? In other words, if we erase all names from the diptych, in the same way in which the traitor's name was scratched out from his death sentence, can we construct them again? This reconstruction is possible by two axes meeting at an angle of 60 degrees and a point that stands on the divider

between the two axes (Fig. 4). This point is reflected three times and rotated twice. These transformations create the hexagon like in a kaleidoscope (Fig. 5). As all points are variations of the same genotype the two axes and the point can be seen as Borges looking at himself in two mirrors. If we think of the book we opened to read *The Theme of the Traitor and the Hero* and of the fiction-diptych as made by two mirrors, then at the moment of the reconstruction, or at the moment of the second reading, we realise that we coincide with Borges and that authors and characters in the story are reflections of ourselves. What the author has not said but has indicated, is that like Ryan we are captured in the plot. If author and reader coincide, then the act of reading and perceiving is also an act of constructing. To cite Eco, author and reader discover each other in the process of writing and in the process of reading (Eco, 1995).

The Garden of Forking Paths

The Garden of Forking Paths is narrated by Yu Tsun, a Chinese professor of English and a spy in the

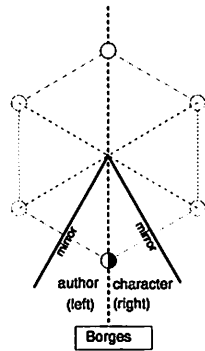


Figure 4. The point between the two mirrors represents Borges as a generic narrative unit that carries the dual role of author (in white) and character (in black).

secret service of Germany. About to be arrested by Madden, 'an Irishman at the orders of the English', Yu Tsun conceives a plan to transmit the secret name of the location of the new British artillery park on the Ancre to his German leader. He then visits Stephen Albert, an eminent Sinologist. The two men discuss a labyrinthine garden and a labyrinthine book called the *Garden of Forking Paths*, the work of Yu Tsun's ancestor, Ts'ui Pen, who was murdered by a foreigner. Ts'ui Pen, governor of Yunan province, astronomer, astrologist, chess player, poet and calligrapher had devoted thirteen years to constructing a chaotic novel and a labyrinth 'in which all men would lose their way'. Albert explains the mystery surrounding both works, demonstrating that 'the book and the labyrinth were one and the same'. Instead of a physical labyrinth that forks in space, Ts'ui Pen had constructed a fictional maze that bifurcated in time allowing several choices for action, and several futures. The idea of multiple futures co-existing in time convince

the protagonist to kill Albert certain that in other universes he and the Sinologist are not enemies but friends. Arrested by Madden, Yu Tsun completes his mission to report the name of the city called Albert to his German superior. The latter eventually deciphers Stephen Albert's murder, which appeared to be an insolvable enigma for the British press. However, a reference to Liddell Hart's *History of the World War* in the opening paragraph informs us that Yu Tsun's mission caused only a minor delay to the British attack.

As in the previous fiction, a narrative strategy is applied here in the form of stories and characters that are mirror images of each other. Borges' writer of *The Garden of Forking Paths* is symmetrical to Ts'ui Pen writer of the *Garden of Forking Paths* – the second-order story. Albert is also symmetrical to Ts'ui Pen deciphering his labyrinth and dying by the hand of a foreigner. Yu Chun is linked with Madden, both being under orders from a country

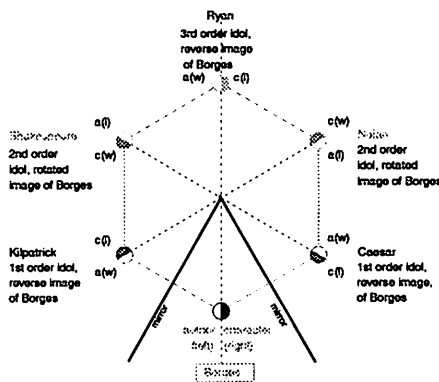


Figure 5. The first and third order idols (Kilpatrick, Caesar and Ryan) interchange left and right through a reflection. The second order idols (Shakespeare, Nolan) rotate the initial image so that the author part of their identity is found at the initial position, i.e. on the left of the circle. The initial entity and its rotations capture the identity of Borges. The rest of the idols capture the identity of the character as a reverse image of the author.

foreign to their own. They are also symmetrical with the stranger who killed Ts'ui Pen by virtue of being either persecutors or murderers. In the previous story reflections and rotations led to a single generic identity. This time murderers become victims and vice versa through the theme of infinite bifurcation. To generate a geometrical pattern that captures infinity we need to construct the basic units of the fiction and study the ways in which they expand to other units and stories.

The geometric construction of the narrative

We can represent Borges' *The Garden of Forking Paths* by a circle with Borges at the centre, (Fig. 6a). Yu Tsun's narrative generates another circle the centre of which is situated at the circumference of the first one, (since Yu Tsun features in Borges' fiction). The two shapes intersect on two other points, taken by Albert and Madden (Fig. 6b). A third story is Albert's interpretation of Ts'ui Pen's book. Another circle is formed with Albert in the centre intersecting the previous two circles on points occupied by Ts'ui Pen and the unknown murderer and resulting in new circles (Fig. 6c, 6d). Madden arresting Yu Tsun releases a story to the press which leads to a seventh circle. The German leader, who lies at the centre of an eighth circle, eventually deciphers this story (Fig. 6e). This pattern can grow infinitely, creating a network of triangles and nodes that branch out in all directions expressing the pattern of bifurcating paths (Fig. 7). All nodes are symmetrical with each other based on 'translations', a term that describes a transformation resulting from shifting the position of an element on a plane. The circles were constructed by

moving their centres along three axes. In the previous story the geometrical structure is the hexagon, while the metaphor to reconstruct this shape is the hinged mirror. In this story the geometrical pattern is the triangular tessellation, whereas the metaphor is the tiled surface.

Sir Thomas Browne, a seventeenth century English philosopher, wrote an essay entitled *The Garden of Cyrus* (Huntley, 1966) suggesting that the pattern of ancient plantations was the quincunx which captured the mystical mathematics of the city of heaven (Fig. 8). In the opening chapter he proposed that the original pattern was not the square but the lozenge generating a triangular grid. This configuration allows closely packed circles to be formed providing the densest planting of trees in an orchard (Moore, Mitchell, Turnbull, 1988). For Browne this was also the original pattern of chessboards, that brings us to Albert's question to Yu Tsun: 'in a riddle whose answer is chess, what is the only word that must not be used? . . . The word "chess" I replied' (Borges, 2000). Albert's question aimed at demonstrating that in Ts'ui Pen's book, an enigma whose answer was time rather than space, the word time was deliberately omitted. The association of the quincunx plantation, as cosmic model of heaven, with the chessboard and the maze expresses the relationship between the human mind and the world whose logic it deciphers in the form of the ordered patterns of geometry, mathematics and language (Irwin, 1994).

Irwin argues that Ts'ui Pen's labyrinthine book alludes not only to Browne but also to a garden that is both a labyrinth and a chessboard – the garden of Looking-glass House in Lewis Carroll's *Through*

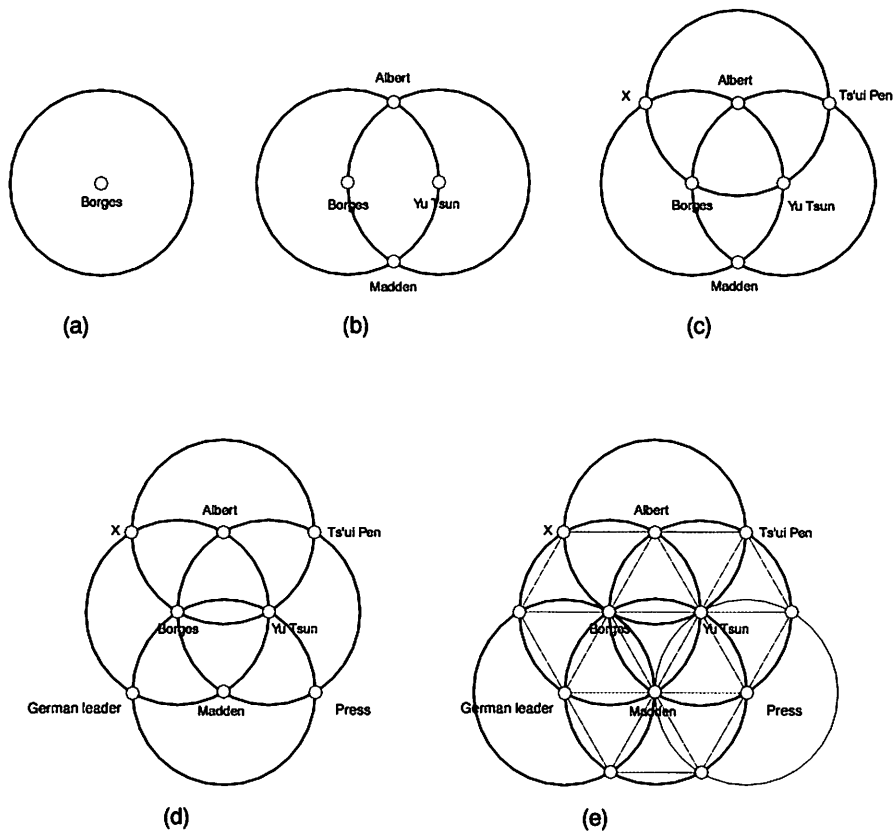


Figure 6. The centre of each circle represents a narrator whereas the perimeter stands for one of the stories embedded in the fiction. A regular and expanding pattern of intersecting circles is generated that captures the geometrical structure of the narrative and the infinite expansion of stories.

the Looking Glass (Irwin, 1994). Carroll's book creates temporal reversals and spatial inversions. Gardner comments that Alice's dream of the red king who dreams of Alice suggests infinite regres-

sion like two mirrors facing each other (Gardner 2001). For Gardner chess encompasses the notion of the mirror by the reflectional symmetry of the opposing chess pieces at the start of the game. The

Figure 7. The geometrical pattern is infinitely extendable generating a tiled surface.

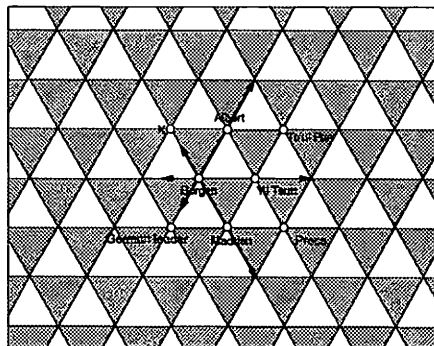
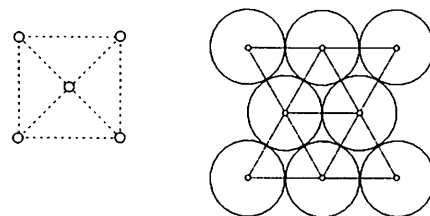


Figure 8. The quincunx (left) and minimum spacing of circles (right).

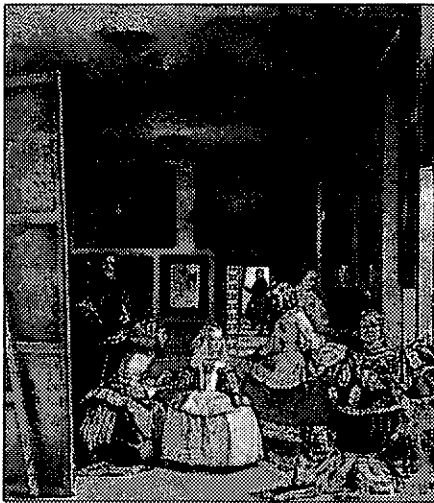


allusions to Carroll and Browne then seem to suggest that by reading *The Garden of Forking Paths* we are reading a riddle whose answer is chess.

Calvino in *Invisible Cities* has also used chess as a metaphor for the structural relationships underlying a narrative. For Peponis it refers to Saussure's comparison between language and the game (Peponis, 1997). Each move on the chessboard is understood within the structural rules, in the same way in which words in a sentence are understood in terms of their relationship to other words. We

may add that the comparison with chess points also to another fundamental proposition by Saussure. The mode of signification is governed not only by sequential operations (of noun and verb, subject and predicate, etc.) apparent in a sentence, but by structural laws of association which relate each signifier to other potential, but not actually present, signifiers within the total system of language (Saussure, 1985). In Calvino's *Invisible Cities*, laid out as riddles, Kublai Khan tries to decipher their logic with the help of the chess game. The name that is not used but is always implied is: Borges.

In his essay *Fiction lives in Fiction* Borges refers to Velasquez's painting *Las meninas* showing Velasquez himself painting a portrait of Phillip IV and his consort who are outside the frame but reflected in a mirror (Borges, 2000). On the painters' chest is the cross of Santiago (Fig. 9). Borges explains that there was a rumour that the King painted it there, making him a knight of that order. He concludes that inserting one painting inside another corresponds in the world of literature to the interpolation of one fiction within another fiction. Velasquez's pictorial technique to omit the royal couple, providing their reflected image instead, corresponds to the absence of direct reference to Lewis Carroll. But it is not only Carroll who is implied in Borges' canvas. Looking at the painting we see the characters looking at ourselves. We realise that the pictorial plane expands to include us and that we perhaps are the missing subjects. Following the conventions of western pictorial representation that opens a window in the real world, *Las meninas* challenges our habitual reading of paintings as representations of reality. By pulling us into the



scene, it puzzles us with the paradox of real and fictional space merging into oneness. Borges' narrative techniques achieve the same effect. The multiplied personae of the author onto the tiled surface open a window into his mind. There we see what he wants us to see: seeing ourselves seeing.

Death and the Compass

Death and the Compass is the story of the attempts of detective Lonrot to solve the mystery of a periodic series of murders. The first murder took place on the night of the 3rd of December. The rabbi Marcelo Yarmolinsky, was killed at an hotel that appears to be located in the north of a European capital city. Among his books was a treatise on the Tetragrammaton, the secret name of

God, and in his typewriter a sheet of paper saying 'The first letter of the Name has been written'. The second victim, Daniel Simon Azevedo, was killed on the night of the 3rd of January in the doorway of a paint factory. On the walls, across the painted diamond shapes, was the sentence: 'The second letter of the Name has been written'. The third murder occurred on the night of the 3rd of February, during Carnival time. The victim, a man called Gryphius, was killed by two harlequin figures whose costumes bore coloured lozenges. Scrawled on the blackboards of the tavern where the murder took place was: 'The last letter of the Name has been written'. A letter and a map of the city sent to the police predicted that there would not be a fourth crime on the 3rd of March because the locations of the three crimes in the north, west and east of the city formed an equilateral triangle. Lonrot examines all evidence in the light of the Tetragrammaton which has four letters rather than three. The diamond shapes featured in the last two crimes and the Jewish day which begins at sundown suggest that the murders were committed on the 4th day of each month. A drawing compass and a navigational compass reveal the location of the fourth murder – the abandoned villa Triste-le-Roy.

Arriving at the villa he is astounded by its perfect symmetries. Exploring a series of repeated spaces, he progresses from the cellar to the top of the house where he is captured by the criminal Red Scharlach. Scharlach reveals the maze he had woven around Lonrot. The first murder happened by mistake. He, Azevedo and friends of theirs had planned a robbery in the hotel where the first victim stayed. Azevedo double-crossed his associates, got

Figure 9. Las meninas, Velasquez.

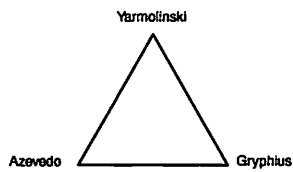
lost in the hotel, went into the rabbi's room and killed him when he tried to call for help. Reading in the newspapers that Lonrot was trying to find the solution to the murder in the rabbi's writings, Scharlach planned the other two murders to reinforce Lonrot's belief that Hasidic Jews had killed Yarmolinski in the quest for the secret name of God. The second victim, Azevedo, was killed because he 'acted on impulse and was a traitor'. The last murder was a simulacrum with Scharlach in the role of the third victim, Gryphius. Thinking for the last time of the problem of the symmetrical periodic numbers, Lonrot proposes a labyrinth that is more economical than the two-dimensional maze of Scharlach.

When you hunt me down in another avatar of our lives, Scharlach, I suggest that you fake (or commit) one crime at A, a second crime at B, eight kilometres from A, then a third crime at C, four kilometres from A and B and halfway between them. Then wait for me at D, two kilometres from A and C, once again halfway between them. Kill me at D, as you are about to kill me at Triste-le-Roy. Irwin suggests that Lonrot and Scharlach are doubles of one another (Irwin, 1994). The end syllable of Lonrot means red in German, and Red Scharlach is also translatable, in German, as Red Scarlet. However, there is more to their symmetry than the semantic similarity in their names. They are symmetrical by virtue of constructing and solving riddles which is common to all characters in the three stories. It is by this characteristic that both slain and slayer, riddle-creator and interpreter hold a mirror in which we see Borges, higher-order author of mazes, reflected.

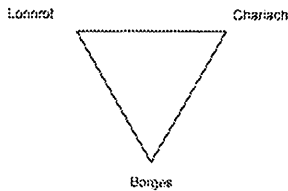
In this fiction the shape of the crimes and of their topography is not only the geometrical structure linking the characters (Fig. 10), but also a device that lures the protagonist. Narrative turns upon its own structuring to reflect its mode of operation. In the story, Lonrot's search for the solution to the problem in the writings of the rabbi is juxtaposed to the suggestion of the police commissioner that Yarmolinski's death happened by mistake. However, Lonrot's interest in logical mathematical conjecture gains predominance over the legitimacy of accident and over the pragmatic facts in the murders.

He had virtually solved the problem; the mere circumstances, the reality (names, arrests, faces, the paperwork of trial and imprisonment) held very little interest for him now.

Borges turns our attention to the geometrical structure as failing to capture a precise image of reality. If the models in his stories, or in Lonrot's mind, can link actions and happenings, then real life does not necessarily fall into perfect patterns. Realising his defeat Lonrot proposes a linear mathematical labyrinth, where he and Scharlach will face each other in other fictions. This labyrinth is known as Zeno's paradox, and concerns the division of a distance between two points into regressing fractions (Aczel, 2000) (Fig. 11). While the fractions are infinite the whole is conceived as a single entity. If reality has random instances, Borges seems to suggest, if the beginning of the sequel was based on accident, the writer, the artist, the scientist and the philosopher will continue weaving webs in order to explain its apparent chaos and randomness. They will continue trying to reconcile two categories, unity and its divisibility into infinite parts, which reality is unable to synthesise.



The triangle of victims



The triangle of riddle makers

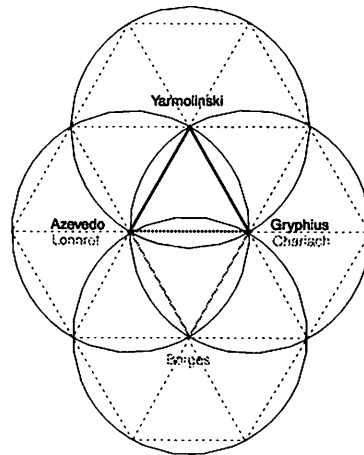
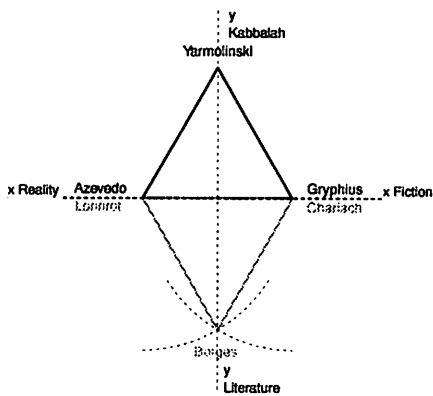
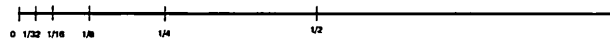


Figure 10. (a) The shape has two reflectional and two rotational symmetries. The y axis expresses a relationship between literature and the Kabbalah while the x axis relates fiction to reality. (b) The arcs that are used to define the fourth point are extended to form circles. The triangular tessellations shown in Figure 6e are generated this way extending the geometrical pattern to infinity. All points are interchangeable suggesting a single narrative unit carrying the dual characteristic of slain and slayer. In the story the triangle units are expressed through the window longezes in the belvedere of Tristele-Roy.

Borges' narrative strategy

The comparative study of these fictions shows that the narrative strategy of Borges consists of a minimal narrative unit defined along the opposition of slain and slayer who have a symmetrical relationship with each other. This unit is reflected several times, producing a number of identical units. In the linear progression of the narrative this structure is disassembled to achieve differentiation. The units are characters that appear under different identities. They are German spies or Sinologists, Chinese governors, police detectives, poets, chess players, or Irish revolutionaries. They are contemporaries or belong to different temporal moments. They make their appearance from other fictions or from historical events. Underneath this diversity of people, happenings and works of literature lies a network

Figure 11. The division
of a line into infinitely
regressing fractions.



of geometrical relations establishing their homogenisation across the plane.

As the characteristics that signify the identity of the narrative units in the stories, like origin, preoccupations and predilections, revolve around recurring oppositions, they undergo specific transformations. Heroes become traitors and their comrades become their judges, persecutors become victims and pursued criminals weave mazes that capture their hunters, Irish conspirators become play writers, fictional characters become historical or literary figures, and readers become writers. These transformations carry higher levels of meaning defined across oppositions between, fiction and reality, history and fiction, fiction and literature, time as transition from one event to another and time as timeless present. They mediate the relationship between writing and reading, between raising questions and finding solutions, between observing the phenomena of the real world and organising them into meaningful and ordered propositions.

Claude Levi-Strauss provides an illustration of mythic and ritual structures of societies based on their logical structure. The constituent units of myth cannot be explained in isolation from each other. Such a reading looks at their literal-semantic content which quite evidently lacks any sustained or universal significance. Meaning resides in how these elements are combined (Levi-Strauss, 1963). The structural relations within a comparative mythology show that the task of myth is to reconcile opposi-

tions that remain insoluble at the empirical level of experience (Kearney, 1986). The comparative analysis of the narratives shows that the task of Borges has been to synthesise fundamental contradictions, like reality and fiction, unity and infinity, similarity and difference, nature and culture, self and other, time and eternity, as if they are one and the same, when in real life they are seen as categories that are separate and rigidly defined.

From Borges' fictions to architecture

We now come to examining the role of architecture in Borges' fictions. At the pure pragmatic level, architecture in a story is used to render the idea of space where action takes place. In the first fiction Dublin is the urban stage for Kilpatrick's assassination. Although there is no physical depiction, the cityscape is implied through Killpatrick's actions and the actions of 'hundreds of actors' who took part in the rebellion. The second story follows Yu Tsun from his flat to the country road that brings him to Stephen Albert's house. Amongst all places the English countryside gains special importance. Walking in this landscape, represented by forking country roads, dew-drenched paths and formless meadows, Yu Tsun navigates, turning left at every crossing. He is thus reminded of a way to discover the centre in a maze, and of the labyrinthine garden of Ts'ui Pen. In *Death and the Compass* architecture enters the narrative through a map with a superimposed diamond shape and through the places of the four murders. However, as the narrative

advances to its end, it focuses on the villa Triste-le-Roy, describing Lonnrot's path from the garden to the belvedere through the symmetrical house and its identical rooms.

The choice of setting establishes a geographical, topographical, historical and social context. However, architecture in these fictions carries meaning beyond the realistic representation of the identity of place. Dublin in the first story becomes the stage for a theatrical performance the scenes of which have been taken from *Macbeth* and *Julius Caesar*. It echoes Joyce's *Ulysses* in which every episode corresponds to an episode in the *Odyssey* of Homer³. Stephen Dedalus, one of *Ulysses'* heroes, is named after the mythological inventor of human flight and creator of a labyrinth. Burgess explains that Joyce conceived the sixth chapter of *Ulysses* spatially and wrote it with a map of Dublin and a stop-watch. Confusions in the chapter, created by the unexpected insertion of characters involved in the plot, generate the feeling of being lost in a maze (Burgess, 1982). Borges' choice of Dublin, thus, alludes to another work of literature and to the city as labyrinth.

The English landscape in the *Garden of Forking Paths* is the landscape that inspired William Kent, Humphrey Repton and Capability Brown. Its essence in the eighteenth century was to eliminate the accidental flaws of nature and 'improve' its patterns to match an existing conception of beauty. Walking on the country road, Yu Tsun thinks of the garden of his ancestor. Like many English gardens, the gardens of China are miniatures of natural worlds apparently informal but composed in a precise and contrived way (Moore, Mitchell, Turn-

bull, 1988). There are no straight lines, no symmetrical elements, allowing for layers of discovery within a flowing nature.⁴ The choice of the English and the Chinese garden evokes the relationship between the apparent informality of nature and the human intervention that simulates and reinforces its patterns.

In Yu Tsun's imagination the garden of Ts'ui Pen expands to include 'rivers, provinces and kingdoms' and eventually an infinite universe where every scene dissolves to a mental landscape of contemplation. The depiction of space thus shifts from a stationary point positioned at eye level to one that is placed at a remote distance. Certain pictures and woodcuts of early Chinese gardens, like the garden Yuan Ming Yuan, depict aerial views of buildings, mountains and lakes in a way which is different from the Western post-Renaissance paintings where the artist and the observer are placed in the composition. For Gibson they lack a fixed point of observation. Examining Japanese depictions that are similar to that of Yuan Ming Yuan, Haagen explains that they do have a fixed viewpoint, but it is at optical infinity (Haagen, 1986). The depiction that changes with Yu Tsun's position in space and the one that is panoramic allude to the relationship between the unfolding sequence of the fictional events and the narrative structure which is static, sees everything at once and organises them into ordered patterns.

Evans argues that ideas about perception are dominated by vision and are defined by pictures and projections (Evans, 1995). Ideas about landscape design in the eighteenth century were also influenced by pictures, like the idealised Roman

landscapes of mythical scenes painted by Claude le Lorrain and Nicolas Poussin. Chinese landscape gardening was also rooted in landscape painting with the painters themselves participating in the construction of gardens (Cho Wang, 1998). Parallel to painting, there was an influence from poetry and literature. This found expression in the form of verses that were incorporated into the garden elements or of narrative episodes that were visited in a definite sequence. Examples of such gardens are the Ge Yuan in Yanszhou and the Stourhead Garden in Wiltshire (Fig. 12). It is not clear whether Borges saw the story scenes in this way aided by existing landscapes and by pictorial examples. However, *The Garden of Forking Paths* is informed by significant moments in the history of ideas of landscape design and its pictorial representation. These ideas were based on philosophical

approaches that saw the garden as an integral part of nature (Pope, 1731) and of an underlying universal order. It is here that the origin of a labyrinth that consists of a book that contains the universe of all possibilities is founded. Borges uses specific cultural contexts and the philosophical framework that found expression in landscape painting, landscape design and their creative incorporation of literature to enrich the story's content.

The places upon which Lonrot sets foot in *Death and the Compass* are the cityscapes of a European capital. They are informal places of diversity, with factories, museums of wonders, brothels, tanneries, bookshops, Irish taverns and echoing suburbs. Researchers of the city suggest that cities possess an underlying logic in the form of spatial connections that is manifested in the ways in which people navigate through their streets (Hillier and Hanson, 1984). However, their maps do not have a geometrical structure of parts that can enable us to understand them as wholes. Against this cityscape of informality two readers, Scharlach and Lonrot, face and measure each other with the help of a compass. Victory belongs to the one that better grasps the complexity of the two layers: the city seen from the ground, echoing the narrative progression with its sequence of murders, and the superimposed shape, expressing the underlying order of symmetries, the surface of geometric tessellations.

Leaving the city's 'labyrinth' Lonrot comes to the solitude of the villa Triste-le-Roy. This is the moment that narrative through fiction and narrative through space coincide following his steps through identical courtyards and chambers with facing mirrored

Figure 12. Stourhead Garden.



walls. The house is a palace of disorientation and infinite reflections. Understanding the 'architect's predilections' Lonrot concludes that it looks infinite because of its symmetry, its mirrors and his lack of familiarity with the place. So, he manages to navigate from its depths to the belvedere. His route marks his transformation from ignorance to the time he meets his plotted death. The villa whose name in French means 'the sorrow of the king' is the place where the game ends at checkmate. Lonrot's last experience evokes the superimposition of the diamond shape on the city's grain.

A stair took him to the belvedere. The moonlight of the evening shone through the lozenges of the windows . . . Lonrot avoided Scharlach's eyes. He looked at the trees and the sky subdivided into murky red, green and yellow rhombuses.

Triste-le-Roy with its symmetrical disposition of rooms, staircases and statues is modelled like a classical villa which, starting from Italy in the fifteenth century, reached France and northern Europe. Following a tradition rooted in the Pythagorean and Platonic conception of mathematical order and supported by a mediaeval conception of heavenly proportions and numbers, the Renaissance architects applied harmonic ratios and symmetries to the layout of villas and gardens (Fig. 13). Influenced by Roman ideals of rural life through Virgil and Pliny they combined the pagan conception of mathematics and beauty with the Christian conception of a divine cosmic order. Triste-le-Roy is not just an edifice where Lonrot wanders, loses his way and emerges in search of a solution to the crimes. It embodies moments in the history of ideas about the universal edifice and the ways



Figure 13. Palladio, Villa Malcontenta.

in which these were poetically synthesised in architecture.

Three kinds of landscapes are painted on Borges' canvas: an urban landscape, a perfected natural landscape and an interior landscape. All three are negotiated by the characters as they progress to the end of their actions. Kilpatrick, a condemned man, enters a cityscape as Stephen Dedalus and Leopold Bloom entered it, in the footsteps of other writers, through the labyrinths of Homer, James Joyce and William Shakespeare. Marching to his predetermined death he enhances this labyrinth with his actions and 'words of pathos'. Yu Tsun, a pursued man, advances in the English landscape in search of Stephen Albert whose name will send out a coded message to his German superior. Instead of a garden-labyrinth he finds a literary-labyrinth that contains all characters and all actions. Lonrot traverses the city from east to west and from north

to south. He comes to a house in search of a symmetrical pattern that enables him to read order out of the city's apparent chaos. He finds an architectural labyrinth full of repetitions and deceptions that end his life.

All the stories provide a conventional narrative disclosure associated with the protagonist's death. However, the transformations and the reflections establish oscillations, digressions as well as new points of departure, or movement towards new narratives. They seem to indicate that a narrowly defined linear sequence with a beginning and an end is only one of the possible ways in which we can read these fictions.

As the characters advance in the stories, the physical experience of the places they occupy becomes a metaphor for the linear progression of the narrative towards an end and a solution. Anthony Burgess has suggested that the narrative techniques employed by Joyce and the re-telling of the *Odyssey*, make a bridge for marching across the chapters (Burgess, 1982). We may say that the three places are spatial models for marching across the disorientations and reflections in Borges' fictions.

Models can have a resemblance between the thing that is represented and the representation itself or can be arbitrary and widely accepted by social convention. In all the stories the depiction of space is locked to the movement of the central character. It has a human scale and we as readers can either visualise the rebellious events in Dublin's streets or can discern details and experience sensations we would feel if we were marching in the English countryside, in the cityscape or in Triste-le-Roy. It is thus not the form of the three places that

carries the content of the labyrinth. It is the nature of their depiction which shifts at eye level with the character's movement and is bound to temporality, from the moment Kilpatrick enters Dublin to the moment he is killed, from the time Yu Tsun leaves his flat to the time he is arrested by Madden, from the moment Lonrot's eyes meet the belvedere of Triste-le-Roy surrounded by trees from the garden, to the moment he looks back at the trees, through the latticed windows of the belvedere.

Borges juxtaposes the vision that unfolds in temporal sequence with another vision which is static like the cityscape seen as a map and the landscape as panorama. The two ways in which space is rendered remind us thus of the ways in which cartographers, city planners, landscape designers and architects look at space, i.e. as a sequence of visual fields and as an overall framework where all spatial moments are concentrated on a single instant, on a flat plane, the surface of a map, an aerial photograph or a building plan.

Against the two places of informality, the city and the landscape, stands a tiled surface of symmetry that links characters and events independently from their position in the narrative sequence. The third setting, the villa Triste-le-Roy, is the only place where narrative progression, space and geometrical order merge into oneness. Here Lonrot is deprived of the external point of view, the point where he stands to draw the diamond shape on a map. His relationship to the geometrical order of the house is a physical one from which he finds no escape.

If a narrative structure employs geometry and symmetry to capture the reader in the plot, then architecture is different from literature. The

reader-viewer is already captured inside its spaces. We come to the most fundamental of Borges' propositions: literature creates representations of experience, whereas architecture creates physical space which we occupy with our bodies. However, in spite of this difference, the symmetry of the house alludes to the symmetries in the narrative. It suggests that although the reality of space separates architecture from literature, the mode in which they are experienced and certain tools of construction, concerning temporal sequence and the organising framework of geometry, can be fundamentally close. Finally, the analysis of the stories reveals that the analogy between architecture and Borges' fictions is also founded on the history of philosophical ideas about nature, infinity and cosmic order.

At this point we might revise the analogy between literature and architecture. It was stated above that the former is concerned with representations of reality whereas the latter with the actual constitution of space. It was also stated that they have a representational function in their capacity to embody and reflect philosophical ideas. However, to confine architecture to the actuality of spatial construction or to the referential powers of symbolism would be similar to reducing Borges' fictions to story telling or his fictional spaces to an actual image of labyrinths.

Architecture and fiction for Borges do not represent reality as it actually is. They are attempts to express what reality actually lacks: i.e., an underlying framework, a perfect order that can explain the conflicting, empirical and time-bound aspects of everyday life. This is Lonrot's last discovery as he

emerges from the solitude of the villa to face his irrevocable death. The house whose name means 'the sorrow of the king' 'does not speak or tell' about a universal order of infinity, 'but indicates through signs'. It is an illusion of infinity, of a universe mapped out in the image of a clear and rigorous geometry. It allows us to move inside boundaries that give shape to things that in reality are separate and distinct. It has its own ontological structure and like chess is the domain of possibility, where new combinations, new discoveries, new games are hidden. To play, to linger, to invent. Happily, in the kingdom of our intellect. In boundless time. In invisible solitude . . . While Red Scharlach is waiting in the belvedere.

From architecture to narrative

Borges is often considered as the first of the so-called post-modern authors who negate the formulation of history as a steadily unfolding sequence of events with a conclusive ending, and often turn this negation into the subject of their writing. Calvino's *Invisible Cities* consists of chapters which, although linked by conceptual relationships (Peponis, 1997), possess an autonomy and can be read individually skipping large parts of the book, or circulating into its sections in many different ways. In his book *If on a Winter Night's a Traveller* Calvino accentuated the openness of his narrative further, inserting unfinished stories into the plot, which also incorporates the reader, whose main task is to explain why these stories have no ending.

A parallel architectural movement in the late twentieth century emphasised the absence of anthropocentric space, of a single viewpoint

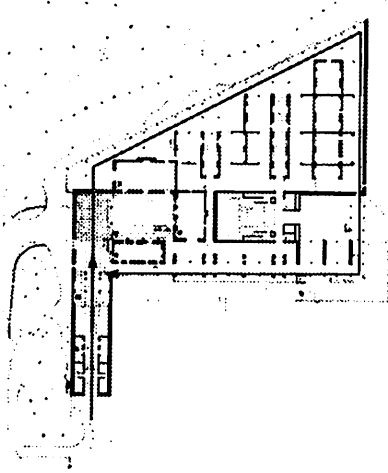
(Eisenman, 1991), and the celebration of fragment and disjunction over oneness. Underlying these ideas are contemporary developments of thought that stressed the presence of multiple universes, the multiplicity of consciousness and an apparent chaos in social structures. For Robin Evans the idea of a society that has suddenly fallen out of order is a demonstrable fiction. 'There was never such age with such state of mind. There was only art which gave that impression from certain points of view, so that the imagination could feed what the intellect could not accept' (Evans, 1995). The task of art is to establish a continuum amongst contradictions, like the centralised Renaissance churches which represent the universe as wholesome and ordered. The study of Borges shows that narrative has the same function: it represents a coherent world out of conflicts, and satisfies our desire to see them resolved into carefully crafted and rigorously ordered propositions.

Borges' influence on writers like Calvino is immense. His narrative structure establishes movement towards itself, towards other existing narratives and finally towards narratives which are not realised yet, but are latent in the text. This is achieved within extremely condensed stories that are complex and simple enough, to satisfy a large public. Most significantly, in contrast to post-modern approaches, he does not decompose his narratives that in spite of their oscillations progress linearly, in the traditional narrative fashion.

Architecture also constructs worlds which appear 'closed' or open-ended and infinite. Buildings can be like the villa Triste-le-Roy, utterly symmetrical, or

like a city, informal and irregular. In most cases they offer many rather than a single way to move inside them. Some buildings, however, together with multiple routes, provide one path which enables the viewer to experience them in a linear sequence. In the Burrell Museum a clockwise movement along the periphery of the layout brings the visitor back to the point of departure (Fig. 14). In the Museum of Scotland a peripheral route allows one to skip the exhibition spaces and reach the top of the building offering views to the city and its monuments (Fig. 15). In Stirling's Staatsgalerie a path penetrates the museum from front to back. In Villa Savoie the route twists inside the house in an upward movement bringing the visitor to the roof terrace. The penetration of a building from one side to the other and from the bottom to the top expresses the capacity of architecture to function as narrative. Crossing a boundary that separates the inside from the outside is like entering a fictitious world, like opening a book to read a story. When architects offer a linear path they emphasises one route out of many. This route defines their narrative voice, pointing at one of the ways they might want us to see the building: as sequence with a beginning, middle and an end and within the organising framework of geometry. This might explain why elements of transition like entrance halls, ramps, stairs, passages, ante-chambers and roof terraces are the most favourite elements in architects' vocabularies, defining moments in a sequence from entering to leaving and from progressing to arriving.

We can conclude that if the task of Borges has been to expand a single route into many, using



digression and multiplicity, these buildings move in the opposite direction: they try to condense digression and multiplicity into one path or as few paths as possible.

We can now return to the observation made at the beginning of this paper. Architecture is a thing in so far as it renders itself to be experienced, and an activity that deals with the organisation of the parts into a whole (Hillier, 1996). The thing defining unity and the parts constituting the whole bring us to Zeno's paradox, or to Borges' labyrinths. The aesthetic experience is determined by a desire to organise the patterns of this world into meaningful wholes described as unities. At the same time it is fundamentally locked into reality consisting of infinite aspects that unfold sequentially. We take as much pleasure in the parts as in the formation of

Figure 14. a) The Burrell Museum, Glasgow, plan; b) interior.

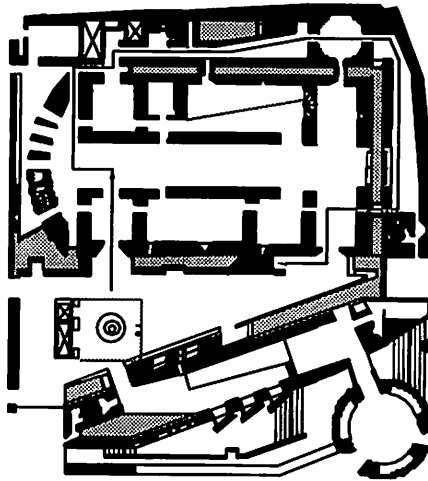


Figure 15. Benson and Forsyth Museum of Scotland, plan.

the whole, as much satisfaction in lingering with our senses at work, as in grasping patterns with our intellect in full power.

Summary

Borges' narratives are based on a tension between the linear progression of the story and the underlying symmetrical structure that organises all narrative elements into a unity. Architecture is used to enrich the fictions' content by its property to articulate a similar relationship between spaces that are seen sequentially and geometrical patterns that link these spaces into a conceptual order. The ideological framework that underlined architecture and landscape design in specific historical and cultural contexts is also used to reinforce the philosophical ideas in his work. The study of Borges' fictions shows that architecture is different from literature by creating physical space. However, it also shows that it is analogous to fiction in so far as it creates illusions of reality governed by a rigorous order and within a universe of combinations. The significance of the study of Borges is not only in helping us to understand architecture, but also in pointing at its powers to unify ideas, media and disciplines that in architectural discourse and architectural application are increasingly seen as separate and distinct.

Notes

1. In 'The Name of the Rose' Eco constructs a labyrinthine library consisting of interconnected rooms in the image of Borges' 'Library of Babel'. The influence of Borges on Calvino is best explained by Calvino himself: 'I will start with the major reason for my affinity with him, that is to say my recognising in Borges of an idea of literature

as a world . . . being formed in the image and the shape of the spaces of the intellect, and inhabited by a constellation of signs that obey a rigorous geometry', I. Calvino, *Jorge Luis Borges*, in *Why Read the Classics* (Jonathan Cape, 1999), p. 238.

2. Felix della Paolera suggests that Borges creates the appearance of a French city and its suburbs through the use of places such as Hotel du Nord, Rue de Toulon and the villa Triste-le-Roy, but in reality these stand for locations in his home city, Buenos Aires. F. della Polera, *La Ciudad de Borges: Transfigurada y Arbitraria*, in *Cosmopolis Borges y Buenos Aires*, J. Insua (ed) (Centro de Cultura Contemporanea de Barcelona, 2002).
3. It is interesting to note that whereas in *Ulysses* Joyce has concentrated 24 rhapsodies of the *Odyssey*, describing travels through many places 'in one day and within the perimeter of one city' (Borges, 2000), Borges proposes that Nolan expands a two-hour theatrical play by Shakespeare to take place over a number of days and within many stage settings, the streets of Dublin.
4. The affinity in the ideas underlying the English and the Chinese landscapes is reflected in many examples of English landscape gardening which incorporated Chinese structures creating what was known as the Anglo-Chinese garden.

References

- A. Aczel, *The Mystery of the Aleph, Mathematics, the Kabbalah and the Search for Infinity* (Four Walls, Eight Windows, 2000).
- D. Balderston, *Out of Context, Historical Reference and the Representation of Reality in Borges* (Duke University Press, 1993).
- J.L. Borges, *Fictions* (Penguin Books, 1998).
- J.L. Borges, *The Total Library* (Allen Lane the Penguin Press, 2000).
- A. Burgess, *Here Comes Everybody* (Arena, 1982).
- T. Browne, *Hydrotophia (Urn Burial) and The Garden*

- of *Cyrus, The Quincunial, Lozenge, or Network Plantations of the Ancients, Artificially, Naturally, Mystically Considered*, ed. Huntley F. L. (New York, Appleton-Century-Crofts, 1966).
- I. Calvino, *Why Read the Classics?* (Jonathan Cape, London, 1999).
- I. Calvino, *Invisible Cities* (Vintage, 1997).
- I. Calvino, *If on a Winter's Night a Traveller* (Vintage, 1997).
- P. Cobley, *Narrative* (Routledge, 2001).
- J. Cho Wang, *The Chinese Garden* (Oxford University Press, 1998).
- K. Devlin, *The Language of Mathematics, Making the Invisible Visible* (Freeman and Company, 2000).
- U. Eco, *Six Walks in the Fictional Woods* (Harvard University Press, 1995).
- U. Eco, *The Role of the Reader* (Indiana University Press, 1979).
- P. Eisenman, 'La Maison Dom-ino and the Self Referential Sign', in (eds) C. Palazzolo, R. Vio, *In the Footsteps of Le Corbusier* (Rizzoli, New York, 1991).
- R. Evans, *The Projective Cast-Architecture and its Three Geometries* (MIT Press, 1995).
- M. Gardner (ed.) *The Annotated Alice*, (L. Carroll) (The Definitive Edition, Penguin Books, 2001).
- M. Haagen, *Varieties of Realism, Geometries of Representational Art* (Cambridge University Press, 1986).
- B. Hillier, J. Hanson, *The Social Logic of Space* (Cambridge University Press, 1984).
- B. Hillier, *Space is the Machine* (Cambridge University Press, 1996).
- J. Insua, (ed), *Cosmopolis, Borges y Buenos Aires* (Centro de Cultura Contemporanea de Barcelona, 2002).
- J. Inwin, *The Mystery to a Solution, Poe, Borges and the Analytic Detective Story* (Johns Hopkins University Press, 1994).
- A. Kanecar, *Metaphor in Morphic Language, Space Syntax III International Symposium* (Atlanta, Georgia Institute of Technology, 2001).
- R. Kearney, *Modern Movements in European Philosophy* (Manchester University Press, 1986).
- C. Levi-Strauss, *Structural Anthropology* (Basic Books, 1963).
- C. Moore, M. Mitchell, W. Turnbull, *The Poetics of Gardens* (MIT Press, 1988).
- S. Molloy, *Signs of Borges* (Duke University Press, 1994).
- J. Singh, *Mathematical Ideas, Their Nature and Use* (Hutchinson 1961).
- J. Peponis, *Cwrografies* (Alexandria, 1997).
- A. Pope, *An Epistle to Lord Burlington*, 1731.
- C. Steenbergen, W. Reh, *Architecture and Landscape* (Prestel, 1996).
- A.S. Weiss, *Mirrors of Infinity* (Princeton Architectural Press, 1995).
- F. Yates, *The Art of Memory* (Routledge & Kegan Paul, 1966).