A formal study of Le Corbusier's spiral plan designs, arguing their production out of Neo-Classical planning methods, and examining parallel techniques in present-day design practice.

Forms and techniques: Le Corbusier, the spiral plan and diagram architecture

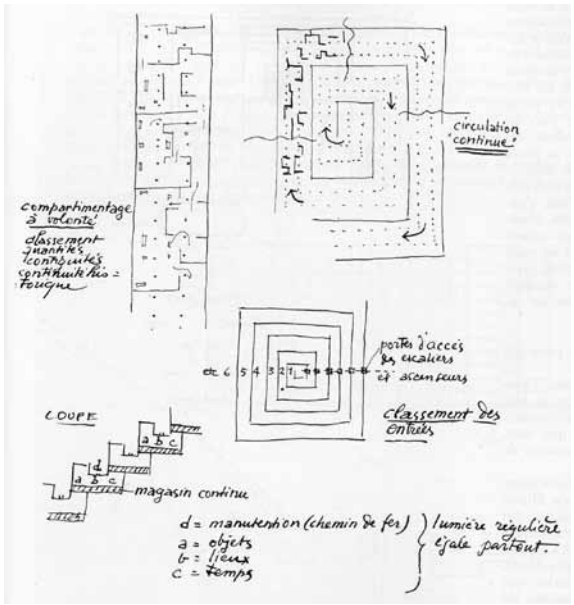
Antony Moulis

While Le Corbusier's spiral plan projects have long been debated for their symbolic and rhetorical meaning – dealing with initiation, procession, ritual, generative nature, unlimited growth and so on – little attention is paid to their actual production as designs.[1] If we look for the emergence of the spiral plan as a production of Le Corbusier's studio then we might begin with a sketch design for the Villa La Roche made in 1923 and not with the project for the Mundaneum (1928) generally credited as the point at which the architect 'invents' the spiral type *[1]*. Taking the Villa La Roche spiral experiment as a tentative beginning marks a much longer history of the spiral plan type in Le Corbusier's work that links the architect's early domestic projects to later major public building proposals such as the Venice Hospital (1964). That which binds these various uses of the spiral plan over four decades and produces complementary plan forms as a result is a certain understanding of design method – an alignment of formal arrangement and spatial effect that is a familiar technique of Neo-Classical planning – often called up by Le Corbusier, albeit dismissively. While Le Corbusier's Modernist rhetoric and his play with symbolism dominates readings of his spiral plans, their production out of design methods understood as belonging to the nineteenth century remains generally unregarded. In revealing a history of Le Corbusier's spiral plans based on formal technique, the paper argues how that technique has come forward to present-day concepts of diagram architecture.

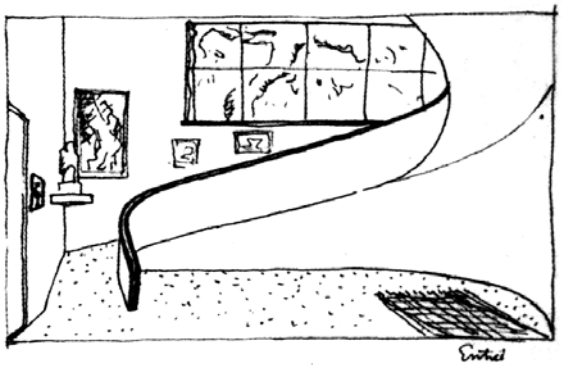
Early spiral plans

What appears as an initial experiment with the spiral plan occurs in a preliminary drawing for the Villa La Roche (1923) where an elliptical form is shown in plan *[2]*. In accompanying sketch views, the elliptical form appears as a ramped circulation route climbing through a double-height volume. The form does not dominate the plan entirely; it is simply tried within the plan layout and does not materialise in the final scheme.

Further development of this spiral form appears in an initial scheme for the Villa Meyer (1925). The plan drawings show an unbroken ellipse positioned at the centre of each level, which connects rooms situated around it *[3]*. The ellipse indicates a spiral ramp travelling through all the levels of the plan to the roof garden. In this scheme, the spiral achieves a more definitive form than was the case in the



1 Mundaneum, sections and various plans, *Oeuvre Complète 1910–1929*, p. 193

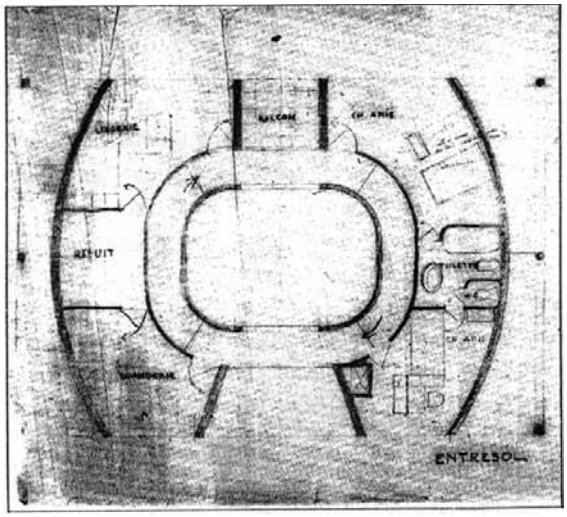


2 Villa La Roche-Jeanneret, sketch plan and views, FLC 15254

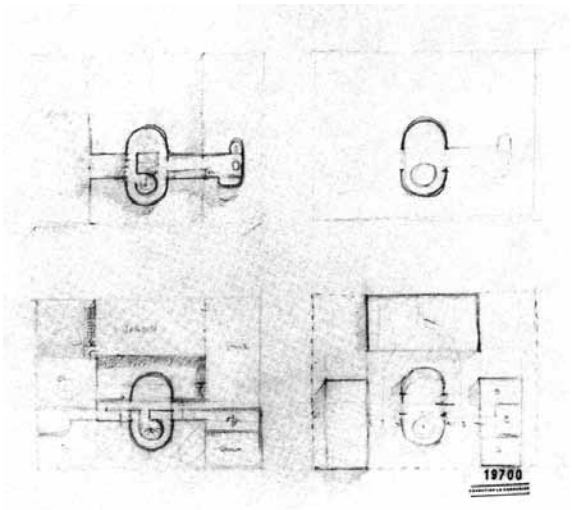
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La Roche project, though it does not yet become the whole of the plan. In a second scheme for the project, the ramp is removed from the centre of the plan and is positioned adjacent to the main floor plates. Later schemes for the Villa Meyer dispense with the spiral ramp arrangement altogether and the circulation is moved back into a more conventional stair arrangement. The elliptical route arrangement of the Villa Meyer has been likened to that of another project also being designed by Le Corbusier in 1925.[2] This project, for M. Mongermon, features an elaborate figure-of-eight circulation ramp shown in plan.

In an early sketch drawing for the Villa Savoye (1928), a spiral stair is positioned at the centre of the plan in an ellipse-shaped enclosure *[4]*. While the spiral stair becomes a curving dogleg stair in the completed project, the spiral is notionally deployed in the form of the central ramp that famously dominates the organisation of the plan. At the same time in the scheme for the Mundaneum (1928), the spiral takes definitive form rendered as a giant circulation ramp formed into a ziggurat-shape. That



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3 Villa Meyer, sketch plans, FLC 10403

4 Villa Savoye, plans, FLC 19700

the architect's prior experiments with spiral plans connect with his design of the Mundaneum can be imagined because of a direct connection between this project and the Villa Savoye, which are literally designed simultaneously. On this basis, it could be imagined that the ramping spiral of the Mundaneum is a distilled version of the central spiral motif proposed for the Villa Savoye, or conversely, that the Mundaneum design becomes a place to test at a monumental scale the spiral idea then being contemplated for the villa. Either way, the fact that the projects have a similar central form and are worked on in parallel suggests a strong relationship between them. This concurrence also draws attention to what can be seen as broader developments in Le Corbusier's thinking about the use of spiral plans.

In each instance observed, the spiral form is clearly used as means of producing circulation and distribution between spaces. However, understood in the broader context of Le Corbusier's writing about architecture of the 1920s, it is evident that the spiral plan form is seen to offer more – a 'Picturesque-like' experience of movement that is favoured by the architect.

Curving movement

Before proceeding on this line of argument it is important to note that the Picturesque is a difficult term to pin down, particularly in relation to the work of Le Corbusier. Jan Birksted has recently questioned general assumptions about the relationship between the architect's concept of the architectural promenade and the English notion of the Picturesque, identifying instead Le Corbusier's direct uptake of Auguste Choisy's *pittoresque* that was, in its French cultural context, quite distinct from its English counterpart.[3] To this varied discussion of the Picturesque we can also add the work of Christoph Schnoor writing on Le Corbusier's interest in Picturesque townscape in the German context, revealed in the notes and manuscript for *La construction des villes* begun by the architect in 1911, which drew directly upon the writings of German architects and art historians such as Camillo Sitte, Karl Henrici, Joseph Lux and Albert Brinkmann among others.[4] While Le Corbusier's sources on the Picturesque are certainly diverse, both Birksted and Schnoor are able to show how those sources are particular in their uptake and effect.

My interest in raising the issue of the Picturesque here is different from theirs and also particular. It is to argue a direct formal correlation between the spiral-shaped plans produced in Le Corbusier's studio and his parallel interest in the experience of curved forms as expressed in his discussion of Picturesque townscapes conducted through text and diagrams in *Urbanisme* (1925). In his discussion, Le Corbusier specifically describes Picturesque effects in townscape, famously contrasting the effect of straight roads and winding roads in layout and site planning, suggesting that the straight road is better used for motorised forms of movement whereas the winding street is best for ambulatory movement

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creating interesting visual effects for the stroller.[5] While the architect understands the effects he describes are ones properly related to arrangements of gardens and townscapes (specifically referencing the English example of Golders Green), he also makes it clear that he is not interested in the winding road as integral to a garden suburb aesthetic. His professed interest is more abstract, related to the singularity of the curve, the form that he understands as producing the layout. Pointedly, he observes how the Picturesque arrangement of detached houses in the garden suburb destroys the pleasing effect of curved street forms because 'the eye cannot see the curve as originally drawn on the plan'.[6] To illustrate his argument he makes diagrams that show the singularity of the curve in plan, derived from his Golders Green example, disrupted by the unsympathetic arrangement of house forms.[7]

Le Corbusier's apparent objection to the English Picturesque garden suburb is revealing of his interest in 'underlying' abstract forms and tallies neatly with Birksted's argument about Le Corbusier's uptake of Choisy's *pittoresque*, an approach that is volumetric, spatial and optical rather than scenic or painterly in the English sense.[8] Nonetheless, what the architect's reading of an English garden city Picturesque allows him to express, in both text and diagram, is a particular preference for curving circulation and movement.

Elsewhere, Le Corbusier unselfconsciously describes the movement of an architectural observer in terms of a series of curving movements, where he observes how: '[t]he human eye, in its investigations, is always on the move and the beholder himself is always turning right and left, and shifting about'.[9] Again in *Urbanisme,* the architect makes reference to the psychological importance of curved movement in urban settings, observing how the eye requires, '*rotation* and change of scene ... and your walks will be neither tiring nor drowsy'.[10] These references to curved movements, rotations of view and meandering walks in Le Corbusier's writings of the 1920s give a distinctive tone to the architect's thinking about the way that the layout of architectural spaces should stimulate viewers' experience. Not only does the architect speak appreciatively of the experience of curved building forms, he also describes the movement of individuals observing architecture as 'naturally', or at least preferably, curved or meandering. This broader thinking carries over directly into the architect's design work and his experiments with the shaping of plans. The spiral plan form clearly produces the type of curved movement Le Corbusier extols in his writings, and his shaping of plans appears as a direct manifestation of that thinking put into practice in the design studio.

That thinking in design practice is further evidenced by drawn marks made upon Le Corbusier's architectural plans. These freehand lines infer the occupant of space within those plans – indicating the type of spatial organisation determined for the user as well as their experience of curving movements. In themselves, such drawn marks constitute a method by which architects indicate preferred forms of movement and imagine it as a product of their plans: used so often in the spiral plans, they indicate how the architect's preferred thinking about movement and experience is managed by the particular architectural form proposed. These drawn marks are a method of testing the efficacy of spiral plans, allowing the architect to picture effects of space in the act of orchestrating them;[11] yet this is not an unbiased test. Though they might seem to enact a 'conversation' between the plan and its effect, these lines are, in the end, as formally determined as the plans in which they appear.

An inventory of spiral plans

Considering Le Corbusier's experiments with spiral plans as a whole, it is evident that the architect and his studio tried the spiral form in 21 projects between 1923 and 1965.[12] The total set of projects is predominantly for museums, yet the set also includes exhibition buildings, villas and an apartment building. From 1923 onwards, excluding



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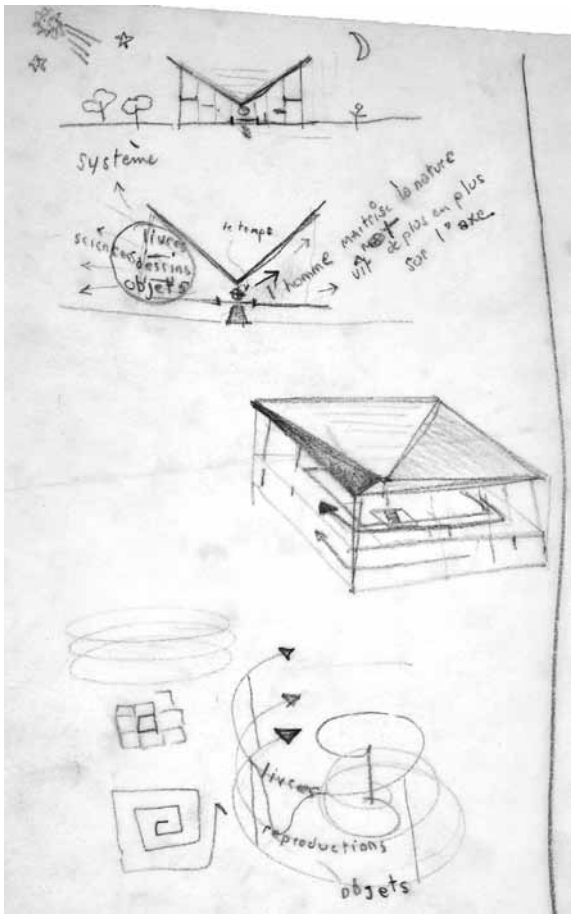
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5 Museum, Cultural Centre of Ahmedabad

6 Tokyo Museum

7 Museum, Cultural Centre of Chandigarh

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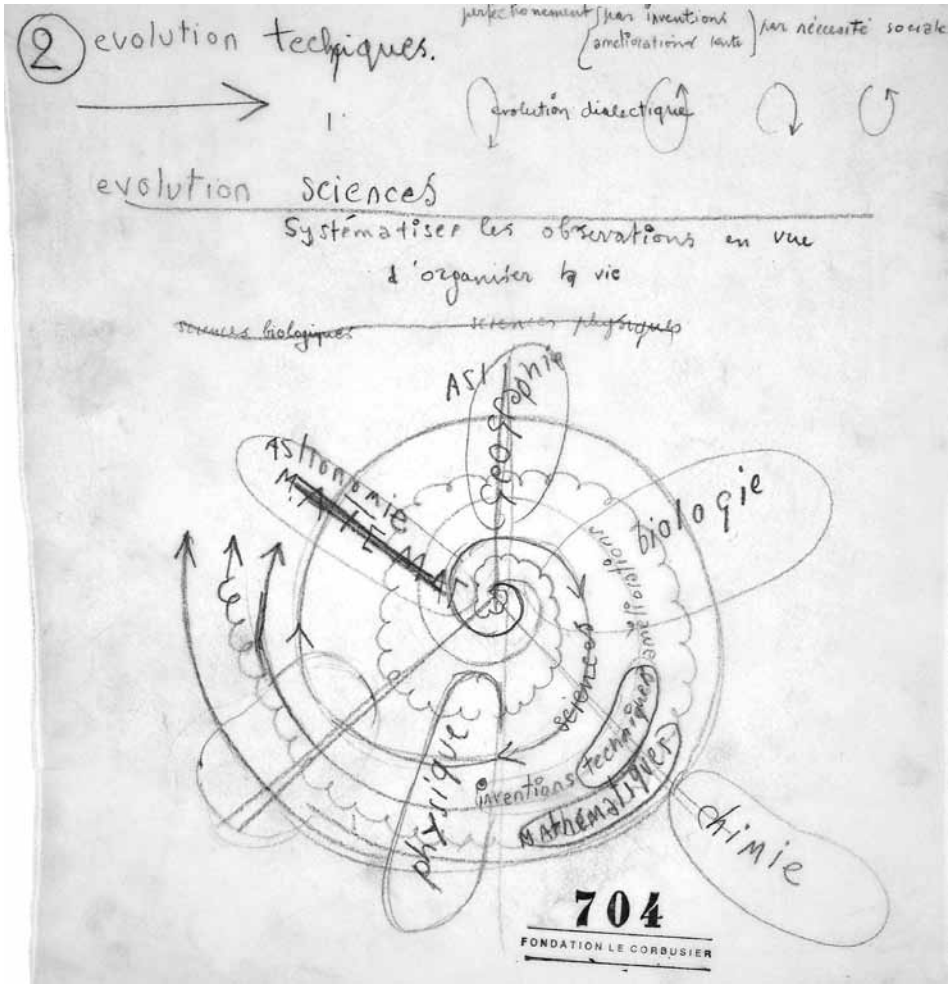


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the period of the war, there is no more than a three-year gap to the start of another project involving a spiral form plan. Considering that projects might take longer than a year to design and complete, there is a remarkable consistency in the use of the spiral plan, which appears as an ongoing project over the life of the architect's studio.

Spiral plan form projects were regularly proposed but they were rarely built. Only three schemes based on the spiral plan form were ever constructed: the Museum of the Cultural Centre at Ahmedabad (1951) *[5]*, the Tokyo Museum (1959) *[6]* and the Chandigarh Museum (1959) *[7]*. Other spiral schemes were for proposed, but abandoned, projects. Still others were used on architectural projects as initial schemes, only to be superseded by other designs. Despite the fact that these schemes were rarely built, the drawings of them illustrate a significant amount of attention to the uses and effects of the spiral plan form. Even as design exercises, the spiral plans created by Le Corbusier and his studio were not simply a standard repetition of the same proposal – variation and design exploration are evident concerns.

One surprising example of design exploration of the spiral plan appears in an initial, but abandoned, proposal for the Pavillon des Temps Nouveaux at the Paris Expo (1937).[13] Early conceptual sketches illustrate this proposal, showing a vertically layered space organised as a series of routes emerging from a central point described as circular or square spiral



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8 Pavillon des Temps Nouveaux, sketches, FLC 843

9 Pavillon des Temps Nouveaux, sketch, FLC 704

10 Pavillon des Temps Nouveaux, plan, FLC 625

11 Pavillon des Temps Nouveaux, plan and sketches, FLC 871

12 Pavillon des Temps Nouveaux, plan, FLC 933

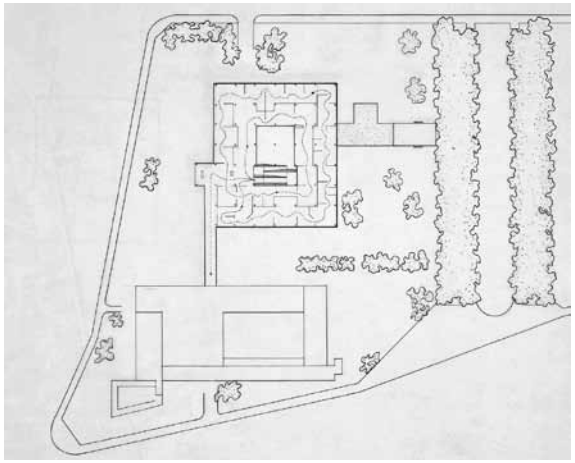
13 Pavillon des Temps Nouveaux, plan, FLC 934

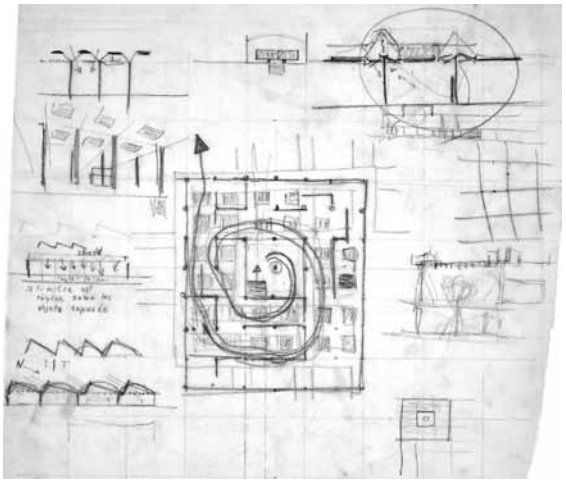
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in form [8]. Another drawing shows the proposal as a diagram, indicating how the various displays might be organised with respect to a series of spiral routes [9]. In another drawing accompanied by notes, the diagram is shown again and converted to a preliminary architectural plan that is based on the square spiral layout.

The development of the diagram as a plan is the subject of other drawings. These drawings show arrowed and meander lines used for investigating the routes through spaces. These are the freehand lines drawn over plans that were described earlier that indicate the idealised movement of occupants as produced by the plan – a singular passage that meanders as it spirals [10]. In another notable drawing [11], the preference for the spiral figure as constituting the preferred path of movement through the architectural plan (and not simply the form of the plan) is graphically illustrated.

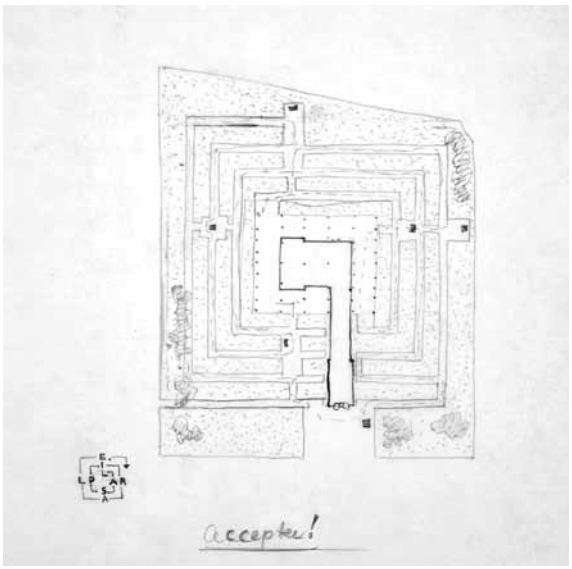
Another pair of drawings is significant for highlighting the relationship between forms of circulation and the spiral plan form in the design process [12, 13]. The drawings are both sketch plans, illustrating a ground floor layout of the proposed pavilion, including paths and garden spaces, up to the boundaries of the site. The drawings present different proposals for the layout. One proposal is for a series of concentric square rings connected by smaller paths, and the other presents a familiar spiral pattern. Both layouts are rendered as diagrams adjacent to the plans. It is apparent that the two schemes were compared with notes on the drawings confirming that the spiral proposal is preferred over the other. This preferred plan includes an overlaid freehand mark illustrating an idealised curving movement of the observer through space that can be referred back to Le Corbusier's interest in the experience of curves emerging from his discussion of the Picturesque. The overlaid freehand line acts as an arbiter of the plan in the design process – a means of confirming choices through a type of graphical test of the plan.


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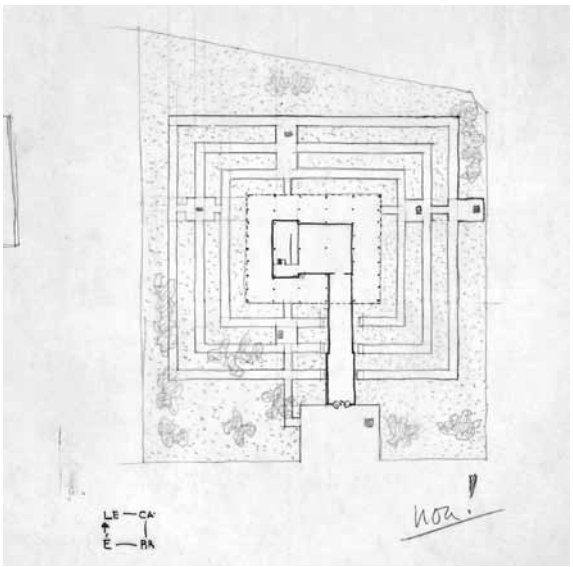

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The rhetoric of the spiral

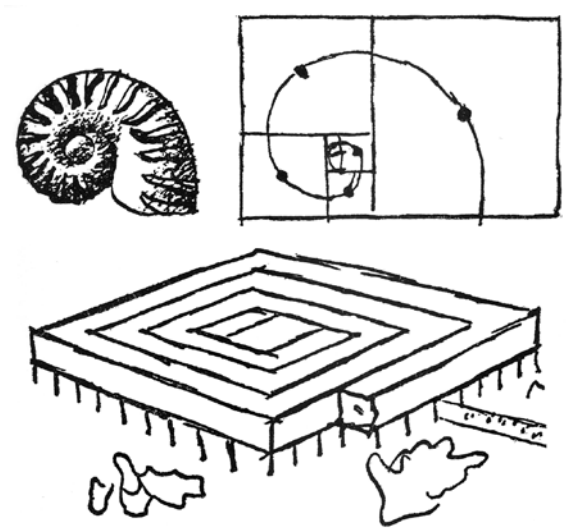
In 1939, a scheme called the Museum of Unlimited Growth was proposed for Philippeville, North Africa. It exhibits a square spiral plan form as well as other features common to the museums based on this plan type. Like earlier schemes, entry to the museum is via an undercroft and a double-height central hall. Also like those schemes, the museum is designed such that it might be extended in a continuous fashion around the central hall. This aspect of the scheme is illustrated in the elevations of the model, which



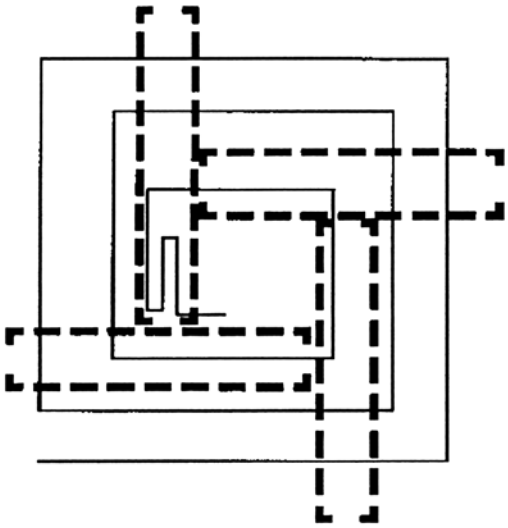
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14 Museum of Unlimited Growth, diagram and sketches. Le Corbusier, *Oeuvre Complète 1938–1946*, pp. 16 & 17

15 Museum of Unlimited Growth, plan diagram showing overlay of spiral and swastika forms

show floor and ceiling beams protruding from behind temporary external cladding in anticipation of further construction.

The scheme for the museum is published in the *Oeuvre Complète 1938–1946* and on this occasion the spiral plan form is famously compared with other forms of the spiral – a shell form and a geometric spiral based on the Golden Mean *[14]*. This comparison comes fifteen years after Le Corbusier begins experimenting with the spiral plan, a period through which his use of the plan foregrounds his interest in generating curving movement paths rather than a long-held interest in shaping the plan geometrically. Typical of Le Corbusier this comparison can be seen as a kind of architectural rhetoric, one that certainly gives on to symbolic readings of the spiral plan that have dominated discussion of it. To align forms in geometry, nature and architecture in this way constitutes a powerful means of promoting the spiral plan concept, evoking the 'organic' and various related associations as a strategy for the dissemination and advancement of the concept.[14] How those alignments have a particular basis in the architect's production of his spiral designs is another question. For example, investigation of the Le Corbusier Archive does not reveal graphic evidence that the geometry of the Golden Mean was a deliberate preoccupation of the studio in devising the spiral plans. Indeed it never appears as a figure drawn over a spiral plan in Le Corbusier's lifetime, only appearing posthumously overlaid on a model of his Museum of the Twentieth Century, published in the *Oeuvre Complète 1965–1969*, and credited to his office associate André Wogenscky who completes the project for publication.[15]

Another form emerges: the swastika

In the text that accompanies the publication of the scheme, Le Corbusier's interest in the occupant's experience of movement as determined by the plan is again highlighted, where he states that, 'the square spiral, which starts from [the central hall] makes for a discontinuity in the flow of circulation, extremely favourable for attracting the required attention from the visitors'.[16] The discontinuity of circulation is presumably produced by the spiral because it makes for a labyrinth-like effect that allows users to concentrate on exhibits and their immediate environment – the spiral being well known as a type of maze pattern.

The 1939 museum also shows the use of a secondary form in the plan, which the architect refers to as a swastika pattern. Le Corbusier writes of this plan formation as follows:

> *The means of orienting one's self in the museum is provided by the rooms at half height which form a swastika; every time a visitor, in the course of his wanderings, finds himself under a lowered ceiling he will see, on one side, an exit to the garden, and on the opposite side, the way to the central hall.*[17]

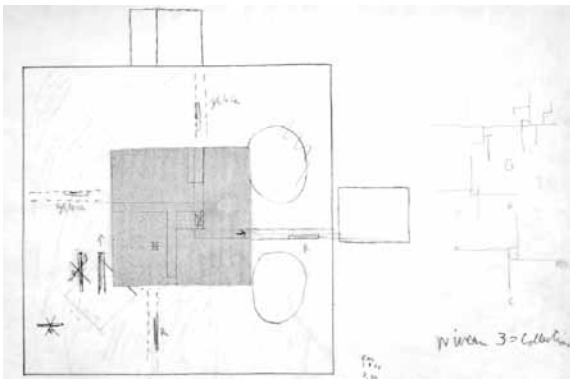
Here, the four spokes of the swastika are given an explicit role in relation to the museum visitor's experience, namely, to allow continuous views across the plan. The swastika form is based on design explorations in earlier spiral schemes for the Bata Exposition Pavilion (1935) and the Centre of Contemporary Aesthetics (1936). In the later of those schemes, the swastika pattern does not yet take form as a whole, rather it was referred to as a series of 'diagonal or orthogonal crosspieces'.[18] The formation of those crosspieces into a single formal pattern, overlaid on the spiral plan, becomes a typical feature of subsequent spiral schemes from 1939 onward *[15]*. It is evident that the use of these forms in combination offers contrasting effects to occupants of space, namely orientating axial views versus a maze-like containment. The 1939 museum is therefore significant in consolidating over a decade of research into the possibility of integrating the spiral with the multi-axial swastika.

Le Corbusier's use of a swastika pattern at this point in the twentieth century has political and

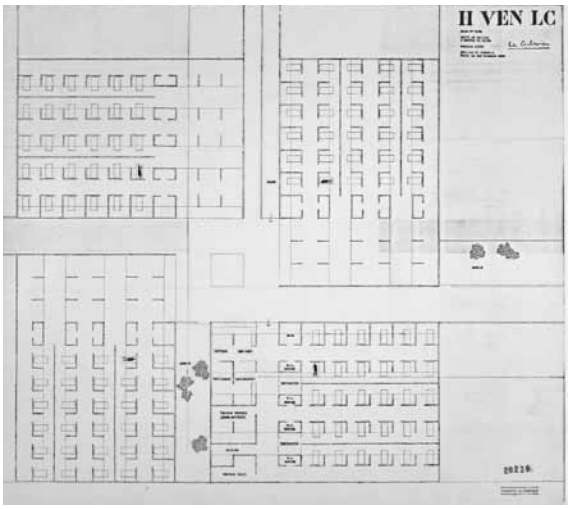
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symbolic overtones that are at least problematic. While reference to the swastika may raise pertinent issues about the architect's ambiguous wartime alliances or the more arcane origins of its form, it is also evident, in the context of the present discussion, that Le Corbusier's calling up of the swastika pattern is in some sense incidental to the formal investigations in plan out of which it emerges – investigations that precede its eventual consolidation or 'discovery' as a plan image. Here we might note a distinction between a formal planimetric approach (a desire for the patterning of plans) and Le Corbusier's strategy of symbol making, which, as Birksted notes, is a means of both promoting his architecture and an obfuscation of any particular meaning.[19]

Through the subsequent spiral projects, the spiral and swastika patterns are often used in combination, an arrangement that can be traced to each of the built examples previously mentioned. One curious exception is an apartment block scheme for Meaux (1957). Based on a spiral ramp that ascends through the entire block, the scheme is reminiscent of the ramp arrangement proposed for the Villa Meyer (1925), here used on a much larger scale. A study drawing shows the diagrammatic arrangement sketched out as a series of rings housed within each other. In another drawing, a developed plan of the block is shown which consists of three concentric rings of space. The outer ring contains the rooms of the apartments and the inner ring is a lift core. The ring between these two indicates the continuous ramp that spirals up through the entire structure.



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16 Museum of the Twentieth Century, Nanterre, FLC 30016

17 Venice Hospital, plan layout study, FLC 28236

Late schemes: spirals and swastikas

In early 1965, Le Corbusier was commissioned by André Malraux, the then French Minster of Culture, to design a Museum of the Twentieth Century for France. Le Corbusier did make some initial sketch drawings for this project, one of which shows the familiar central hall and swastika pattern developed out of the spiral plan type *[16]*. By this time, the swastika pattern had become an independent form capable of its own re-use as is evident in slightly earlier schemes for the Palace of Congresses for Strasbourg (1964) and the Venice Hospital (1964) *[17]*. Yet the fact the swastika form developed out of experiments with the spiral plan undertaken in the previous three decades remains clear, particularly in the early sketches for the Venice Hospital. The spiral/swastika plan – crystallised in the 1939 Museum of Unlimited Growth – is repeated and collaged together to form the basis of the hospital plan. The swastika form is retained with the spiral formed sections of the combined plan removed to be replaced by wards, offices and patient rooms. While the act of collage evident in the design of the Venice Hospital appears as a clearly Modernist strategy, the application of the spiral plan form and its iteration through three decades of design work in Le Corbusier's studio can be seen to mirror techniques of architectural composition developed in the nineteenth century.

Plan form and design method

Durand's rational approach to architecture presents architectural design process in the nineteenth century as a codified system produced through a set of clear graphical statements. The principal graphical statement within that process was the axial form, a method later consolidated in the Beaux-Arts tradition. Marking the axis established a set of properties of the project's design in advance; literally marking the centre of the main facade of the building and passing through all the principal spaces of the plan situated enfilade behind the facade. Marking the axis also fixed broader concerns to be addressed through the design: *distribution*, *disposition, composition* and *marche* – the walk through a building's major spatial sequence. For Durand and the Beaux-Arts that followed, orthographic layout and design process were entirely interrelated by codes understood in the design process. As David Leatherbarrow argues, while axes were instruments of projection (the means to describe built form), they were also instruments of composition (the means to orchestrate effects).[20] As Alan Colquhoun further notes, the fact that the codes of composition are fixed in relation to particular plan forms, like axes, creates an enclosed system of design.[21] Le Corbusier regarded the nineteenth-century method of using axes as plan forms mechanistic, yet in promoting a new rhetoric of architectural values he clearly

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18–21 **Yokohama Port Terminal**

illustrates his understanding of this 'false' technique for relating the experience of spectators to geometric formations of the plan. In *Towards a New Architecture* (1923), Le Corbusier wrote accordingly:

> *When at the Schools, they draw axes in the shape of a star, they imagine that the spectator arriving in front of the building is aware of it alone, and that his eye must infallibly follow and remain exclusively fixed on the centre of gravity determined by those axes. The human eye, in its investigations, is always on the move and the beholder himself is always turning right and left, and shifting about. He is interested in everything and is attracted towards the centre of gravity of the whole site.*[22]

In this statement, Le Corbusier exemplifies the Beaux-Arts codification of the plan, particularly the highly formalised method of determining the architectural experience of spectators according to axes. For Le Corbusier, this type of method was false because it did not correspond with, or cater to, the nature of spatial experience. Le Corbusier then reveals his own thinking about the 'true' spectator of architecture. As he explains, that spectator is more self-willed in their investigation of architecture, having an eye that follows the movement of their body rather than an eye fixed by the axes that an architect makes upon the plan. And yet, to manage or arrange the way of experiencing buildings was not a project abandoned by Le Corbusier, particularly on the evidence of his spiral plan projects, which just as clearly relate the experience of spectators to geometric formations of the plan. While arguments for continuity between nineteenth- and twentieth-century methods in architecture are certainly familiar, and often cite Le Corbusier as a Modernist who deliberately inverted previous practices of design, it can also be shown that in the case of the spiral plans there is a continuity at the level of technique which is more direct and far less self-conscious or deliberately rhetorical.

Looking over the spiral plan forms parallels to a Neo-Classical tradition of architectural plan making; the spiral plan evokes an enclosed system relating a plan form to particular architectural concepts. Here is a means to the production of a certain type of circulation and experience similar to the conceptualising of *distribution, disposition, composition* and *marche* by the use of axes. In both cases, there is evidence of an underlying method. Plan forms provide a means to visualise and ground the effects of architecture. Le Corbusier's idealisation of a wandering spectator who turns their body in a constant curving motion while appreciating space gives expression to modern ideas, but the means of producing that spectator are clearly parallel with traditional methods of plan making. The freehand spiral lines describing a spectator's movement end up placing the walls that form them – like the axial *marche* that forms a sequence of volumes in Beaux-Arts planning. Le Corbusier dismisses the Beaux-Arts intention that architecture be appreciated on axis as doctrine; however, his spiral plans show he is nonetheless mindful of the method by which that outcome is achieved.

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This is not to label Le Corbusier as a covert traditionalist or to see his Modernist practice of design as a self-conscious inversion of Neo-Classical principles as others have noted.[23] There is an obvious logic in observing continuity in architectural practice between the nineteenth and twentieth centuries despite a greater and more obvious break in formal intentions. Certainly architects of the twentieth century dispensed with the totalised system of design extolled by the Beaux-Arts yet retained, selectively, aspects of that practice that were useful in pursuit of new intentions; their act of design undertaken through available techniques rather than an always self-conscious dismissal of past methods. In this respect, Le Corbusier's spiral plans point to subtle continuities of understanding in architectural practice or, at least, to the difference between an apparent continuity of method and the comparatively greater changes taking place at the level of intention or ideas that were part of the Modernist agenda.

Contemporary practice, diagramming and design method

As much as Le Corbusier's spiral plan designs evidence Neo-Classical methods as techniques to support a Modernist agenda, those same designs also throw forward to contemporary agendas; providing something of an *ur*-project for diagram architecture. The formal precedent of Le Corbusier's spiral plan experiments, his play with producing architecture as a path of continuous meandering circulation, provides a key reference for the architecture of Rem Koolhaas. In *S,M,L,XL*, Koolhaas presents the architecture of OMA's Rotterdam Kunsthal (1993) as a series of cinematically framed moments along a continuous promenade of interior space.[24] In his Jussieu Libraries design project (1993) and the later Seattle Central Library (2004), Koolhaas pointedly incorporates Le Corbusier's spiral circulation experiments, most directly in the latter's 'Books Spiral' – a volume of space constituting the public collection as a continuous access ramp.

However, beyond these formal references there are other more subtle similarities to be found in terms of plan form and method, particularly where we witness the emergence of line diagrams of movement as generators of built form. With the use of software technologies to map circulation lines, diagrams have become material for the self-generation of architectural forms constructed within computer environments. The kind of complex and hybrid architectural forms being created clearly signal a broad shift away from typologically based approaches apparent in Modernism. Yet, beyond the issue of type, there are certain parallels between contemporary methods and past ones – specifically those prefigured in the kinds of explorations undertaken by Le Corbusier through his spiral plans.

A key example of diagram architecture is found in the work of Foreign Office Architects who describe the design of their Yokohama International Port Terminal (2002) as 'generated from a circulation diagram that aspires to eliminate the linear structure characteristic of piers'.[25] Their method is to align the shaping of the whole with reference to modes and possibilities for circulating through architectural space. As the architects describe below:

> [...] *the project is produced as an extension of the urban ground, constructed as a systematic transformation of the lines of the circulation diagram into a folded and bifurcated surface.*[26]

This technique proposes an alliance between lines describing human movement and the production of form. The plan now a 'surface' owes its form to a 'systematic transformation of [...] lines' such that the architectural outcome is choreographed for, and from, the movement and experience of the body. The relation between the movement line and the form is direct – one produces the other. The Port Terminal's concretising of meandering urban pathways is not unlike Le Corbusier's explorations of the 'natural' curving movements that eventuate as spiral-shaped plans *[18–21]*. More than this, there is a distinct echo of nineteenth-century method. To borrow from Leatherbarrow's description, it is evident in the diagramming of the Port Terminal's design that an axis of composition (the line denoting circulation and movement) is made synonymous with an axis of projection (which constructs the geometry of the form). Those lines of circulation may have multiplied in the contemporary instance, but in both cases the management of lines is a production of the media of design – axial orthography in the case of the Beaux-Arts and the technological possibility of converting non-orthogonal lines into grids and surfaces in a contemporary context. The technologies may differ but the working assumption – that a linear artifice of circulation acts as arbiter of plan form – is greatly similar; indicating something of the internalised rules or codes of architecture that make the discipline cohere. Of course this is not to say that such contemporary architects are 'Neo-Classicists' but it is to observe certain continuities of understanding in design practice that have aided architects since the nineteenth century in producing and picturing the effects of their architecture.

Conclusion

While Le Corbusier's spiral plans have been studied for their symbolic meanings, it is not for those meanings that the projects have returned to favour in the contemporary practice of architecture. It is the techniques that form the spiral plan projects – their actual production as designs – that mark them out in the current context. By evidencing a relation between forms and techniques in architectural design we might look past the more dominant discussion of ideas (symbolic or otherwise) to issues of method and of the plan itself as an assembly of techniques for the formation of buildings. The premium on technique in the practice of design today – the currency of diagram architecture – also points, obviously enough, to the return of the rhetoric of technique as well as to technique's instrumentality in the process of design. While Le Corbusier played down the description of methods

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evident in his drawings and used his spiral plans to present symbolic meanings or associations (organic form, unlimited growth, ritual, procession and so on), we might now appreciate the spiral type as evincing both: exemplary of his deployment of long held planning methods towards specifically spatial ends as well as being a show of rhetorical and symbolic effects at which he proved expert. Beyond this, however, it is precisely the methods – what appears as the relatively long term stability of planning techniques in the practice of architecture – that best allow us to make sense of Le Corbusier's spiral plans as we look from them, both backward and forward in time.[27]

Notes

1. For example, see Alfred Willis, 'The Exoteric and Esoteric Functions of Le Corbusier's Mundaneum', *Modulus* (1980–81), 12–21; Kenneth Frampton, 'The Humanist v. the Utilitarian Ideal', *Architectural Design* 38 (March 1986), 134–36, or Giuliano Gresleri, 'The Mundaneum Plan', in *In the Footsteps of Le Corbusier,* ed. by Carlo Palazzolo and Riccardo Vio (New York: Rizzoli, 1991), pp. 93–114.
2. Tim Benton, *The Villas of Le Corbusier 1920–1930* (New Haven: Yale University Press, 1987), p. 143.
3. Jan Birksted, *Le Corbusier and the Occult* (Cambridge, MA: MIT Press, 2009), pp. 82–86.
4. Christoph Schnoor, *La Construction des Villes: Le Corbusiers Erstes Stadtebauliches Traktat von 1910/11* (Zurich: GTA Verlag, 2008).
5. Le Corbusier, *Urbanisme* (8th French edition) published as *The City of Tomorrow and its Planning* (London: John Rodker, 1929).
6. Le Corbusier, *Urbanisme*, p. 208.
7. Le Corbusier, *Urbanisme*, p. 207 & p. 210.
8. Birksted, *Le Corbusier and the Occult*, p. 84.
9. Le Corbusier, *Towards a New Architecture* (London: The Architectural Press, 1987), p. 191.
10. Le Corbusier, *Urbanisme*, p. 62.
11. Antony Moulis, 'From Functionalist to Humanist Line: On Circulation Diagramming and the Work of Alvar Aalto', in *Building, Designing, Thinking – 3rd International Alvar Aalto Meeting on Modern Architecture – Proceedings*, ed. by Karl Jormakka and Esa Laaksonen (Jyväskylä, Finland, 30–31 August, 2008), pp. 75–78, as well as an extended discussion in Antony Moulis, *Drawing Experience: Le Corbusier's Spiral Museum Projects*, PhD, The University of Queensland, 2002.
12. Villa La Roche-Jeanneret (1923), Villa Meyer (1925), Mundaneum (1928), Museum of Contemporary Art (1931), Bata Boutique (1935), University Campus, Rio de Janeiro (1936), Centre of Contemporary Aesthetics (1936), Pavillon des Temps Nouveaux (1937), Museum of Unlimited Growth (1939), Exposition Habitat 45 (1945), Urban Development, Saint-Dié (1946), Exposition Synthèse Des Arts, Porte Maillot (1949), Cultural Centre of Ahmedabad (1951), Tokyo Museum (1959), Etude d'urbanisation, Meaux (1957), Museum at Chandigarh (1959), Cultural Centre, Chad (1960), Museum of the Twentieth Century, Eisenbach (1963), Museum of the Twentieth Century, Nanterre (1965), Musee de lotissement (undated).
13. This abandoned project for the Pavillon des Temps Nouveaux was the subject of a 1995 conference paper which discussed the contribution to the project of Le Corbusier's cousin, Pierre Jeanneret. Danilo Udovicki, 'Revisiting the Pavillon des Temps Nouveaux at the 1937 Paris World's Exhibition: The Role of Pierre Jeanneret', Conference Paper, *The Society of Architectural Historians (48th annual meeting)*, 5–9 April 1995, Seattle, Washington.
14. See Jan Birksted's argument about Le Corbusier's use of symbols that are deliberately enigmatic in *Le Corbusier and the Occult*, pp. 303–07.
15. Le Corbusier, *Oeuvre Complète 1965–1969* (London: Thames & Hudson, 1969), pp. 162–67.
16. Le Corbusier, *Oeuvre Complète 1938–1946* (London: Thames & Hudson, 1964), p. 16.
17. Le Corbusier, *Oeuvre Complète 1938–1946*, p. 16.
18. Le Corbusier, *Oeuvre Complète 1934–1938* (London: Thames & Hudson, 1964), p. 154.
19. Jan Birksted, *Le Corbusier and the Occult*, pp. 303–07.
20. This understanding of the instrumentality of axes in nineteenth-century architectural practice is given by David Leatherbarrow, *The Roots of Architectural Invention: Site, Enclosure, Materials* (Cambridge: Cambridge University Press, 1993), p. 15.
21. Alan Colquhoun, 'The Beaux-Arts Plan', in his *Essays in Architectural Criticism: Modern Architecture and Historical Change* (Cambridge, MA: MIT Press, 1981), pp. 161–68.
22. Le Corbusier, *Towards a New Architecture*, p. 191.
23. For example see Alan Colquhoun, 'Displacement of Concepts in Le Corbusier', in Colquhoun, *Essays in Architectural Criticism,* pp. 40–57.
24. Rem Koolhaas and Bruce Mau, *S,M,L,XL: Office for Metropolitan Architecture* (New York: Monacelli Press, 1998).
25. 'Foreign Office Architects: Yokohama Port Terminal, 1995–2002', *Lotus* 108 (2001), 82.
26. 'Foreign Office Architects: Yokohama Port Terminal, 1995–2002', p. 82.
27. On the longer history of modern architectural planning see John Macarthur, *The Picturesque: Architecture, Disgust and other Irregularities* (London, New York: Routledge, 2007).

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Biography

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