# From Garden City to Hanging Garden

## the story of a diagram

An account of the role of the Fresnel diagram from Raymond Unwin's theories to Colin St John Wilson's British Library.

**Robert Atkinson**
**May 2005**

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**Robert Atkinson**

An essay submitted for the Architecture in 19th and 20th Century Britain (ENVSGH 02) module of the MSc Architectural History course, Bartlett School of Graduate Studies, UCL.

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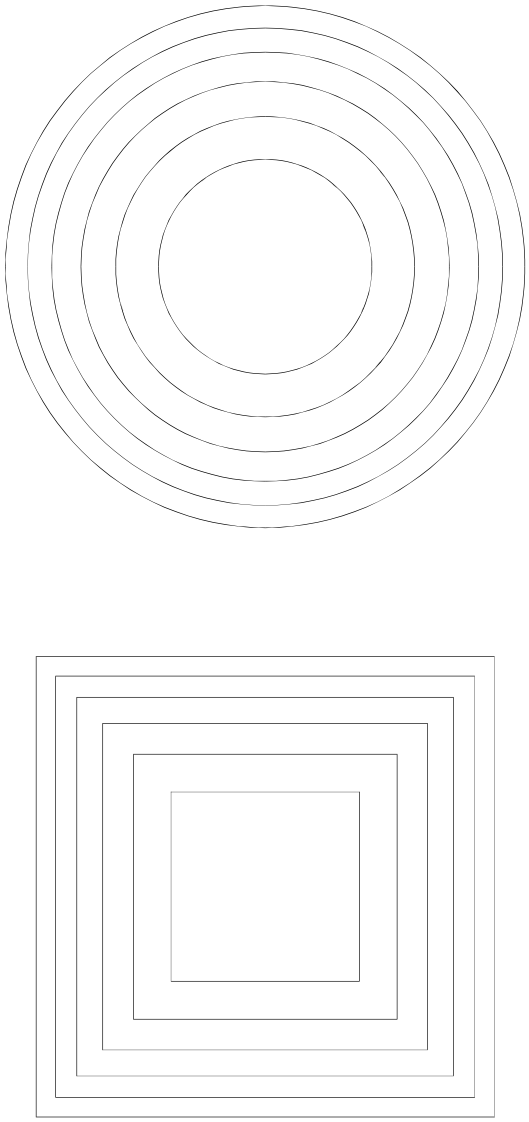


figure 1

**The Fresnel diagram.**

The principle of the diagram (which may be drawn as a circle or a square) is that it expands in increments of equal area. Thus the area of the outer ring is equal to any of the other rings, and to the central circle/square. A further geometrical fact which it demonstrates is that the area of the diagram as a whole increases in proportion to the square of its radius.

figure 2

**The British Library**

Colin St John Wilson (1998) *The Design and Construction of the British Library p.42*

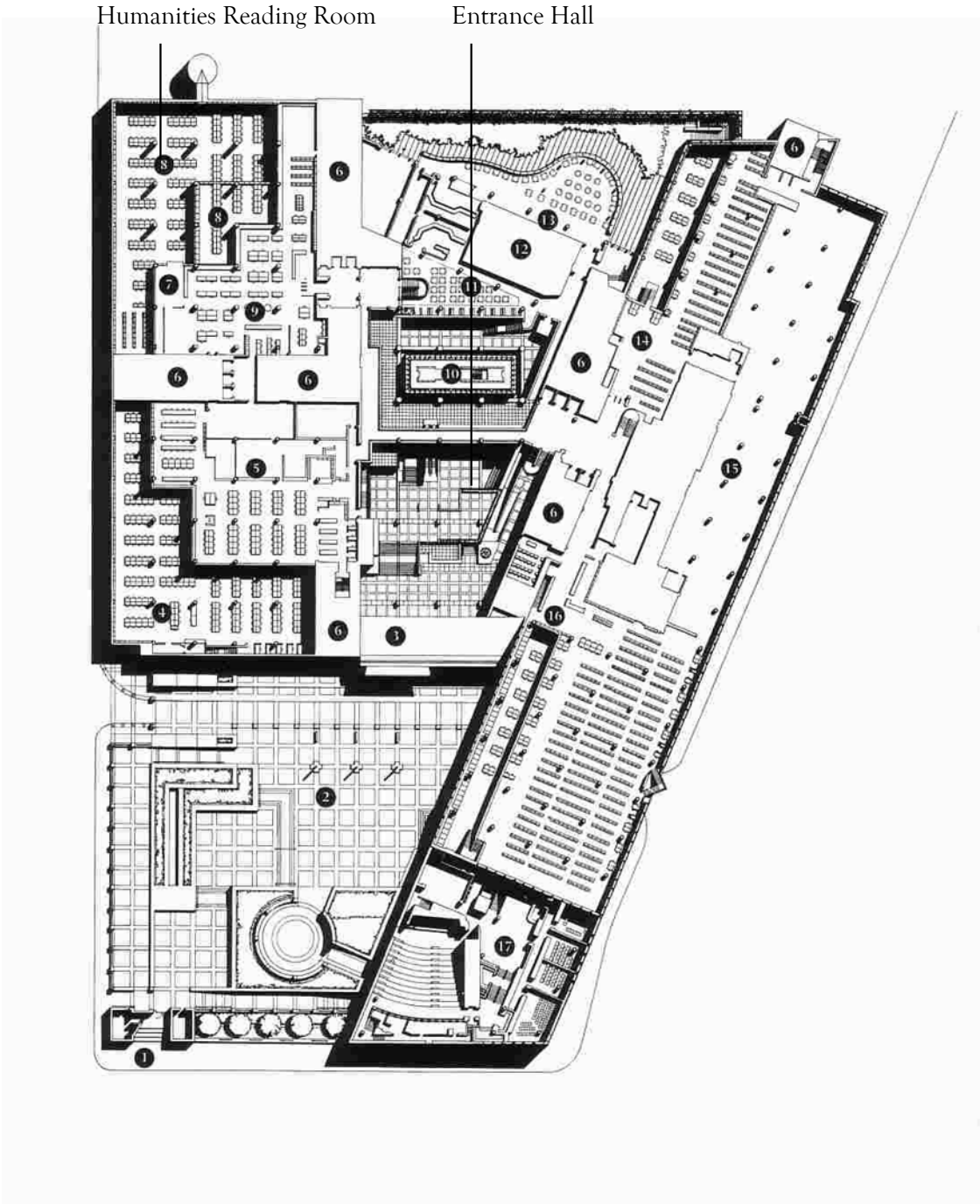


figure 3
**The Humanities Reading Room**

Colin St John Wilson (1998) *The Design and Construction of the British Library p. 61*

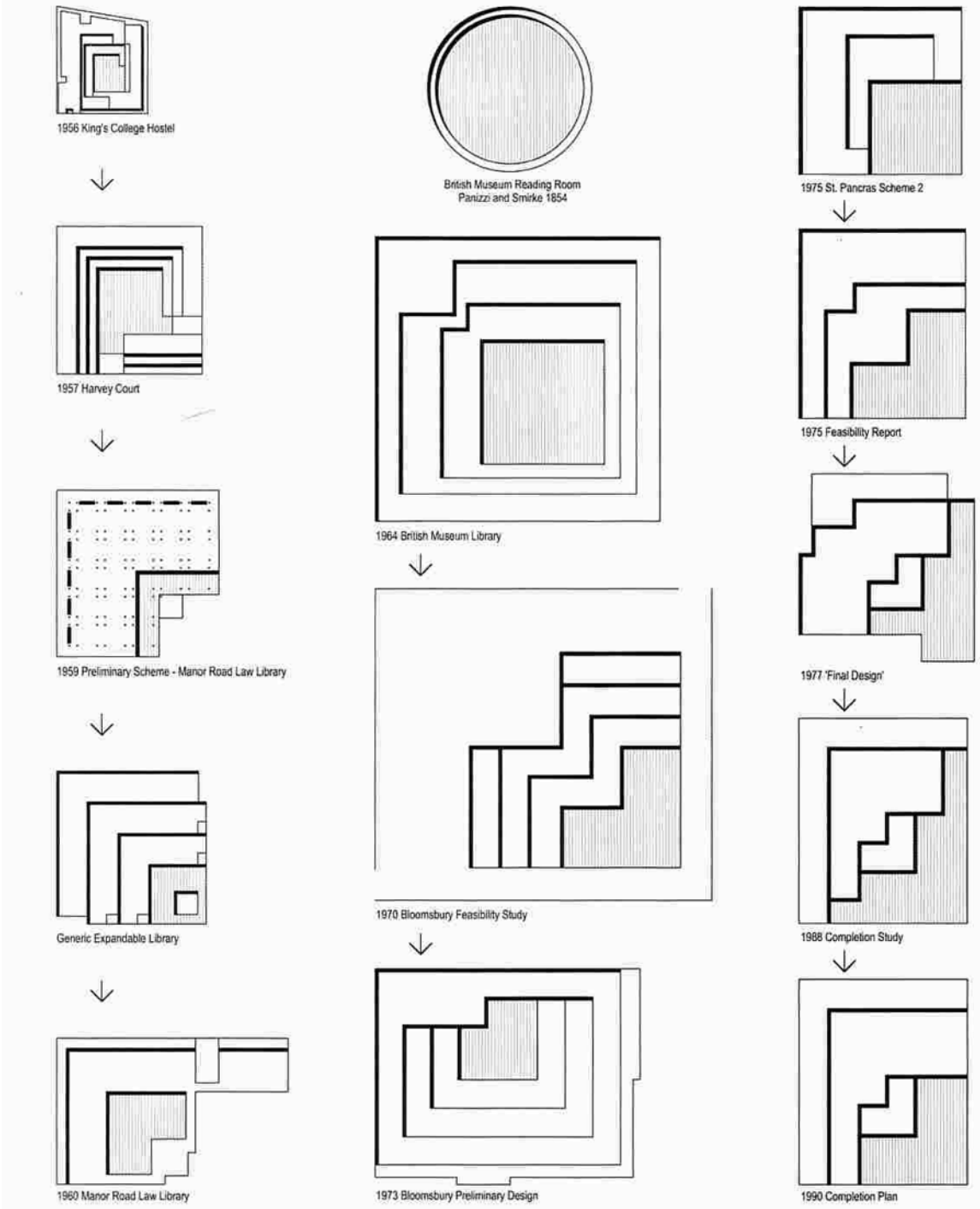



figure 4

**"Evolution of the Humanities Reading Room"**

Roger Stonehouse (2004) *The British Library at St Pancras, p.103*
Spon Press

# Introduction

This essay is an account of a single conceptual thread that can be traced from Raymond Unwin's garden city theories to what Colin St John Wilson calls his "hanging garden" - the Humanities Reading Room at the British Library. The ideas that comprise this thread are not consistent; they constitute a shifting figure as one follows the thread from one end to the other, but what links them all is their relationship to a single graphical entity; the Fresnel diagram (figure 1). The essay will examine the role of this diagram as the conductive environment that has allowed ideas or ways of looking at architecture to apparently evolve from others which are quite different.

For many visitors to the British Library there are two significant spaces; the Entrance Hall and the Humanities Reading Room. Certainly, there are many other important rooms - several reading rooms, exhibition spaces, shop and other ancillary areas - but these two rooms in particular seem to make an architectural statement that expresses the grandeur and excitement of the interior of this building. For these visitors they form the functional axis of the library - introduction and destination. They are equivalent in size and scale, and they share a general quality of light spaciousness.

However, as initial spectacle turns to more considered observation, the visitor may become aware that the architectural quality of the two spaces is not the same at all. The Entrance Hall (which has the advantage of being a large space with little to go in it) manages to combine a clarity of function of its elements with a relaxed, almost informal air of welcome. It is certainly grand, but its grandness has an unforced quality. The Humanities Reading Room by comparison seems to be a combination of muddle and pomp. Entering it at any level, a reader is at first presented with a dense, but loose and apparently unstructured arrangement of desks, bookstacks and information points. What gives the room the little direction it has is the appearance, more visible on the upper floors than the ground, of an open space along the further two sides, and across that, a blank light-flooded white wall. It is only on emerging into this space at ground level that the significance of the galleries overlooking it becomes apparent. Together, they comprise a structure of extraordinarily rigid monumentality that dominates the room. This structure (a "pavilion", as it will be referred to for reasons that will become apparent later in the essay) does not have a definite relationship with furniture around it; reading desks extend under and across its boundaries, and bookcases appear to advance and recede within it. The height of the structure is visually increased by the skylight windows that

form part of its outer surface. Its self-contained centrality is reinforced by the four-square design of the ceiling panels of its middle levels. The Reading Room is not a small room, but the pavilion eats into the available space in a way that seems to threaten its integrity. It is an edifice that looks as though it should really stand in open space.

The apparent ease of design of the Entrance Hall throws the Reading Room into sharp contrast. The difference in quality of the two spaces may be seen in the context of the British Library's history. As well as being a large and complex building, it has been through a long and convoluted process of design development. The two rooms represent two ends of this process; the Entrance Hall relatively recent, the Reading Room based far in the past. The Entrance Hall gives the impression of having provided Wilson with an opportunity to approach an architectural problem without preconceptions. In designing the Reading Room, however, he appears to have allowed himself to remain saddled with the historical remnants of a form-generating idea that had a forceful, logical beginning, but gradually degenerated until by the time it emerged in the finished building it had not just lost its original meaning, but become positively contradictory to the intended function of the space.

# Introduction - Functionalism

A theoretical context for the analysis of the Reading Room's history has to involve an examination of the meaning of the terms function and functionalism. The concept of function (and its derivatives) is a notoriously difficult one to pin down, but within the context of this essay, two strands of meaning stand out in particular.

The first strand lies in the scientific examination of a quite narrow definition of the function of a building and its formal resolution by a group of architects and theoreticians led by Leslie Martin in the 1960s and early 70s. Leslie Martin was appointed the first head of the School of Architecture at Cambridge University, which had been set up in 1956 by Edward Prior, dean of the Faculty of Art. Martin went on to establish an architectural practice in 1957, and through this twin career (together with his leadership of the Cambridge Centre for Land Use and Built Form Studies) became the lead figure and guiding light of a group of architects, teachers and theoreticians who together became known as the "Cambridge School". Two of these in particular, Patrick Hodgkinson and Colin Wilson, worked extensively with Martin in teaching and in joint architectural practice; others - Philip Steadman and Lionel March - concentrated on research. It is the search by this group- Martin and March in particular - for an identifiable relationship between function and form, and their use of the Fresnel diagram both as a representation of function and as a generator of form, that provides the basis for the following sections.

The second strand Wilson's own standpoint in relation to functionalism is set out in his book “The Other Tradition of Modernism” [1] . His general intent is to rescue the term from the negative connotations arising out of its use in the context of the mainstream of the Modern Movement. In the hands of the mainstream modern architects (he argues) functionalism became debased into a mere stylistic exercise, but there was a resistance movement (the “other tradition” of the title - Aalto, Scharoun and others) who remained faithful to its true calling. His underlying premise is that these latter architects showed that there is a way of making architecture which is functional, but which avoids the trap of allowing an expression of functionalism to develop into a self-referencing formal style. This architecture is an unselfconscious natural response to the building's requirements. It develops from within rather than being forced into a pre-set external shape. It also, while being a practical act of building, lifts the hearts of those who use it.

1

Colin St John Wilson (1995) The Other Tradition of Modern Architecture; Academy Editions

But what Wilson does not satisfactorily answer is the question of exactly how a function determines a particular form. Examining the function-form relationship from all angles, his only conclusion is that a general sense of practical artistry on the part of the architect will allow the function to express itself properly. His example of a classical Greek theatre, whose form (he proposes) arises out of a rationalisation of a rough circle of people sitting on available objects to watch a spectacle, underlines his difficulty in finding a satisfactory relationship between the two without involving the application of a separate system of formal rules.

It is this separate system which is the ever-present spectre troubling the form-function pair and threatening to disrupt it. John Summerson, in his influential essay of 1957 "The Case for a Theory of Modern Architecture" (it is quoted in work by both Wilson and Hodgkinson) found that:

> "The programme as the source of unity is, so far as I can see, the one principle involved in modern architecture".[2]

2

John Summerson (1957) The Case for a Theory of Modern Architecture; published in The Unromantic Castle; Thames and Hudson p. 263, 264

But can the programme alone generate form? Summerson continues:

> "Here comes the crux of the whole matter. The conceptions which arise from a preoccupation with the programme have got,at some point, to crystallize into a final form and by the time the architect reaches that point he has to bring to his conception a weight of judgment, a sense of authority and conviction which clinches the whole design, causes the impending relationships to close into a visually comprehensible whole. He may have extracted from the programme a set of interdependent relationships adding up to a unity of the biological kind, but he still has to face up to the ordering of a vast number of variables, and how he does this is a question. There is no common theoretical agreement as to what happens or should happen at that point. There is a hiatus. One may even be justified in speaking of a 'missing architectural language'."

In a sense both of the strands of functional theory described above are attempts to deny the necessity of this separate system, or "missing architectural language". The first, as we shall see, involves a reduction of the form-function relationship to such a basic level that a direct correspondence between the two

can be determined without an intervening separate system. The second involves the employment of Wilson's idea of “practical artistry” to express functionality, but without considering that this may in fact itself amount to a separate system.

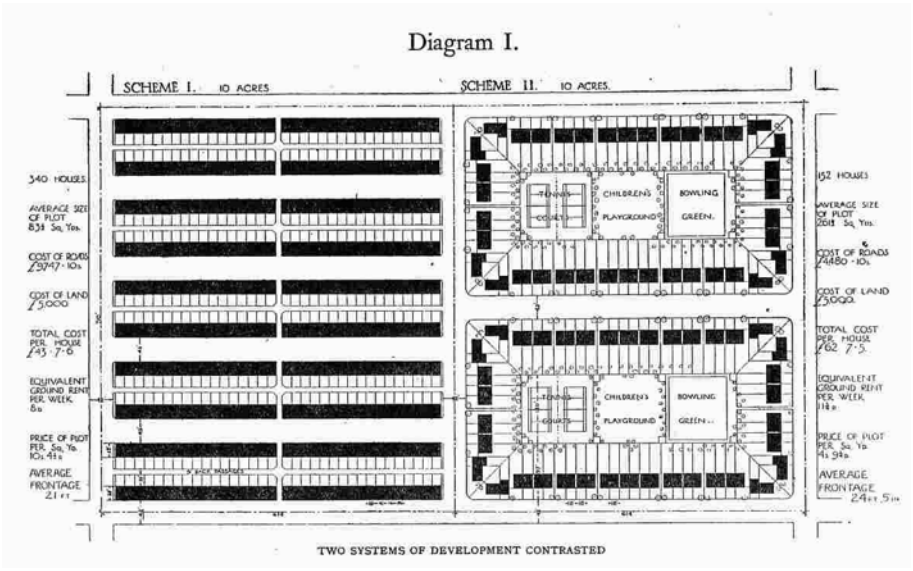



figure 5

**"Two systems of development contrasted"**

Raymond Unwin (1912) *Nothing Gained by Overcrowding, p.4*
Garden Cities and Town Planning Association

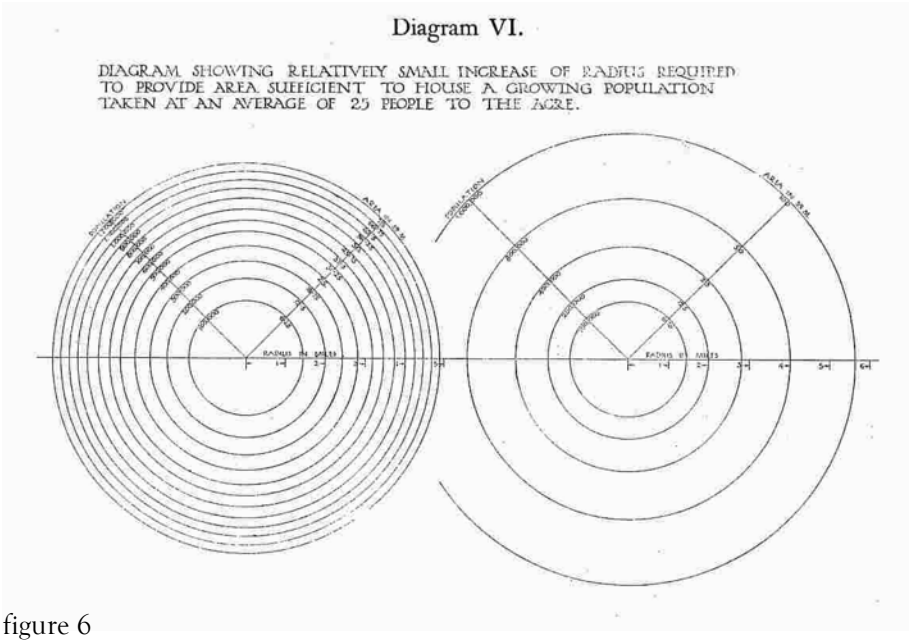



figure 6

**Town expansion diagram**

Raymond Unwin (1912) *Nothing Gained by Overcrowding, p.15*
Garden Cities and Town Planning Association

## Fresnel Development - Unwin

Figure 4 is a page from Roger Stonehouse's "The British Library at St Pancras". It shows in sequence a series of plans by Leslie Martin and Colin Wilson starting with the 1956 King's College Hostel, leading through the Manor Road Library group in Oxford and ending with the many stages of the British Library Humanities Reading Room itself. It illustrates the clear formal relationship of each stage to the next and suggests a remarkable degree of continuity over 30-40 years.

In fact the sequence can be traced even further back than the illustration shows, to Raymond Unwin's ideas for garden city development in his pamphlet "Nothing Gained by Overcrowding", published in 1912 to proclaim the advantages of the garden city design over the conventional "by-law" method of development. Unwin's comparison between the perimeter development of a site (the garden city) and cross-street development (the by-law method) is mainly in financial terms, as figure 5 illustrates, but although the financial calculations provide the comparative "glue" between the options of garden city or street, the title word "overcrowding" indicates an underlying social dimension to the argument. Though the term is rarely, and only incidentally, given a particular value in the text, there is an assumption running through it that "crowding" represents a scale on which lower rather than higher density is socially desirable. It is Unwin's identification of a social problem and its environmental solution that provides the foundation for the formal development that leads to the shape of the Humanities Reading Room.

In the latter, secondary part of his pamphlet, Unwin goes on to derive from his perimeter/cross-street analysis a more general theory of development: that building on the periphery of any site is more efficient than building in its centre. His illustration (figure 6) is of the expansion of a town, and he demonstrates in simple mathematical and diagrammatic terms that building on its edge can provide a large increase on housing stock for a relatively small increase on commuting distance to its centre. The diagram that he uses to illustrate this is a Fresnel figure (see figure 1).

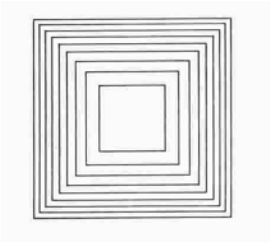


figure 7

**Fresnel diagram**

Leslie Martin, Lionel March (1972) *Urban Space and Structures, p.19*
Cambridge University Press

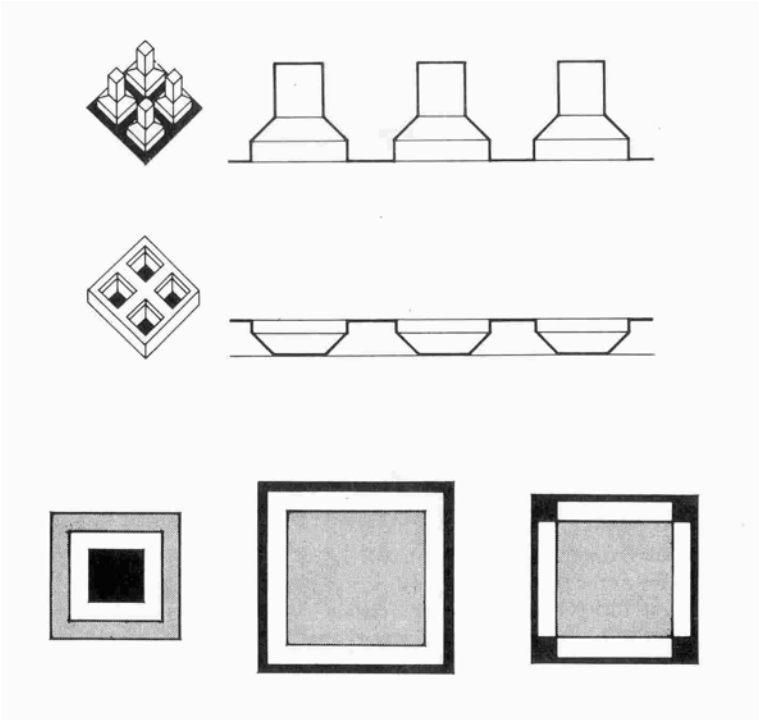


figure 8

**Pavilion and court comparison**

Leslie Martin, Lionel March (1972) *Urban Space and Structures, p.38*
Cambridge University Press

## Fresnel Development - Urban Space and Structures

The first stage in the connection between Unwin's Fresnel diagram and Stonehouse's illustration of sequential development is through "Urban Space and Structures" (1972), a collection of essays edited by, and including contributions by, Leslie Martin and Lionel March. In it, the authors attempt to find a mathematically rational way of defining an ideal general form for urban development. The analysis offered by the collection as a whole (Martin contributing the discursive element and March the mathematical) is both broad and complex, but the conclusion is relatively simple; that at almost any scale of development, building around the edge of a site (a court) is more efficient in terms of building height and useable open space than building in its centre (a pavilion), or in rows (streets). This analysis has evident connections with Unwin's ideas, and at an early stage in his argument Martin introduces both the mathematical and diagrammatic aspects of the latter part of Unwin's pamphlet:

> "One of Unwin's most forceful contributions to theory is his recognition of the fact that 'the area of a circle is increased not in the direct proportion to the distance to be travelled from the centre to the circumference, but in proportion to the square of that distance'." [3]

3

Leslie Martin, Lionel March (1972) Urban Space and Structures; Cambridge University Press p. 19

He observes that:

> "The importance of this geometrical principle is profound. Unwin did not pursue its implications. He was too concerned to make his limited point about low density."

Martin goes on to illustrate the geometric principle with a square version of the circular Fresnel pattern that Unwin had used (figure 7). The change from circle to square is significant, as is his slightly dismissive attitude to Unwin's underlying concern about low density. In taking this line, he is apparently trying to separate the diagram from the analysis of the social value of particular building forms that Unwin had (albeit in an unspoken form) invested in it. Stripped of its socially deterministic connotations, it appears at first to become a simple geometrical illustration of a mathematical observation, but as it slips out of its social role it takes on a new one as the representation of Martin's more abstract goal - to establish a general theory of how to maximize useable open space and minimize building height. For Martin this goal is the "programme" (in Summerson's terms) at the most basic level expressible, and the Fresnel figure

is its diagrammatic manifestation. But the figure has a second role in Martin's argument. Drawn as a square, it becomes the basic grid for the planning of built form, or as Martin puts it, a “generator” for designs that answer the programme. In Martin's hands, the Fresnel is simultaneously an abstract diagram of the programme and a proto-representation of substance; both function and form. In jettisoning Unwin's social connection he has laid the foundation for a different type of determinism, in an irreducible, “atomic” level of function/form relationship.

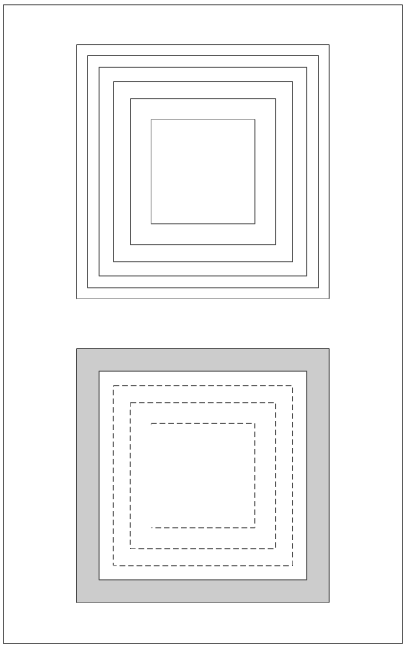
The question of this fundamental function/form relationship is something which had already concerned writers in the field of functional determinism. In considering the question of whether a function could lead to a particular form, Christopher Alexander [4] had concluded that at any level beyond the simplest, it could not; that there was insufficient “information” in the function to determine a form, and that different cultural approaches to the problem would produce different forms for the same functional requirement. However, he also suggested that as the relationship simplifies the number of forms that satisfy a given functional requirement decreases until at a basic level of simplicity there is only one satisfying form, or as Philip Steadman puts it in his analysis of Alexander's work, a “direct correspondence or one-to-one mapping between form and context”[5]. The Fresnel diagram in this context represents just such a one-to-one mapping.

4

Christopher Alexander (1964) Notes on the Synthesis of Form; Harvard

5

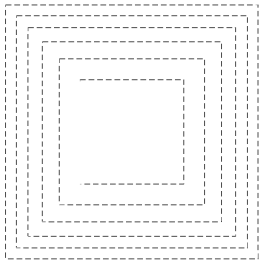
Philip Steadman (1979) The Evolution of Design; Cambridge University Press
p. 200



1. The Fresnel diagram as an illustration of the mathematical principle of the programme (function)

The two together form a "one-to-one mapping" of function and form.

2. The Fresnel diagram as an illustration of the building form that responds to the function.



3. Implicit within the building form is the form-ordering role of the Fresnel.

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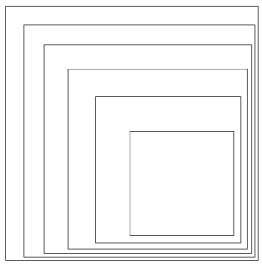
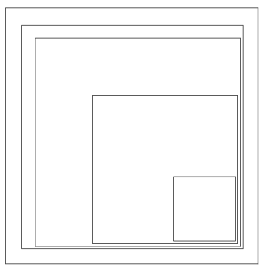


4. Weighting of the Fresnel towards one corner - the mathematical principle remains intact, but the diagram is more useful as a plan-generator (compare figure 10).



5. The Fresnel as an actual plan (the Manor Road Law Library) - the mathematical principle is diluted, and the range of generated spaces is richer (compare figure 11).

figure 9

**The stages of development of the Fresnel diagram from mathematical representation to building plan.**

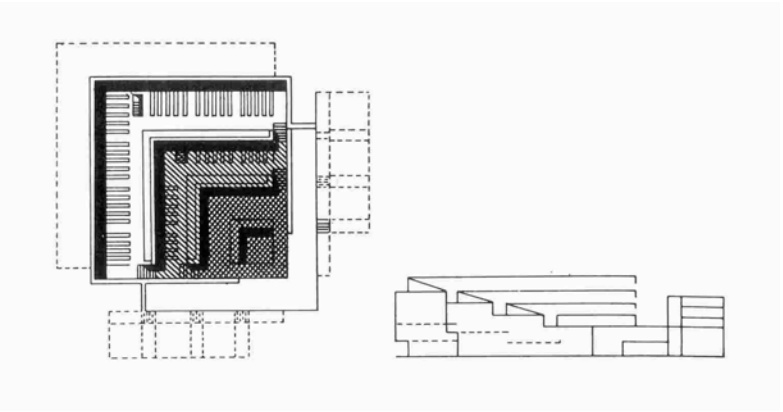
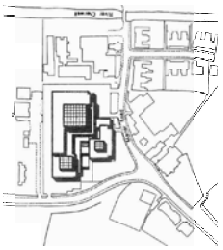


figure 10

**Generic expandable library**

Leslie Martin(1983)
*Buildings and Ideas 1933-83, p.17*
Cambridge University Press



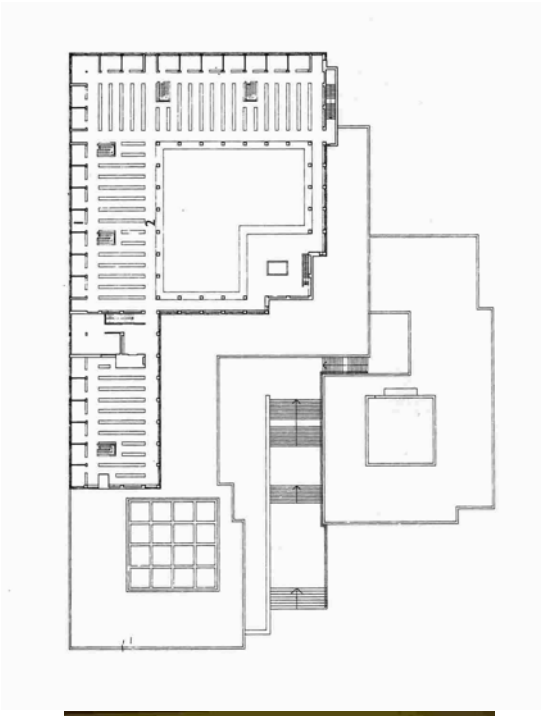


figure 11

**Manor Road Law Library, Oxford**

Leslie Martin(1983)
*Buildings and Ideas 1933-83, p.45*
Cambridge University Press

## Fresnel Development - Building and Ideas

By the time Martin published "Buildings and Ideas" in 1983, the fashion for functionally deterministic theories had waned. The book describes (among other things) his ideas for the design of libraries, including his most famous, the Manor Road Library complex at Oxford; but the Fresnel diagram, though very much in evidence in the library designs themselves, is not mentioned in the text. However this does not detract from its importance. The Manor Road complex was designed in the early 1960s, just at the time that Martin was developing the theories expressed in Urban Space and Structures, and the link between the two is evident.

In drawing the Fresnel as a square figure Martin had used it not only as a diagram of a functional programme, but as an indicative plan for how the requirements of that programme might be met. The "one-to-one mapping" of this fundamentally simple relationship implied that there was an unbreakable connection between its two sides - the representation of function and the representation of form. However it appears that Martin was willing to consider a loosening of this bond as he began to acknowledge something which had been implicit in his earlier discussion: that wrapped up with the Fresnel's role as a generator of efficient urban form is a sub-role as a device for the ordering of that form. In his proposal in Buildings and Ideas for a generic library plan he began to separate the Fresnel's form-ordering role from its function-answering role, and as the former slides out from beneath the latter it is possible to see three aspects of the Fresnel emerging (figure 9.1 - 9.3).

The separation of the ordering role from the functional role was gradual. Martin continued to use a functional "excuse" for the Fresnel in his generic library proposal in the potential it offered for efficient expansion around the edge of the library(figures 9.4, 10). In practice it is unlikely that any library on a limited site would be able to expand in this way, but as an abstract plan it fully corresponds to the mathematical idea that forms the basis of the Fresnel. What is more important in the generic plan is the shift that took place in the Fresnel itself. A disadvantage of the standard form of the square Fresnel diagram (figure 9.1) as a prototype for the physical layout of a building is that it lacks any particular emphasis in any direction: there is no ordering axis and no obvious place to put an entrance. Martin solved this by moving the segments of the Fresnel diagonally, weighting it towards one corner (figure 9.4). In doing this he moved the figure very firmly towards its new form-ordering role. It began to address not just the simple functional question of the building-to-space ratio,

but the more detailed and practical architectural question of the relationship of elements of the building: the ordering, in Summerson's words, of the “vast number of variables”present in a building's design.

In the Manor Road Law Library the process is taken a stage further. The Manor Road complex of three libraries and ancillary accommodation was designed by Martin with Colin Wilson and Patrick Hodgkinson as assistants in 1960. The Law Library, the largest of the three, is the clearest example of the application of the Fresnel principle to built form, but although its plan looks similar in shape to the diagonally-shifted Fresnel of the generic library, it is a further step from the Fresnel figure's representation of functionality. The Law Library room is ordered into a clear sequence of zones, with echoes of the “court” and “open space” of Martin's analyses in Urban Space and Structures - the bookstacks forming the building and the reading room the space. However, the syntax of this logic has been developed: a further zone of “front gardens” lies outside the bookstacks in the form of post-graduate carrels, and a separate entrance zone intrudes into the main space.

It is the fact that the logic has been extended that makes it into a syntax. In this extension, Martin's original atom of functional representation has been developed into a language of formal structure. The part of the logic that has been extended is not the mathematical logic of efficient expansion that the Fresnel represents, butt he ordering logic of its graphic form, something which is flexible enough to be adapted in this way. It may be that Summerson's “missing architectural language” is emerging here, but if this is so, and if indeed there is such a thing as an architectural language, the ordering logic, or syntax, is only part of it.

## Fresnel Development - Function and Sign

In his essay “Function and Sign” [6], Umberto Eco talks of “code” rather than “language” in relation to architecture, recognizing that while architecture acts within an environment of the conveyance of meaning, it does not act as the conveyor of structured information. Quoting Roland Barthes' observation that “as soon as there is a society, every usage is converted into a sign of itself”, Eco develops an argument that an object conveys a signal of its function separately from the action of its actual use: a spoon, for instance, conveys the idea of a certain manner of eating before the act of eating takes place, or even without the act of eating having to take place at all. This he terms its “denotative” semantic quality - it denotes its function without the function necessarily being utilized. The spoon also carries “connotative” semantic qualities: its presence on someone's table indicates to a visitor an expected style of behaviour, while decoration on the spoon may indicate the social rank of its owner.

6

Umberto Eco (1976) Function and Sign; published in Neil Leach (ed.)(1997) Rethinking Architecture; Routledge p. 182

Eco divides architectural codes into three types:

1. Technical codes
The level of codification of the practical or tectonic aspects of a building where there is“no communicative content”.

2. Syntactic codes
The structures that arrange the formal and contextual relationship of sign vehicles (the elements which do have communicative content).

3. Semantic codes
The actual relationship of sign vehicles, and their denotative and connotative meanings.

In assessing the Law Library and the meaning that it conveys within Eco's definition it seems to make sense to separate, at least temporarily, the building's enclosure from its contents. The elements that convey the function of the library's individual areas are not primarily the spaces that the enclosure creates, but the immediate points of functional contact - bookcases, tables etc - that exist within the area. The denotative aspect of the enclosure itself is quite limited: there is nothing in the nature of the parts of the enclosure that surround these areas that signals their function. The full denotative force lies in the interaction of enclosure and contents and their mutual enhancement, and in the case of the Law Library this interaction and the enhancing effect is strong.

The enclosure's connotative aspect is more complex, and revolves around the question of how to connote the idea of “functionalism”. It may be possible to say that part of the enclosure's functional connotative quality lies precisely in the clarity of its engagement with its enclosed elements. It is also true for most visitors that the functional “ornament” - the particular quality of detailed design and use of materials - is still, after 45 years, a valid signifier. But there is also an aspect which appears not to comply with Eco's definition - that the syntax itself may carry both denotative and connotative meaning. The diagonally-shifted Fresnel planning grid is clearly a syntactic code within this context, but the fact that it is derived from a diagram whose purpose was to denote a relationship of function and form gives it associated meaning. Separated from this original purpose the denotative aspect is less forceful, but the connotation of functionalism remains strong.

Martin's skill as an architect in his handling of the Law Library is evident in his ability to orchestrate a coherent whole using the full “vocabulary” of these code-components. His, and his team's, undoubted practical artistry lay in uniting the denotative and connotative, the syntactic and the semantic, together with (by all accounts) an exemplary application of technical codes, in such a seamless manner that one can almost be convinced that the building's form is a natural and logical outcome of its function. The intervention of an architectural “language” is all but invisible. However on closer inspection it may be seen that many of the things that appear to be “actually” functional are in reality symbolic. The Fresnel,in particular, has developed from its role as the bond between function and form, and taken on a new one as an essential component of the language of this symbolism.

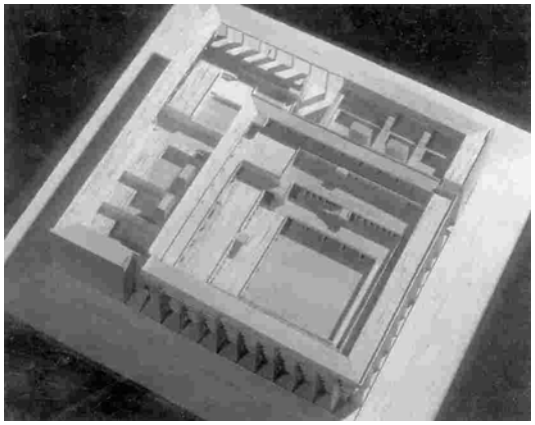


figure 12

**British Library: 1964 Bloomsbury scheme, model**

Roger Stonehouse (2004) *The British Library at St Pancras, p.84*
Spon Press

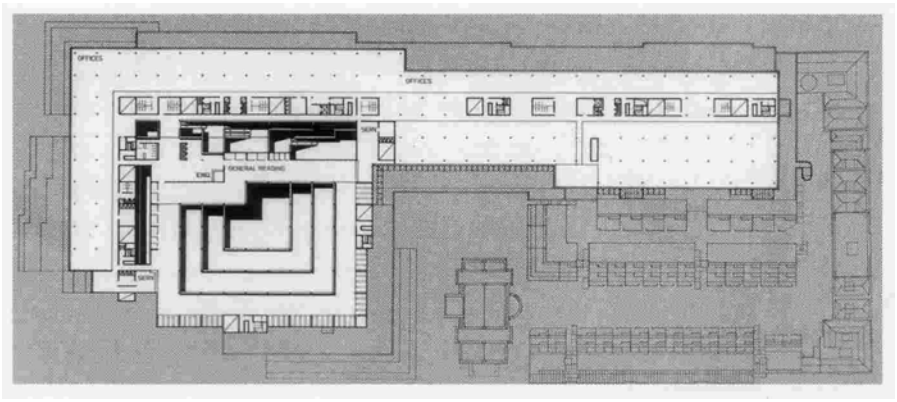


figure 13

**British Library: 1973 Bloomsbury scheme, plan**

Roger Stonehouse (2004) *The British Library at St Pancras, p.84*
Spon Press

## Fresnel Development - British Library

After the success of the Law Library it is not surprising that Martin and his team adopted the diagonally-shifted Fresnel (I shall continue to call it a Fresnel although its original mathematical meaning has become diluted) as a basis for further library design. When Wilson and Martin won the commission for the new British Library in 1962 the intended site for it was in Bloomsbury, South of the British Museum, around St George's church. The schemes for this site all include a reading room based on the Fresnel figure, and while they generally lack the organizational clarity of the Manor Road Law Library, they appear, especially in the earlier versions, to regain some of the direct relationship with the Fresnel's functional origin. Both the 1964 and 1973 designs show a stepped section which increases in height towards its outer edge, taking full advantage of the efficiency of perimeter development that the Fresnel demonstrates.

However, as Stonehouse's evolution diagram (figure 4) shows, from the time that the site was moved to St Pancras in 1975 (and coincidentally when Martin resigned from architectural practice) the design for the reading rooms underwent a change of character. While evidently still based on the graphic syntax of the Fresnel diagram, its functional aspect begins to drift away. Most importantly, the central court loses its positive character against a gradual intrusion of the surrounding "building", and bit by bit what was the focal space of the Law Library becomes a residual space in a corner of the Reading Room.

Stonehouse puts it in these words:

> "The consequence of this last move is to reverse the emphasis of the form from that of the space onto which the terraces look, to that of the terraces stacked in the corner of what has now become a room. It is a reversal of figure/ground in which the anti-form (the shape of the space) of the original terraced courtyard is, in effect, rotated to become the form of the new type of reading room. This was not a conscious act. In fact, the consequences of the shift to a room from a terraced space were only gradually recognised.
> ...
> The story ... is one in which the type form is repeatedly rediscovered as an appropriate form and then transformed through developments of its inherent morphology."[7]

Roger Stonehouse (2004)
The British Library at St Pancras;
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p. 105

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This “reversal of figure/ground” is, within Martin's original Fresnel analysis, the substitution of a pavilion for a court, or in other words the substitution of the most inefficient type of space use for the most efficient. This seems to signal a further stage in the development of the Fresnel as an ordering device, for now the denotation and even the connotation of function has been removed. When Stonehouse refers to “developments of its inherent morphology” he is speaking of something which arises from an internal geometric logic, and which no longer has even a semantic connection with the logic of functional building that Martin had originally invested it with. The story of the Fresnel so far has been one of a shift from diagram of socially-improving built form, to illustration of function-form relationship, to symbol of that relationship. None of the divisions is very definite, and there has always been some kind of correspondence between each stage and the previous. A developmental integrity has remained, and in the process the figure has gained depth of meaning. However, in this manifestation the Fresnel appears arbitrary; precisely the “self-referencing formal style” that Wilson argued against in “The Other Tradition”. The feeling is compounded by the fact that the furniture of the room - the desks and bookcases which (as in the Law Library) communicate the actual function of the room - do not coincide with the spatial delineation given by the enclosure in the same way as they do in the Law Library, and the opportunity for the additional clarity of meaning that they would give to the space is lost.

There is no doubt that the Humanities Reading Room is imposing, just as the pavilions of Martin's schematic diagrams would have been imposing,but the apparent faith that adherence to the formal qualities of the Fresnel figure will automatically lead to the same functional clarity that is apparent in the Law Library is misplaced. For whatever reason, Wilson was unable to discard a generating form that had once been useful,but had become redundant.

## Conclusion

In many ways this essay presents an old-fashioned argument. The debate over functionalism has moved on in recent years from the areas I have discussed. The structuralist ideas of Eco's essay have been overtaken by post- structuralism, and John Summerson, in his preface to the book in which "The Case for a Theory of Modern Architecture" is published, apologizes that it is only included out of historical interest. Most seriously, I have not discussed the function of a building in mediating the relationships of its inhabitants. The "function" discussed in the essay is a one-way development, starting with the conceptualising and rationalizing process within the architect's mind, and leading to the communication of that process to its audience.

It is within this development,however,that the Fresnel-the core subject of the essay - has its relevance. It seems that in spite of its datedness, Summerson's concept of the "missing language" is a valid key to its analysis. "Language" in the way that Summerson uses it, has two interpretations: firstly, as the internal process by which an architect translates the variables of the programme into form - the conceptualisation and rationalization mentioned above - and secondly as the environment of syntactic structure and semantic meaning. It is in this context that the Fresnel has a story. In any other view, the linkages that join the points of the story might not exist.

What is remarkable is that,within this specific view, there is a story, that it is so long, and that the linkages do hold. The Fresnel figure has meant fundamentally different things to the architects who have used it (and it has apparently meant several different things to Leslie Martin alone during his use of it) but what links these things is not just the graphic symbol of the diagram, but a transformation of concept and meaning that joins each stage to the next. It is only in the last stage that the integrity of this linkage breaks down, though paradoxically it is the architectural difficulties apparent in the Humanities Reading Room that drew attention to the Fresnel and its use in the first place.

## Bibliography


Colin St John Wilson (1998) *The Design and Construction of the British Library*

Colin St John Wilson (1995) *The Other Tradition of Modern Architecture*;
Academy Editions

Roger Stonehouse (2004) *The British Library at St Pancras*;
Spon Press

Leslie Martin, Lionel March (1972) *Urban Space and Structures*;
Cambridge University Press

Leslie Martin(1983) *Buildings and Ideas 1933-83*;
Cambridge University Press

Philip Steadman (1979) *The Evolution of Design*;
Cambridge University Press

Raymond Unwin (1912) *Nothing Gained by Overcrowding*;
Garden Cities and Town Planning Association

John Summerson (1957) *The Case for a Theory of Modern Architecture*;
published in *The Unromantic Castle*; Thames and Hudson

Umberto Eco (1976) *Function and Sign;*
published in Neil Leach (ed.)(1997) *Rethinking Architecture;* Routledge