

Octagons in the Plans of John Andrews

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Abstract

Over a period of three decades John Andrews produced a series of plans which all used the same octagonal pattern. The earliest example is the 1965 student dormitory Housing Complex B, at Guelph University, which was directly influenced by Louis Kahn's dormitory at Bryn Mawr College built a year earlier. The use of octagons in these projects was tied to concepts of cellular growth and significant form. Philip Goad has recently discussed these ideas in relation to post-World War II buildings in Australia with reference to Robin Boyd's The Puzzle of Architecture, also from 1965. Boyd cites the influence of Wittkower's Principles In the Age of Humanism to explain the prevalence of polygon-based plans in the 1950s and 60s. In Kahn, Goad, Boyd and Wittkower the octagon is inevitably conceived of as a kind of adulterated circle, and so as a closed, ideal form. However, an analysis of Andrews's plans reveals that the octagons in his projects are not circle-based but rather emerge out of the relationship between a square and its diagonals. An examination of meanings of the diagonal in modern art and architecture shows how in Andrews's plans the diagonal is used to symbolise both movement and opposition. The octagon comes to be thought of in terms of experience and formal openness. This is different from Boyd's description of circle-based plans as being "closed, final statements," and "self-contained, finite, closed form." Using Robin Evans's model of extrinsic and intrinsic circulation, it is argued that in Andrews's octagons the spaces of occupation are co-located with the spaces of passage, but also, that they are at the same time separated from each other through the use of diagonal axes. It is shown that aspects of Andrews's octagonal projects can be understood in a different light from the dominant history of post-World War II polygonal plans.

Over a period of three decades, from the 1960s to the 1980s, in Canada and Australia, the offices of John Andrews produced a series of plans which all used the same octagonal pattern. The octagons were originally appropriated from the work of Louis Kahn in the 1960s, and as such bore within them ideas of cellular growth and significant

form which were fashionable at the time. However, as they were assimilated into Andrews's practice the octagons rather came to be constructed and conceptualised in relation to ideas about movement and opposition. This shows that aspects of these projects can be understood in a different light from the dominant history of post-World War II polygonal plans.

The earliest example of octagons in the plans of John Andrews is in the 1965 student dormitory Housing Complex B, at Guelph University near Toronto. The overall plan of the extensive complex is organised by a grid of internal streets which provide access to vertical circulation risers which in turn service each of the thirty-six bedroom towers. On each level individual bedrooms are clustered around communal living spaces and shared facilities. It is the plans of the individual bedrooms that are octagonal in shape. Philip Drew has noted the similarity between the diagonality of Housing Complex B and Louis Kahn's design for a dormitory at Bryn Mawr College, Philadelphia (1964).¹ Completed working drawings of Bryn Mawr show the overall plan of the complex as a row of three interlocking square diamonds with bedrooms around the perimeter which are separated from central social spaces by wide corridors. The diagonal plan structure is certainly similar to that of Housing Complex B, however, this paper is arguing that Andrews's use of octagons in his plans was also influenced by this project. A plan of an earlier version of Bryn Mawr was published in Vincent Scully's 1962 monograph on Kahn.² In general, the arrangement of the earlier plan is similar to the finished project, however a notable difference is that the earlier design has octagonal shaped bedrooms. By the time the project appeared in Scully's book it had been in development since 1960, and during this period Kahn had shown a continued interest in the octagon as a means for achieving a dense packing of functional "cells."³ Kahn referred to geometric ordering principles as found in nature as he grappled with the dense programmatic requirements of the large complex. Techniques of "grouping"⁴ were explored as a way to organise the large number of variously sized rooms. Process drawings show bedrooms represented schematically as circles aggregated around larger elements, and a study model shows octagonal cells in three-dimensions tightly packed together. It could be argued that such strategies suggest an awareness of D'Arcy Thompson's celebrated *On Growth and Form*, an abridged edition of which had been published in 1961.⁵ Diagrams in Thompson of organic cell aggregations and their relationships to such geometric forms as hexagons and truncated octahedrons bear a notable resemblance to some of Kahn's drawings and models for Bryn Mawr. This kind of metaphorical use in Modernism of polygonal forms, using ideas taken from the natural sciences and the arts, has been recently and eruditely

examined by Philip Goad in his article “Post-War and Polygonal: Special Plans for Australian Architecture 1950-1970.”⁶

Goad’s article is a survey of a number of Australian buildings from the 1950s and 60s which have polygonal shaped plans, including octagons but also 6, 7, 10, 12 and 16-sided regular polygons. Goad puts forward five possible sources for these plan shapes, and confirms Robin Boyd’s assessment—from his 1965 book *The Puzzle of Architecture*—that they reflected a search for significant form.⁷ Goad’s five sources are:

“[1] emerging recognition of the significance of context and place, [2] a reversion to neo-platonic form as part of a search for a new monumentality, [3] panoptic planning through strict adherence to function, [4] an ongoing search for design minimums through investigations of nature and geometry, and [5] the desire to produce organic compositions and prototypes of parametric design that might suggest flexibility and growth.”⁸

Some of these observations can certainly be re-applied to Kahn’s work at Bryn Mawr but this paper wishes to emphasise that for Kahn, and in the examples cited by Goad, the octagon is always conceived of as a kind of adulterated circle.

Most of the examples of octagons that Goad cites date from before 1800, and all of them can be thought of as circular. For example, the octagonal plan of the Tower of the Winds (50BC) is determined by the eight winds which correspond to each of the cardinal and ordinal directions. In this case the octagon can be thought of as representing pan-directionality and acts as a diagram of the circle of the horizon, in the same way that a compass does. Similarly, monastic chapter houses and Bentham’s Panopticon are alike shaped by the requirements of visibility and are responses to the curve of the panning gaze. Goad in particular highlights Boyd’s suggestion that a major influence on the post-World War II interest in significant form was the publication in 1949 of Wittkower’s *Architectural Principles in the Age of Humanism*, the first chapter of which examined renaissance centrally-planned churches. Many of these plans are based on a circular geometry, and certainly the octagonal ones are. Goad quotes Wittkower writing on Alberti’s preference for circular plans: “Nature herself ... enjoys the round form above all others.”⁹ According to Alberti the square, hexagon, octagon, decagon, and dodecagon are all derived from the circle. Accordingly, Boyd suggests that post-World War II architecture (what he calls the “second phase”), can be entirely symbolised by the

circle.¹⁰ The autonomous nature of the circle can be compared with the monadic form of Kahn's Thompsonian cells at Bryn Mawr. Boyd wrote that these circle-based plans were conceived as "closed, final statements," and "self-contained, finite, closed form."¹¹

Another significant group of buildings with octagonal plans that can be thought of as circular are the so-called Octagon Houses built in North America after the publication in 1848 of a self-build manual by the phrenologist Orson S. Fowler, called *A Home for All: Or the Gravel Wall and Octagon Mode of Building*. Fowler thought of octagons in terms of material efficiency and observed that in nature spherical forms predominate, "in order to enclose the most material in the least compass," and also that "the octagon, by approximating to the circle, incloses more space for its wall than the square."¹² Fowler's straightforward logic, supported by mathematical proofs, appealed to many, and hundreds of these octagonal-planned houses were built up until the 1920s.¹³

The influence of Bryn Mawr on the design of Housing Complex B suggests some participation by Andrews in this tradition of thought surrounding the octagon, and it would be possible to describe the Guelph project in terms of Boyd's search for significant form. Published diagrams show the bedrooms as cellular circles clustered around circulatory stems. However, an explanation by Andrews of the origin of the bedroom design at Guelph suggests that the octagon form was derived from a square and not a circle. One of the primary requirements from the client was for flexible rooms that could be occupied in a number of ways. About this, Andrews wrote:

"In the conventional room maximum flexibility is diminished because doors, cupboards and windows cut down the amount of wall space against which a student can put furniture, lamps, bookshelves. Our response was to develop a room in which all four walls were left free. The corners of the walls were chopped off and the doors and windows placed there."¹⁴

The result is a truncated square. The orthogonal walls of the "cell" determine the dominant orientation for static occupation of the space (as if it were a square), whereas the corner doors and windows establish diagonal axes which organise movement through the space; that is, movement of bodies, vision, light, air and services.

In the history of geometric symbolism, the circle represented the heavens, divinity, self-containment and perfection, whereas the square represented the earth and corporeal

existence. The octagon was understood as an intermediary representing the half-way stage in a transformative process of rebirth.¹⁵ Also, because the octagon plan shape can be used to structurally support a dome it is often used as the form for the dome drum, acting more literally in its mediatory capacity along the vertical axis between the material experience of the everyday and the realm of the ideal and abstract. In the renaissance the three shapes—square, octagon and circle—were traditionally drawn along a vertical axis, with the circle at the top and the square at the bottom.¹⁶ The upward directional bias of this axis in neo-platonic thought from the 1450s to the 1950s ensured that the idea of the octagon-transforming-into-a-circle has dominated. However, the concept of the octagons at Housing Complex B as emerging from the relationship between a square and its diagonals suggests a reversal of this orientation and forces us to think about them in terms of experience and formal openness as well as autonomy and the ideal.¹⁷

This openness and connection suggested by the technique of constructing octagons from squares and diagonals is more evident in two office buildings designed by the John Andrews office during the 1970s. The first was designed for the Australian Commonwealth Government in the suburb of Woden, Canberra, in 1974, and the second for the International Telecommunications Satellite Organisation, or Intelsat, in Washington, DC, in 1979. An early design for the Woden offices shows an extensive orthogonal grid covering the site and continuing beyond the limits of the proposed building envelope. A checker-board of office “modules”¹⁸ are accessed by external elevated walkways which run diagonally through the intervening courtyards. Internally, as at Guelph, movement through the spaces occurs at the corners, creating a truncated square, or octagon, plan shape. Spaces of static occupation are organised by the orthogonal grid and corresponding enclosure; and spaces of movement, passage, and interconnection operate diagonally. The Woden offices underwent a number of design revisions and the final proposal was more axial than the field-like original. The oil crisis and attendant economic recession of the mid-1970s meant that the project did not proceed. However, part of the design was appropriated in 1979 to build a College of Advanced Education on the same site, but only three of the twenty-two office modules originally proposed were built. The plan for Woden offices was also re-used, in a developed form, for the Intelsat Headquarters Building. Considering the differences between the two projects—Intelsat was on another continent, had more varied and complex programmatic requirements, was on a sloping rather than a flat site, and used a steel rather than concrete structural system—the similarities with the 1973 Woden plan are remarkable. The Intelsat circulation system is the same as at Woden, with major

inter-office routes located externally and minor intra-office movement occurring through the corners of the building modules. At Intelsat, the courtyards have been enclosed to create climate-controlled atria, however they act in the same way as the courtyards at Woden. Another Andrews octagon-project from the 1970s is the Chemical Engineering building at the University of Queensland. Less explicit than the Woden/Intelsat plan, and without courtyards, the northern section of the building nevertheless has an octagonal structural grid through which pedestrians and services move diagonally.

In the 1980s, after the success of Intelsat, a whole series of buildings using similar octagonal planning patterns, and of varying levels of resolution and success, came out of the Andrews office. In 1982, there was the Adelaide Station and Environs Redevelopment (ASER), an extensive master plan, which included a convention centre, office tower and hotel, and the planning of which was entirely governed by a diagonal grid. In 1984 (the same year that Andrews had heart bypass surgery) the firm produced a schematic design for an office building at Parramatta for the Commonwealth Government. The project did not proceed. The plan does not possess the clarity of earlier projects, and it can be seen that the octagon has become a motif applied onto the plan rather than an outworking of an underlying technique. Two years later, in 1986, an octagonal office building *was* built at Parramatta, this time for a private developer. For marketing purposes it was actually called *The Octagon*. The plan is strongly symmetrical, and exhibits the same relationship between structure, enclosure, occupation and diagonal movement.

All that will be said here is that all of these projects employed a similar octagonal form and a similar strategy of using one orientation for spaces of occupation and another, diagonal, orientation for spaces of movement.

The idea of pedestrian movement, and the technique of representing that movement in plan through use of the diagonal, are both present throughout Andrews's other, non-octagonal buildings. Many of Andrews's other projects were organised around circulation networks, and movement was a major theme of his work throughout his career. Notable projects by Andrews with plans based explicitly on movement diagrams include the Miami Passenger Terminal—which Peter Blake described as “a kind of machine, designed to facilitate and express patterns of movement”¹⁹—and in Australia, the Cameron Offices, where a series of linear buildings were arranged along an elevated pedestrian street which was designed to connect into the broader urban context.

In a 1974 interview, speaking about Scarborough College, for example, Andrews said it “has as its major purpose to encourage and enhance communication,” and that “communication is circulation.”²⁰ Scarborough College, with its monumental off-form concrete spine and open-ended, extendable linear plan, was seen as emblematic of the aspirations of 1960s modernism by Reyner Banham, who included it in his register of megastructures.²¹ This associated the work with general themes of the age to do with infrastructure and flexibility, represented by such architects as the Smithsons, the Metabolists, and Candilis Josic Woods. However, Andrews’s thinking about movement was much more direct, logical, and classically Modern than this, and as a result his buildings can be understood, much more straightforwardly, as circulation diagrams in the way that something like a mat-building cannot be. In 1978, Charles Jencks justifiably described Andrews as an “ultra modernist.”²² Future research will show how Andrews’s geometric formalism and hierarchical circulation systems would have precluded his work from being included in Alison Smithson’s canon of mat-buildings from 1974, as mat-buildings require a radical decentralisation and horizontality of plan in order to allow complete freedom of movement and occupation.²³

There are also a number of other non-octagonal projects which are similarly understandable in terms of a circulation diagram but where the movement of the pedestrian in plan is identifiable by virtue of its diagonality. These projects include the unbuilt proposal for the Metro Centre in Toronto, where the movements of pedestrians, cars, buses and trains were separated to form a dense “multi-level integrated complex;”²⁴ the King George Tower in Sydney, where the original design of the ground level plaza allowed movement across the corner site and determined the triangular plan of the tower above; and finally the student housing at the Canberra College of Advanced Education, where the residences are aligned to a series of diagonal staircases which descend the sloping site.

In the light of these observations, an examination of some of the meanings applied to the diagonal in Modernist art and architecture in general will contribute to a deeper understanding Andrews’s octagonal plans. Neil Levine has written about the role that the diagonal played in the planning of Frank Lloyd Wright. According to Levine, Wright used the diagonal visual axes to systematically and geometrically break down the sense of interior enclosure in his buildings and to achieve an open, free-flowing space. For Wright, the diagonal in plan came to variously represent “irregularity,” “irrationality,” “flexibility,”

and “a more direct relationship between building and landscape.”²⁵ The use of the diagonal axis in this way was a conscious negation by Wright of the orthogonality of his Beaux-Arts heritage.²⁶ Levine notes that by using the diagonal in this way the explicit, compositional axes of Wright’s buildings are separated, and made different from, the implicit, experiential ones. In Levine’s words, the “subjective experience of space is no longer coextensive with the axial definition of that space.”²⁷ He goes on to quote one of Wright’s apprentices: “the vistas are ... oblique to and ... independent of the geometry of the house. This independence suggests to the occupant a freedom of movement in any direction.”²⁸

Vincent Scully has written about Wright in relation to these “twin themes of spatial continuity and geometric order,”²⁹ but he has also projected Wright’s idea of the “reflex diagonal” onto an analysis of Michelangelo’s Florentine fortification drawings from the 1520s.³⁰ Published in 1952, shortly after Wittkower’s *Principles*, Scully’s analysis puts the drawings forward as important examples of a reactive design process that, rather than constraining the plan by an internalised geometric formalism, allows it to be shaped by its “will to form”³¹. Scully writes, that in Michelangelo’s drawings,

“the rectangle and the simple circular rhythm, both calculable by numerical means, must give way to a more complex, dynamic system of interpenetrating diagonals. Space must not now be primarily enclosed as a volume ... but must ... be created psychically along expanding diagonal fields of vision ... The planes of wall then stand free and create reflex spatial diagonals of sight and movement.”³²

He goes on to further differentiate between an open dynamic architecture and a closed static one. The use of diagonal axes in plan causes the form to become “an explosive nugget.”³³ He further suggests that these axes, while,

“controlled eventually by geometry, ... are in their basic energies the very opposite of what is often called today “formalistic” design. ... The power of the sensuously felt diagonal to destroy boundaries and to create reflex makes them live and grow as spatial forms.”³⁴

There are two things to note at this point from the discussion of diagonality so far. Firstly, the idea of the diagonal representing dynamic vision and movement. And secondly, the

idea of the diagonal representing difference or opposition. In relation to this second idea two more examples will be briefly discussed. At the same time that Wright was systematising his techniques of diagonal planning, Theodor van Doesburg was publishing his ideas on contra-composition in *De Stijl*. His well-known manifestos pose the diagonal as a symbol of industrial society's break with nature and classicism. In his 1926 "From Composition to Contra-Composition" Van Doesburg argues that, "The classical principle of art ... seems insufficient to express the modern spirit which is characterised by a need for sharp contrast with nature."³⁵ Two years later in "Elementarism and its Origin," he writes: "Modern man has broken completely with this historical period ... He constructs for himself a new world from the remains of the old one and he offers up the concept of the oblique as opposed to that of the orthogonal system."³⁶ Bruno Zevi makes a similar point in *The Modern Language of Architecture*. Zevi sees classicism as an agent of political tyranny and slavery, and the consequence of a fear of life. The "abstract *a priori* ideology" is manifested in architecture through geometry, symmetry, right angles and grids. One way for architects to emancipate themselves from this oppression is by designing dissonant form. This is done by enhancing and accenting the diagonal view through asymmetry.³⁷ By looking to Wright, van Doesburg, Scully and Zevi, it can be seen that for an extended period the diagonal axis was used to symbolise movement on the one hand—that is, movement of people and vision, with the attendant erosion of static form and enclosing boundaries—and on the other, difference or opposition—opposition to classicism, significant form and geometry.

At this point it is worth differentiating—as Eli Bornstein has done in relation to painting—between "two dimensional diagonal movement," (as one might see in an architectural plan), and "three dimensional oblique form in space." Writing in 1969, Bornstein disparagingly suggested that diagonal movement had become a trope of art associated with "agitation, dramatic and melodramatic gesture, emotional turbulence, 'expressionism' ... change and unrest," as well as opposition to "the 'classical'." And while Bornstein is correct when he says that this is an "unfortunate oversimplification," it is this demonstrable relationship between the two dimensional diagonal axis and ideas about movement and opposition that is the focus of this paper.³⁸

In the octagon plans of John Andrews, the diagonal embodies both of the meanings discussed above. As in other projects by Andrews where he has sought to emphasise and separate pedestrian movement as a way of highlighting his humanistic ambitions, the structuring of movement along diagonal axes is also a way of making that movement

manifest in opposition to other elements in the plan. Also, by using the diagonal as an axis of movement, Andrews reflects ideas associating the diagonal with dynamism, openness and interconnection. In the 1970s Robin Evans tried to locate a shift in the history of planning from the use of intrinsic to extrinsic circulation systems.³⁹ Evans argues that at one time spaces of passage were the same as spaces of occupation, but with the introduction of the corridor, movement became dissociated from function.⁴⁰ Using Evans's model, it can be suggested that in Andrews's octagons the spaces of occupation are co-located with the spaces of passage, but also, that they are at the same time separated from each other through the use of diagonal axes. This is comparable to Wright's work in how the "subjective experience of space is no longer coextensive with the axial definition of that space."⁴¹

By looking at the construction and conceptualisation of Andrews's octagon plans it can be seen that aspects of these projects can be understood in a different light from the dominant history of post-World War II polygonal plans as constructed by Robin Boyd and recently revisited by Philip Goad. While issues of significant form in Andrews's plans have not been touched on, by showing how his octagons are constructed from squares and diagonals rather than circles they have been able to be characterised in terms of formal openness and experience over geometric ideality and formal autonomy.

This representation is supported, but perhaps also complicated, by the fact that none of Andrews's plans are actually octagonal in shape, but rather are fragments of field-like octagonal tessellations. Shapes are said to tessellate if when repeated they are able to completely cover a planar surface without any gaps or overlap. Octagons can only tessellate if combined with squares, and this pattern constitutes one of eight so-called Archimedean tessellations. Also called truncated-square tiling in modern mathematics, this tessellation has a long history, appearing, for example, in Johannes Kepler's 1619 *The Harmony of the World*.⁴² In *The Puzzle of Architecture* Boyd describes the technique of repeating polygonal cells as one of three "guide visions" that architects could use to produce a monolithic effect, creating a form that is "one-piece but cellular, like a honeycomb, or a bunch of grapes."⁴³ But again, this understanding of repeated polygons sees them as closed, circle-based forms that are read individually and which are organised in an aggregate manner, analogous to cell growth. Truncated-square tiling is better understood as the deformation of a Cartesian grid (along with the intimations of preexistence and omnipresence that this suggests), as a field rather than a grouping of cells, modules, or monads. Future research could examine the way that this geometric

pattern has been appropriated by different architects through history—from Leonardo Da Vinci to Bruce Goff and Louis Kahn—and how it was framed ideologically and architecturally. It is also interesting to note, finally, that Andrews ultimately subverts the field-like quality of the tessellation by giving his plans, particularly the Woden/Intelsat plan, a strong processional axis. Further, when this axis is actually experienced much of the diagonality so evident in the plan would be lost. The relationship between this diagonal axiality and the work of Louis Kahn, and so the Beaux-Arts, may also be a subject of future study.

Endnotes

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- ¹ Philip Drew, "Andrews, John," in *Contemporary Architects*, ed. Muriel Emanuel (Detroit: St James Press, 1994).
- ² Vincent Scully, *Louis I Kahn* (London: Prentice-Hall International, 1962), 39.
- ³ Heinz Ronner and Sharad Jhaveri, *Louis I. Kahn: Complete Works 1935-1974*, 2nd ed. (Basel: Birkhauser, 1987), 164.
- ⁴ Ronner and Jhaveri, *Louis I Kahn*, 162.
- ⁵ D'Arcy Wentworth Thompson, *On Growth and Form*, ed. John Tyler Bonner, Abr. ed. (Cambridge: Cambridge University Press, 1961).
- ⁶ Philip Goad, "Post-War and Polygonal: Special Plans for Australian Architecture 1950-1970," *Architecture Theory Review* 15, no. 2 (2010).
- ⁷ Robin Boyd, *The Puzzle of Architecture* (Melbourne: Melbourne University Press, 1965), 49.
- ⁸ Goad, "Post-War and Polygonal," 181.
- ⁹ Rudolf Wittkower quoted in Goad, "Post-War and Polygonal," 173.
- ¹⁰ Boyd, *The Puzzle of Architecture*, 48.
- ¹¹ Boyd, *The Puzzle of Architecture*, 49, 84.
- ¹² O. S. Fowler, *A Home for All: Or the Gravel Wall and Octagon Mode of Building*, Rev. and exp. ed. (New York: Samuel R. Wells, 1853), 82.
- ¹³ Rebecca Lawin McCarley, "Orson S. Fowler and a Home for All: The Octagon House in the Midwest," *Perspectives in Vernacular Architecture* 12(2005): 49. A book discussing Octagon Houses in Ontario, Canada, was published by the University of Toronto at the same time that John Andrews was chairman there—see Chapter 5, "Polygonal Buildings," in John I. Rempel, *Building with Wood and Other Aspects of Nineteenth-Century Building in Ontario* (Toronto: University of Toronto Press, 1967).
- ¹⁴ Jennifer Taylor and John Andrews, *John Andrews: Architecture a Performing Art* (Melbourne: Oxford University Press, 1982), 60.
- ¹⁵ J.C. Cooper, *An Illustrated Encyclopaedia of Traditional Symbols* (London: Thames and Hudson, 1978), 36, 122, 157.
- ¹⁶ Mark Reynolds, "The Octagon in Leonardo's Drawings," *Nexus Network Journal* 10, no. 1 (2008): 54.
- ¹⁷ Jean Bony discusses the way that the diagonals of the buttressing in gothic cathedrals can create either a sense of separateness or of interconnection between structural bays, that they can act either centripetally or centrifugally. I am suggesting that Andrews's diagonals act centrifugally. See: Jean Bony, "Diagonality and Centrality in Early Rib-Vaulted Architectures," *Gesta* 15, no. 1/2 (1976).
- ¹⁸ John Andrews International, "Woden East Government Offices," (Unpublished report, John Andrews International Pty Ltd, 1974).
- ¹⁹ Peter Blake, "Half Mile Gangplank," *Architectural Forum* 132, no. 2 (Mar, 1970), 55.
- ²⁰ John Andrews, "On Architecture," *A+U* 4, no. 5 (41) (May, 1974), 25.
- ²¹ Reyner Banham, *Megastructure: Urban Futures of the Recent Past* (London: Thames & Hudson, 1976), 133.

²² Charles Jencks, "Late Modernism and Post-Modernism," *Architectural Design* 48, no. 11-12 (1978).

²³ See, Alison Smithson, "How to Recognise and Read Mat-Building: Mainstream Architecture as It Has Developed Towards the Mat-Building," *Architectural Design* 44, no. 9 (1974).

²⁴ Taylor and Andrews, *John Andrews*, 85.

²⁵ Neil Levine, "Frank Lloyd Wright's Diagonal Planning Revisited," in *On and by Frank Lloyd Wright: A Primer of Architectural Principles*, ed. Robert McCarter (London: Phaidon Press Ltd., 2005), 234, 246, 263.

²⁶ Levine, "Frank Lloyd Wright's Diagonal Planning Revisited," 263.

²⁷ Levine, "Frank Lloyd Wright's Diagonal Planning Revisited," 250.

²⁸ Levine, "Frank Lloyd Wright's Diagonal Planning Revisited," 250.

²⁹ Vincent Scully, *Frank Lloyd Wright* (New York: George Braziller Inc., 1960), 15.

³⁰ Vincent Scully, "Michelangelo's Fortification Drawings: A Study in the Reflex Diagonal," *Perspecta* 1(Summer, 1952).

³¹ Scully, "Michelangelo's Fortification Drawings," 43.

³² Scully, "Michelangelo's Fortification Drawings," 43.

³³ Scully, "Michelangelo's Fortification Drawings," 43.

³⁴ Scully, "Michelangelo's Fortification Drawings," 43.

³⁵ Theodor Van Doesburg, "From Composition to Contra-Composition," *De Stijl* VII, no. 73/74 (1926), quoted in Donald McNamee, "Van Doesburg's Elementarism: New Translations of His Essays and Manifesto Originally Published in De Stijl," *Structurist*, no. 9 (1969): 23.

³⁶ Theodor Van Doesburg, "Elementarism and Its Origin," *De Stijl* VIII, no. 87/89 (1928), quoted in McNamee, "Van Doesburg's Elementarism," 28.

³⁷ See Chapter 2, "Asymmetry and Dissonance" in Bruno Zevi, *The Modern Language of Architecture* (Canberra: Australian National University Press, 1978).

³⁸ Eli Bornstein, "The Oblique in Art: Toward the Oblique in Space," *Structurist*, no. 9 (1969), 34; For a recent example of a discussion of movement in modernism, see Lee Stickells, "Conceiving an Architecture of Movement," *Architectural Research Quarterly* 14, no. 1 (2010).

³⁹ Robin Evans, "Figures, Doors and Passages," *Architectural Design* 48, no. 4 (1978).

⁴⁰ For a critique of Evans's argument see, Mark Jarzombek, "Corridor Spaces," *Critical Inquiry* (Summer, 2010).

⁴¹ Levine, "Frank Lloyd Wright's Diagonal Planning Revisited," 250.

⁴² Johannes Kepler, *The Harmony of the World*, trans. E.J. Aiton, A.M. Duncan, and J.V. Field (Philadelphia: American Philosophical Society, 1997 [1619]).

⁴³ Boyd, *The Puzzle of Architecture*, 86.

Listen to music from John Andrews & The Yawns like Drivers, Windmill & more. Find the latest tracks, albums, and images from John Andrews & The Yawns. When Woodsiist associate John Andrews isn't drumming for Quilt or playing keys for Woods, he records his own music under the moniker John Andrews & The Yawns. Andrews started working on debut album Bit By The Fang in 2013 while living in Lancaster, PA, but commitments with those other projects prevented him from finishing it until now. Good thing he did, though: The record is a brightly shining (if blurry) example of psychedelic saloon pop, replete with wobbly hallucinatory piano, sun-damaged jangle, and head-trip song titles like "Go To Your Funeral (If You Go To Mine)." [read more Dec 31, 2016 - The John Richards Octagon House - Watertown Historical Society.](#) It now serves as a bed and breakfast. Octagon houses were briefly popular in the mid-1800s for their supposed health benefits and economic use of cladding for the amount of floor space enclosed. Odd angles and awkward floorplans were its demise. Kathy Cutforth 1800-1940 Vernacular and Folk Victorian.