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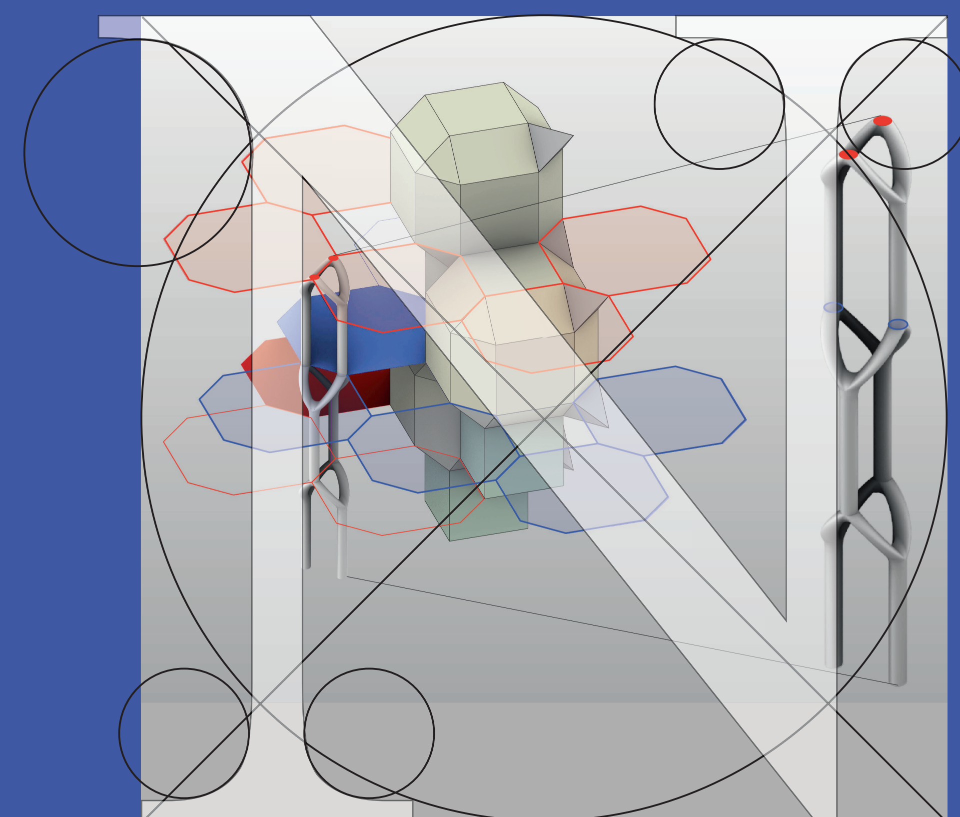

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Founded in 1999, the *Nexus Network Journal* (NNJ) is a peer-reviewed journal for researchers, professionals and students engaged in the study of the application of mathematical principles to architectural design. Its goal is to present the broadest possible consideration of all aspects of the relationships between architecture and mathematics, including landscape architecture and urban design.

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RESEARCH

Geometry and Proportions in Anne Tyng's Architecture

Cristina Càndito[1] · Alessandro Meloni[1]

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Abstract
Anne Tyng spent her long professional life devoted to architecture, mainly in its theoretical aspects linked with geometry and proportions. She is well known as one of Louis Kahn's most important partners in her professional and private life, however a relevant degree of originality was found in her work, while exploring her architectural design through two unrealized projects. The aim of this paper is to investigate these projects by analysing the original drawings and also searching for possible geometries through three-dimensional virtual reconstructions. In this way, it is possible to detect Tyng's propensity for complex three-dimensional geometry in her version of the project for Bryn Mawr College's Erdman Hall (around 1960) made for Kahn's firm, and the attention given to the relations between geometry, environment and perception in her independent project, the Four-Poster House (around 1975–1988). In both examples, Tyng paid special attention to issues related to proportion which link architecture and human beings, adopting dimensions that could fit different kinds of people.

Keywords Anne G. Tyng · Tessellation · Platonic solids · Regular polygons

Introduction

Anne Griswold Tyng (1920–2011) graduated in Architecture at Harvard in 1944 and was an associate in the firm of Louis I. Kahn (1901–1974) from 1945 to 1964, but her architectural designs and theories should not be considered only in Kahn's shadow, especially in connection to her geometric skills. Tyng's main thought can be interpreted as an attempt to create a hierarchy among forms, in which pure geometries, such as the Platonic solids and regular polygons, are placed at the

✉ Cristina Càndito
cristina.candito@unige.it

Alessandro Meloni
alesssandro.meloni@edu.unige.it

1 Department of Architecture and Design, University of Genoa, Stradone Sant'Agostino, 37, 16123 Genoa, Italy

highest levels as expressions of perfection. There is a great deal of literature about architectural projects that are traditionally attributed to Louis Kahn and that critics have recently assigned, at least in part, to Tyng, starting from the testimonies found in the letters exchanged with Kahn himself (Tyng 1997: 216). In this paper, however, two unrealized projects have been analysed, which confirm Tyng's propensity for an original geometric conception. The projects are her version of the Bryn Mawr College's Erdman Hall and the Four-Poster House.

The original drawings of the two projects were found in publications and archives and, with the help of Tyng's theoretical works, they were used as the basis for different studies. They constituted the foundation for the research of two-dimensional geometries, hypothetically used by Tyng to develop her projects. As it often happens, more versions of the same project were found, and some motivated choices had to be made in order to develop further investigations. In the Erdman Hall, the hypothesis described by Tyng has prevailed over the drawings regarding the details like shapes and measures. In the Four-Poster House the lesser documented version was chosen, to provide a comparison with the other version, which is illustrated by a wooden model.

In addition to the reconstruction of two-dimensional geometries, the projects were rebuilt digitally to analyse them in their complex spatial configuration and to investigate the relations between the different elements. The considerations based on the two projects examined cannot, however, be extended to Tyng's entire body of work, although some recurrences can be found, especially in terms of geometries and dimensions.

From Regular Geometry to Architecture in Erdman Hall for the Bryn Mawr College

The project of Eleanor Donnelley Erdman Hall for the Bryn Mawr College (Pennsylvania) was conceived around 1960, when Tyng's relationship with Louis Kahn was coming to an end. In 1959 the president of the college, Katharine Elizabeth McBride, thought about hiring Richard Neutra, but in 1960 commissioned Kahn for this project, probably after a suggestion by Vanna Venturi, mother of Robert Venturi, who worked in Kahn's firm.[1]

The project plan—set by McBride and sent to Kahn in May 1960—called for housing for 130 female students and required a variety of sizes and shapes, as well as some of the recurring characteristics found in the design by architects Walter Cope and John Stewardson for the same Bryn Mawr College (1887), particularly the window seats. It was also recommended the creation of different sizes for living rooms and social spaces, such as dining rooms or smoking rooms (Lewis 1991: 352).

Tyng's project consisted of a succession of octagons alternated with squares. The geometric rigidity was softened thanks to the rounding of the openings

[1] Letter by Kahn to Vanna Venturi, 13th April 1960 (Kahn Collection of Pennsylvania Historical and Museum collection, Philadelphia, box LIK 9, Louis 1; cited by Lewis (1991: 357).

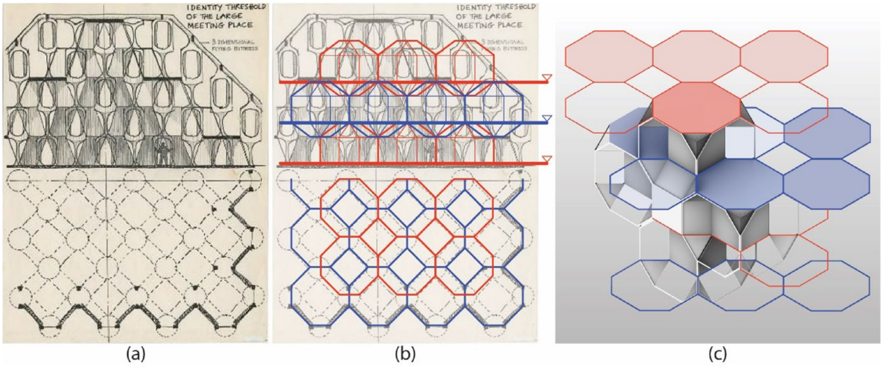

Fig. 1 Erdman Hall (Bryn Mawr College, Pennsylvania, USA). **a** Identity threshold of the large meeting place. Source: Anne G. Tyng Architectural Collection, Ms2001-049, Special Collections, Virginia Polytechnic Institute and State University, Blacksburg, Va. **b** With the two grids of the superimposed levels. **c** The three-dimensional reconstruction of the layout: level 1 (blue faces), level 2 (red faces)

inscribed in the faces of the figures (Fig. 1a). In the upper level, the grid of octagons and squares was translated (Fig. 1b) to constitute a complex spatial system to which the nickname the "molecular scheme" was used, thanks to McBride who recognized its potential for adaptability.

The reconstruction of Tyng's scheme for this paper involves spatial forms that are not easy to understand if only two-dimensional elements are described. In fact, Tyng was well aware of the spatial complexity of her design concept. At first glance, the model would seem to derive from a tessellation of truncated cubes with 8 equilateral triangular faces and 6 irregular octagonal faces (Fig. 1c). The structure is actually more complex, because the grid is translated to intermediate steps between consecutive levels in such a way that the truncated cubes overlap, and the initial tessellation is dematerialized.

In fact, the composition could be described as a combination of convexities and concavities. A hypothetical tessellation formed by three types of solids was reconstructed, underlining the fact that this doesn't reflect the way in which Tyng develops her project, nor is it the only solution. However, it could show one of the possible combinations of solid figures, obtained by breaking down the truncated cubes (Fig. 2a), and able to fill the space without gaps or overlapping areas (Fig. 2b). In this way, the composition of one non-uniform rhombicuboctahedron, with one cube and two tetrahedra can be assumed as a module of the tessellation.

It can also be observed that in Tyng's drawings the octagons seem to be regular (or at least, not so far from this), but she herself described her project as a composition of irregular octagons with 5 and 8 feet sides, alternating with squares of 8 feet, as she stated, inspired by the planimetry she proposed in 1955 for the unbuilt Community Building at Trenton for Kahn's firm (Tyng 1997: 205–206). The different versions (Fig. 3a, b) were studied, and it was hypothesised that the reason for the adoption of the irregular geometry lies in greater flexibility when this planar tessellation is transformed into real architectural spaces.

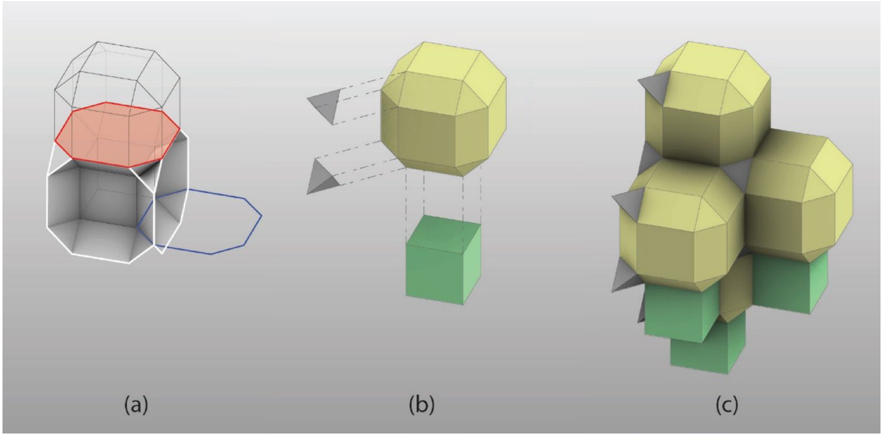

Fig. 2 Three-dimensional tessellation: **a** From Tyng's project to a hypothetical tessellation. **b** Exploded axonometric view of tessellation with the three solids: non uniform rhombicuboctahedron (yellow), cube (green), regular tetrahedron (grey). **c** The composition

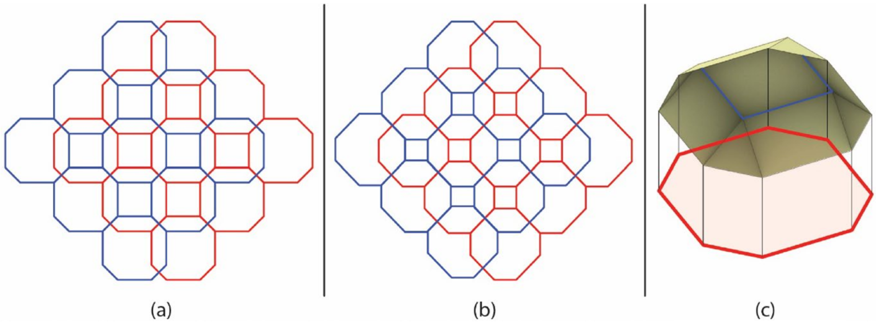

Fig. 3 The different grids with: **a** regular octagons, **b** and irregular ones. **c** The ceiling of the octagonal room: the irregular cupola

These shapes could be combined to constitute different sizes of housing units, as well as offering window seats, as the client requested. The basic apartment was composed of an octagonal shaped dining/living space and a squared sleeping/study room, where the bedroom could find its proper position on the 8 feet side (almost 2.5 m). Tyng paid attention to the variety of *human dimensions* as she described the modules as suitable to "very tall basketball players and very pregnant women" (Tyng 1983: 61). With this, she showed her way of using geometry as a rational basis and not as a constraint that prevents architects from creating human-sized spaces. This attitude also identifies Tyng's role as a forerunner of some crucial themes of contemporary architecture, that can be ascribed to sustainability as an attitude that is inclusive of diversity, thus demonstrating an awareness of what we now call *Universal Design* or *Design for All.*

The same grid of irregular octagons and squares allowed for assembling components in different ways to obtain adaptable solutions. For example, the octagonal space can also assume the role of a larger sleeping room composed of one or two squares (storage or entrance), forming a housing unit capable of hosting married students (Tyng 1997: 205). It was also possible to create public spaces to be shared among students, such as a snack bar, composed of two octagons adjacent to a square. All these features were original answers to the client's request for the possibility of hosting students with different needs, while preserving the continuity of the school's tradition of hospitality, as reflected in the windows seats which were already present in the nineteenth century project.

Tyng also explained the spanning system for the larger octagonal spaces, formed by "faceted domes" (Tyng 1997: 206) that it can defined as irregular cupolas[2] identified with the upper part of the non-uniform rhombicuboctahedron (Fig. 3c). In this way, around the square grid, Tyng probably intended to provide space that would be useful to host the technical systems, as in the Yale University Art Gallery (1951–1953) by Kahn, although she did not mention this function. The supporting structure would be generated by cylindrical cutaway or hollow columns which had the basis in the circle built on the 5 feet side of the octagon (Fig. 4) and formed different alternating positions among superimposed levels. Tyng proposed to obtain a "residual pair of columns" (Tyng 1997: 205) that in the final solution consisted of precast concrete I-shaped pillars positioned at the two ends of the diameter of the circle mentioned above.

The paired I-shaped pillars formed a flying buttress that offered the right space (3 feet) for arched openings in the middle, with the connection at right angles to pairs above and below (Fig. 5). Because of this rotation, this vertical structure was called *Helical column* by Tyng. At floor level the paired pillars were also connected by a tetrahedral joint within a cylinder.

The story of this project involved two different solutions that were developed in parallel: Tyng's design, described above, and a quadrilateral scheme by Louis Kahn with his new collaborator David Polk. The different solutions were periodically submitted to McBride but neither entirely satisfied the client, until the end of 1961. At this point, another project proposed by Kahn and Polk was carried out, consisting of three diagonal squares intersected between them (https://www.moma.org/collection/works/478), in which traces of Tyng's project formulated in May 1961 can be found (Lewis 1991: 354). It cannot be asserted that Kahn copied it, however there should be no question that for years he shared design themes with Tyng during their collaboration, having in common a metaphysical sense of geometry which is well documented in Kahn autonomous projects (Kries et al. 2013; Fleming 2015).

In 1997 Tyng expressed her disappointment with some details of the realized project of Erdmann Hall (Tyng 1997: 206), such as the absence of a direct view of the outdoors from the living room. She also expressed her relief at the reuse of some

[2] The Square cupola is a Johnson solid, as it was described by Norman Johnson in 1966, in the group of convex solids with regular faces. Tying's solution is a deviation from the Johnson's square cupola, because there are regular triangular and squared faces, but also rectangular faces.

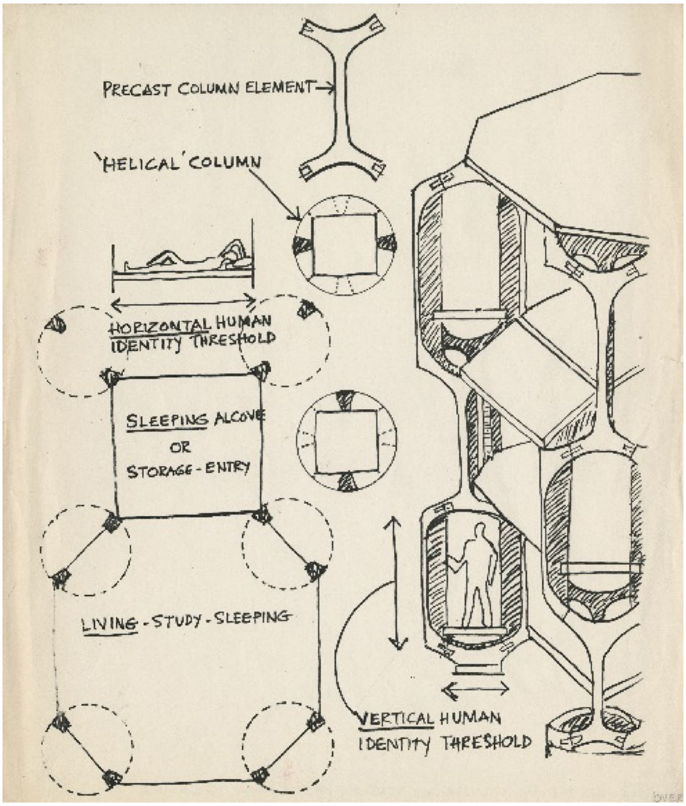

Fig. 4 Sketch of arched-cylindrical version of cutaway columns. Source: Anne G. Tyng Architectural Collection, Ms2001-049b, Special Collections, Virginia Polytechnic Institute and State University, Blacksburg

design solutions in other projects she authored. This can, in fact, be recognised in the solution of the tilted roof for the unbuilt General Motors World's Fair Exhibit 1964, designed by Tyng in the same year 1961 (Tyng 1997: 198, 207) as a polar array of six half truncated octahedra[3] (Càndito 2020).

Tyng's proposal for the Erdman Hall was related to two other concepts that are fundamental in her architectural theory: the possibility of obtaining a perceptive orientation and a personal interpretation of the concept of proportion in relation to the human body's measurements.

As for the first issue, orientation, it should be considered that her molecular structure for Erdman Hall was also thought to form a corridor through adjacent, but not aligned, squares and octagons that could provide various position for the entrances to the apartments (Tyng 1983: 60). In fact, Tyng described her

[3] The truncated octahedron is an Archimedean polyhedron with fourteen faces of which eight are regular hexagons and six squares.

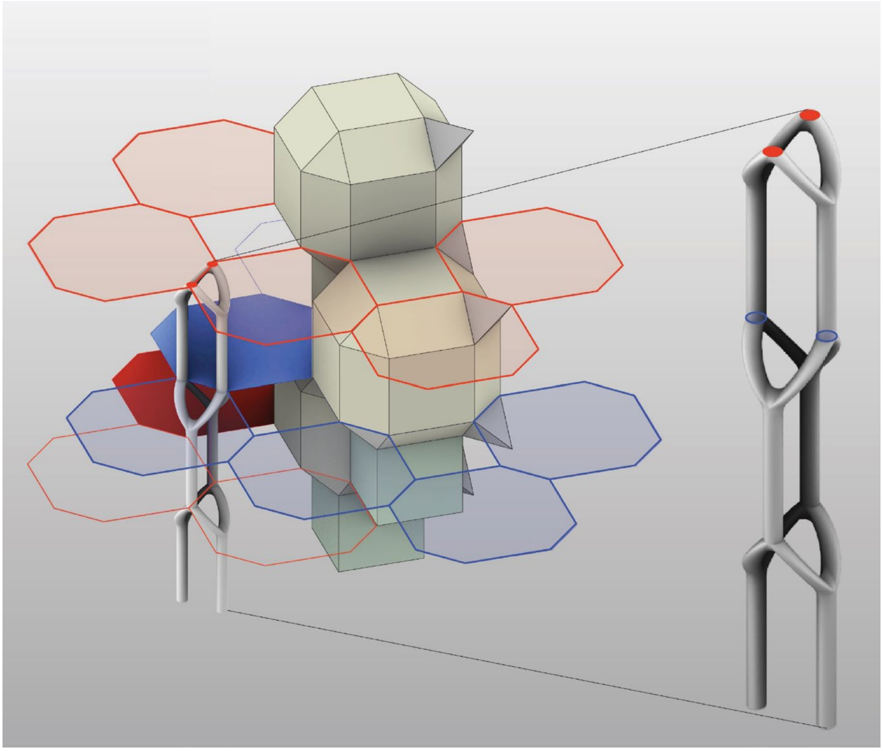

Fig. 5 The structure of the cutaway columns: the helical column formed by the alternating position of the I-shaped pillars

architectural proposal as a "clustered corridor scheme", and this distribution was represented in a plan drawing (Tyng 1997: 203) (Fig. 6) that also shows the variety of apartments which can be obtained by splitting them up differently and aggregating octagons and squares. The importance of the different position of the entrance was stressed as a crucial meaning in architecture and urban planning as Tyng cited a similar solution conceived in her *cul-de-sac of rowhouses* plan, designed with Louis Kahn, Louis McAllister and Kenneth Day in 1952 with hexagonal and pentagonal clusters (Tyng 1983: 61). With this project, it can be understood that the concept is not necessarily something to deal with when applying a specific geometry, but an interpretation of space that considers the priority of the human perception. Tyng indeed understood that it is not sufficient to distinguish entrance doors of houses only by their colours or other secondary characteristics, but it is fundamental to offer a variety of configurations, so that no entrance is like any other, due to their different position and orientation. This statement is evidence of her early interest in what we today define as wayfinding principles, which are linked not only to geometric characteristics (Lynch 1960) but consider the interaction between space and the observer (Gibson 1979). These principles put as a first phase the recognition of one's own position and

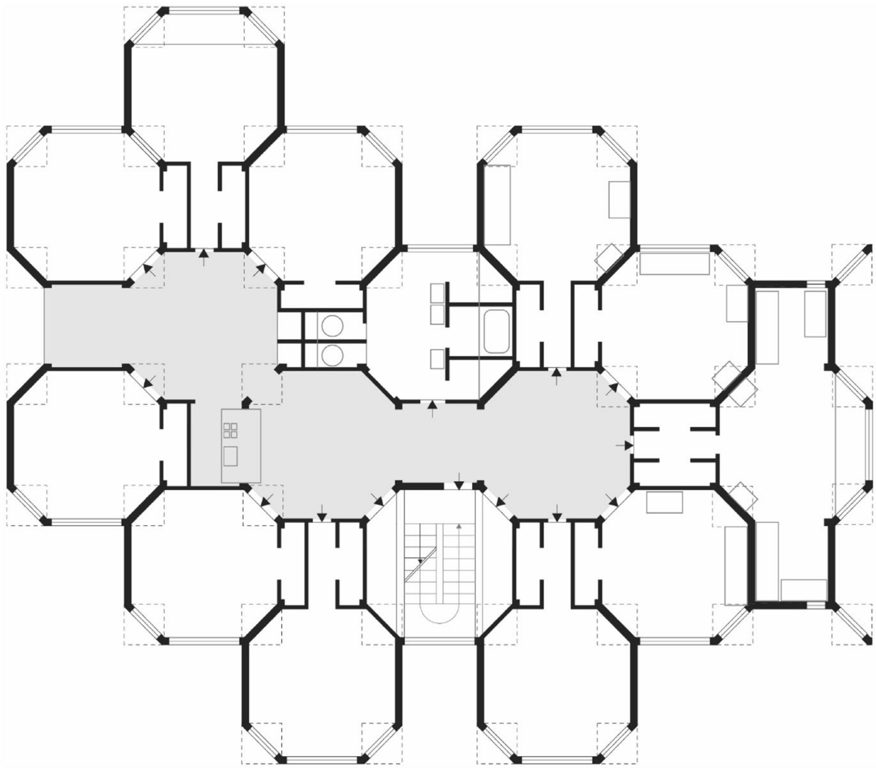

Fig. 6 The clustered corridor scheme (redrawn from Tyng 1997: 203)

the destination, being able to arrive at the desired destination (Golledge 1999), also thanks to the recognition of salient landmarks (Bhatia, Chalup and Ostwald 2013).

The second issue, regarding proportion, is linked to characterization of the space as an ideal configuration as long as it employs regular geometries, and to its conversion to architecture when it is related to human proportion, as happened in the adoption of irregular octagons in Erdman Hall. Tyng studied regular geometries and proportions in depth which led her to more than one original geometric drawing, not always linked to architectural designs. She assimilated some geometric configurations to Gustav Jung's archetypes that occur in human thought and in its spatial conceptions (Tyng 1969). Spatial complexity responds to Tyng's beliefs, who stated that we should exercise our minds' three-dimensionally (Tyng and Kirkbride 2005: 127). She demonstrated on several occasions her theoretical interest in the regular geometric three-dimensional forms: the Platonic solids. For example, her exhibition "The Divine Proportion in the Platonic Solids" (Hayden Hall, University of Pennsylvania) held in 1964 (Schaffner 2012A), must be remembered, but also many more studies, such as her PhD dissertation (Tyng 1975; cfr. Fleming and Ostwald 2001).

Four-Poster House: Triangular Appearances, Squared Structure

The Four-Poster House (1975–1988) is another example of unbuilt architecture, where the formal characteristics derive directly from Tyng's theoretical studies of geometry. The project was conceived as a summer holiday home and dates back to 1975 (The Architectural Archives University of Pennsylvania, Philadelphia, collection 074), although some sources trace its origins to the beginning of the design phase to 1971 (Schaffner and Whitaker 2012: 104). In addition to the two dates cited, the present documentation reveals discrepancies in the date of the project's beginning. Tyng herself indicates 1977 in one of her texts (Tyng 1996: 82), while the publication for the exhibition "Inhabiting Geometry" (Schaffner 2012A) shows two different dates: 1975–84 (Schaffner 2012B: 16) and 1971 (Schaffner and Whitaker 2012: 104). This project has rarely been studied by critics or described by Tyng herself, who in her texts (Tyng 1983: 55) mentions it to reinforce some geometric concepts, such as the presence of geometric solids, yet limiting her descriptions of them. However, it was important for Tyng because its construction was planned on Mount Desert Island (Maine), a place of memories related to her childhood summer holidays and where her maternal great-grandfather was born (The Drawing Board 2011).

The volume is in a raised position above the ground, with which it is connected in a limited way: the four load-bearing pillars and the surface of the square base of the service tower. This limits the building's anthropic impact on the land, reflecting a sensitivity to nature underlined by the choice of the main material: local cedar wood. The elevations, characterised by imposing pitches that emphasise the triangular shape, are an explicit reference to an archetypal mountain (Tyng 1983: 55).

The project has been exhibited on several occasions, the most recent being the exhibition "Inhabiting Geometry" held in 2011 at the Pennsylvania Institute of Contemporary Art and at the Graham Foundation of Chicago. The catalogue allowed for the different design drawings to be compared with four wooden models made by Brian J. Billings in 1983 (Schaffner 2012B: 16). The contradictions that emerged revealed the presence of two distinct architectures, which will be called *version A* and *version B* below. The first can be traced back to two section drawings in the 2011 exhibition (Schaffner 2012A: 79) from the Architectural Archives, University of Pennsylvania (cataloging: 74.III.17); while version B corresponds to the four wooden models. There is also a section drawing in the exhibition that probably refers to the wooden models of version B (Schaffner 2012A: 25, 41). It was not, however, possible to draw directly on this material and the available images do not allow a clear view to ascertain this. It should be noted that Tyng (1983: 52) also presented the Four-Poster House using plan drawings that can be traced back to version B, accompanied by a photograph of a three-dimensional model that appears different and seems to correspond to version A.

For this paper, to reconstruct the drawings and the three-dimensional model, version A was considered, without claiming that this constitutes a more

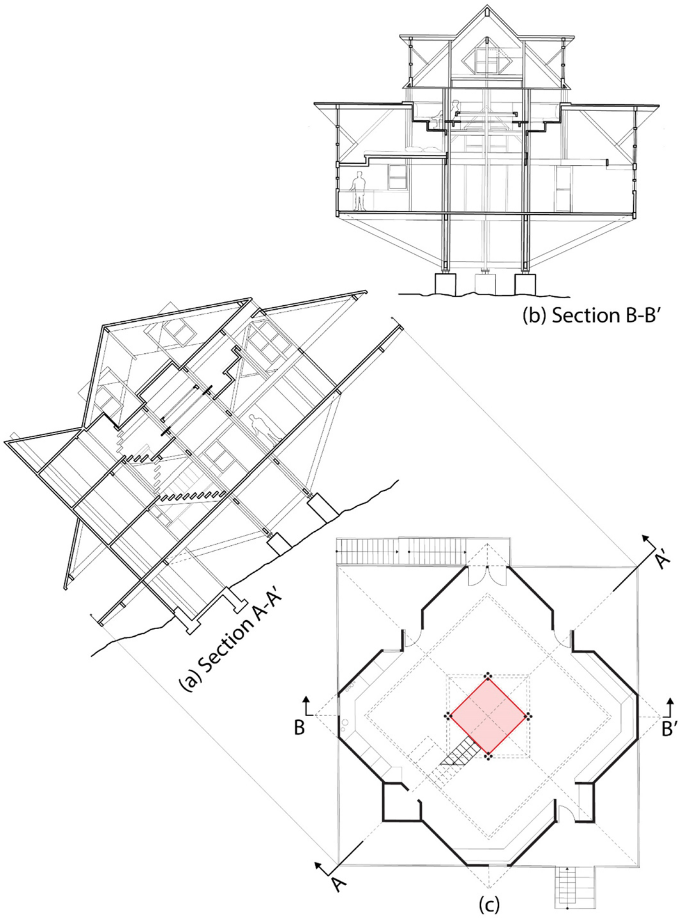

Fig. 7 Four-Poster House (Mount Desert Island, Maine, 1975–1988): version A. **a**, **b** Redrawn of the sections (Schaffner 2012A: 79). **c** Deduced plan with the four-poster bedroom highlighted

mature phase of the project, but to bring to light a version which is less well documented by the original drawings and models. In fact, the available drawings did not include the plan, which can be deduced from the sections (Fig. 7). The redrawing of the sections reveals an incompatibility between the support beams at the first level; for the three-dimensional model referred to section BB', which is considered more coherent.

This operation allowed for an investigation of the geometric relationships in the plan (Fig. 8). The square central core (red), which houses the four-poster bed, is the origin of the entire project with its roof (light blue). The core is the central module of a mesh of 9 squares that identify the secondary pillars of the structure (Fig. 8a). The intersection of the diagonal (light blue) of the first floor level (black) with the circumference inscribed in it identifies the outermost vertex of the square-based

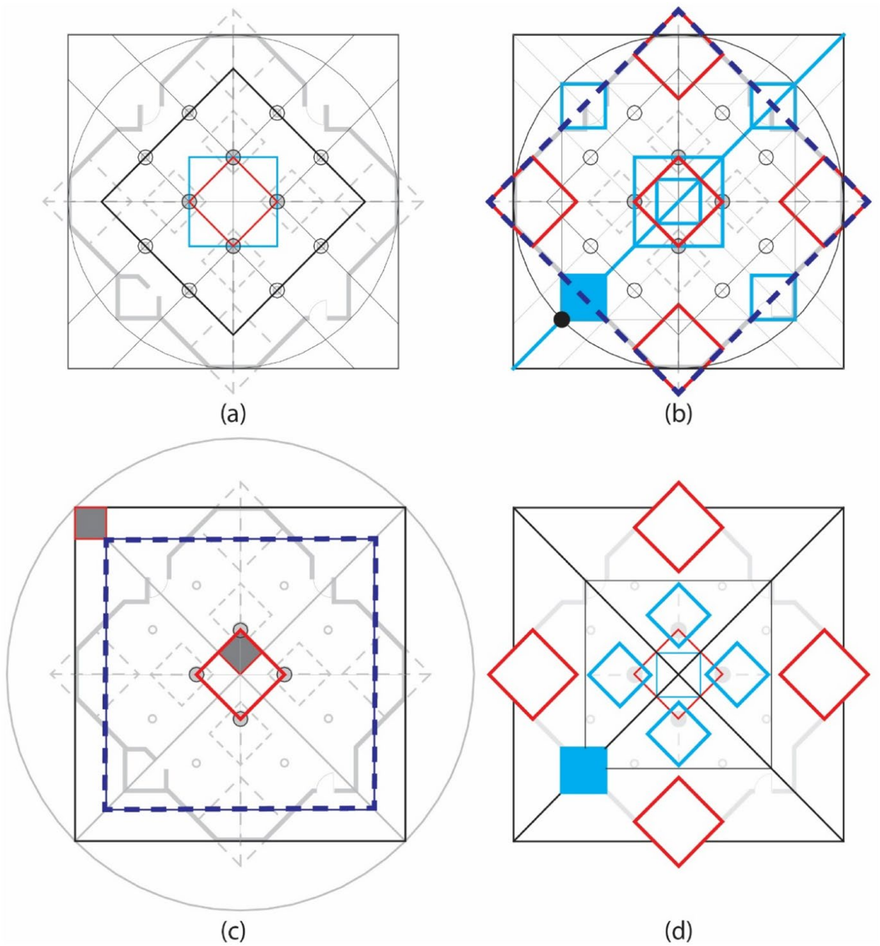

Fig. 8 Geometric relations relating to the first level plan

service tower (filled in light blue), which corresponds to the rotated square inscribed at the core (light blue), coinciding with ¼ of the four-poster roof (Fig. 8b). Similar elements, arranged at all corners, coincide with other significant components in the layout. The size of the lower dormers (red), projecting from the floor level, corresponds exactly to the central core. The square that groups them together (blue dashed), if rotated by 45° and subtracted from the plane of the first level, identifies a frame composed of a square at the vertex that corresponds to ¼ of the central core (Fig. 8c). Finally, the median section also allows one to identify the arrangement of the upper dormers (in light blue), which appear to be the same size as the service tower (Fig. 8d).

In analogy to what Tyng herself wanted to show through the four maquettes of version B in the exhibition, version A was virtually reconstructed and represented in four distinct phases (Fig. 9):

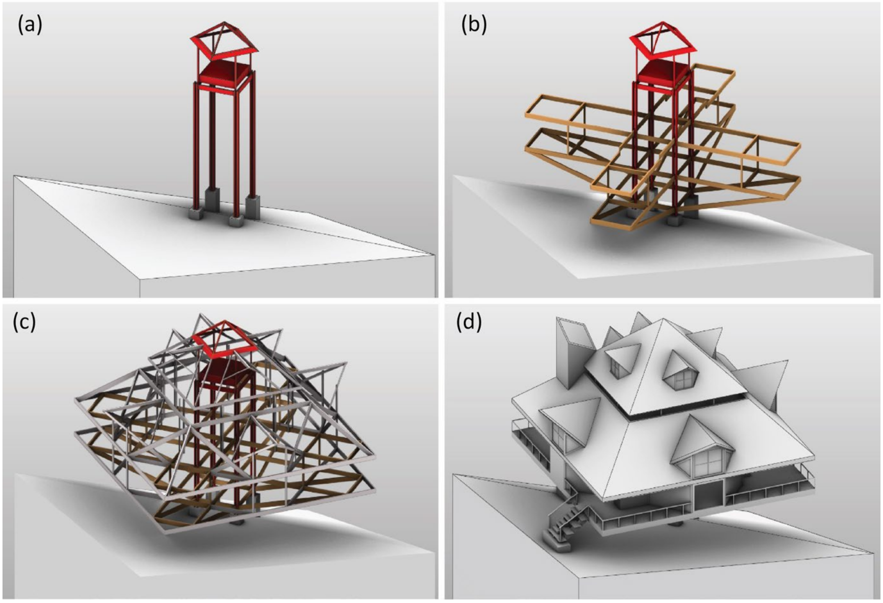

Fig. 9 The subdivision of the project into four phases (**a**–**d**)

In the first phase, the first image of the virtual model (Fig. 9a) represents the central core that provides support for the entire structure and consists of:

- The four-poster bed: the master bedroom located on the top level of the dwelling; its measurements, of 8 × 8 feet, give proportion to the entire building. Note also the coincidence of the square module of the four-poster bed with that adopted in Erdman Hall, which shows a careful reflection on the relationship with human dimensions, not intended in the sense of the modernist minimum measure.
- The bedroom roof structure: a skeletal pyramid with a square base rotated by 45°.
- The four cylindrical pillars: arranged in the shape of a square, each consisting of four vertical elements. These vertical structures support the floors with the exception of the four internal elements, which are higher and support the bedroom, define the four-poster structure and hold up the pyramidal roof.

The second phase (Fig. 9b) shows the primary structure weighing directly on the pillars by means of eight inclined beams arranged below the first level. The structural scheme follows the two main horizontal directions determined by the orientation of the pillars and is defined by a system of beams passing through the core at each level; secondary cylindrical pillars connect the trusses and provide additional support. The third phase (Fig. 9c) adds to the previous ones the secondary structures that complete the static arrangement of the building: the load-bearing roof trusses and the support structures for the dormers. The fourth phase (Fig. 9d) represents the complete architecture.

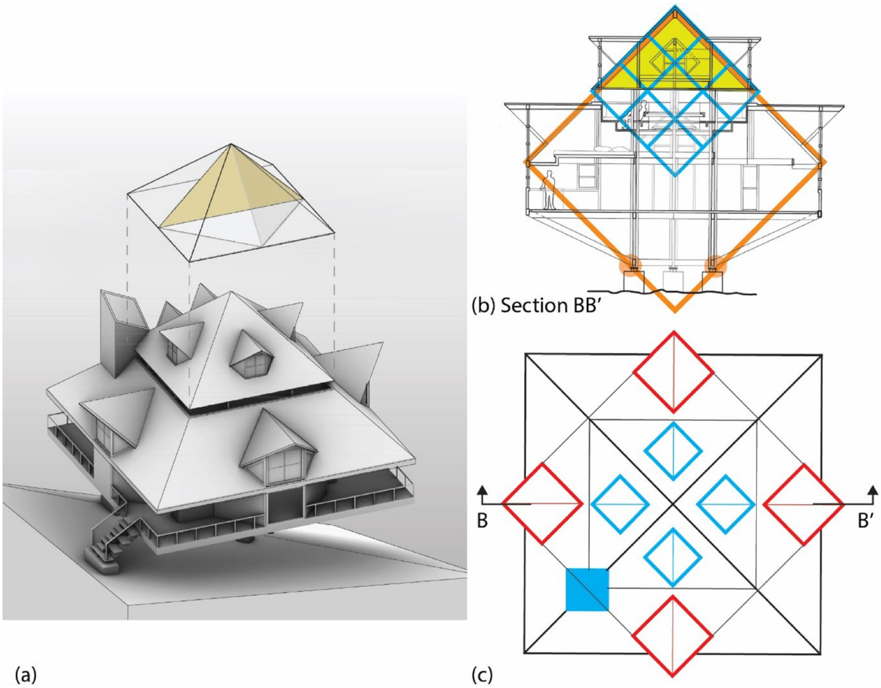

Fig. 10 Geometric relations in section: **a** the pyramid of the upper roof containing the half octahedron; **b** the presence of the square and the triangle; **c** plan of the roofs

The sequence defining this project reveals Tyng's interest in the geometry of structures developed during her time working at Konrad Wachsmann's studio in 1944 in New York. Then Tyng continued to experiment with those forms for the unbuilt Elementary School (Bucks County, Pennsylvania, 1949–1951), and for the extension of her parents' house (Walworth Tyng House, Cambridge, Maryland, 1953), where she used triangular three-dimensional trusses (Tyng 1991). Even within the Four-Poster House the figure of the triangle occurs in different places and modes. As Tyng stated before, the variant of the regular tetrahedron is the square-based pyramid corresponding to half of another Platonic solid: the octahedron (Tyng 1997: 196). Even the latter does not correspond to the pyramid used by Tyng for the Four-Poster House. In this project it was observed how this same pyramid is capable of containing the half octahedron (Fig. 10a), in a geometric game that always derives from the planar rotation of 45°. Moreover, if we consider the section (Fig. 10b), the square confirms its role as a generating geometry. In fact, the upper roof measures three times the module of the light blue square previously described for the plan and corresponds to the square inscribed in the core, the service tower and the dormers of the second level (Fig. 10c). With regard to the square (orange) defined by the lower pitches (Fig. 10b), no significant geometric relations emerged, except for the fact

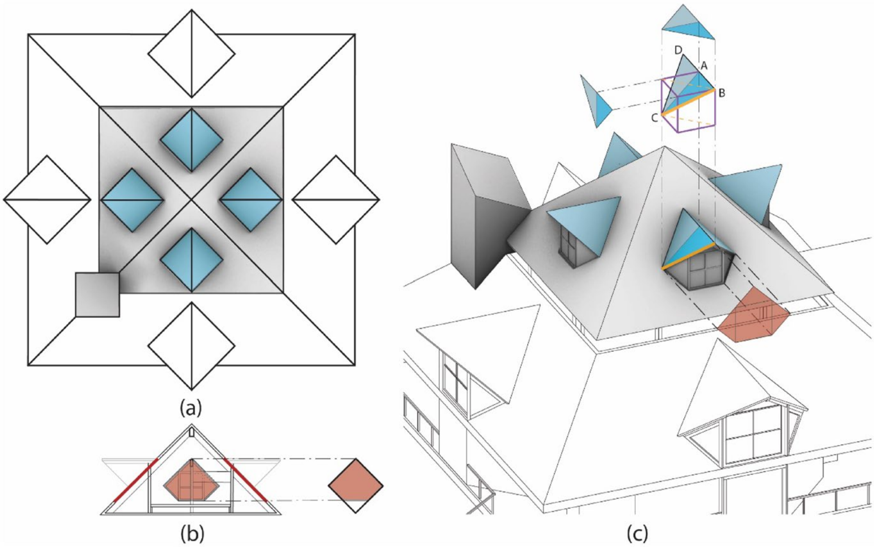

Fig. 11 The tetrahedral dormer roofs: **a** Plan. **b** Elevation and **c** axonometric view of the generation of triangular surfaces and the irregular pentagon

that this geometry totally encompasses the load-bearing structure, being tangent to the connection beams between the pillars of the core.

Contrary to what might appear from the elevations, every element of the project seems to derive from the square form rather than the triangle.[4] This is also confirmed in details such as the tetrahedral roofing of the dormers which, given Tyng's fascination with Platonic polyhedrons, might have been expected to coincide with regular tetrahedrons, but which actually determine the projection in plan of a square composed of two isosceles right triangles (Fig. 11a). This result couldn't have been achieved with a regular triangle, but it is determined by an isosceles triangle at an inclination of 45° (DBC) with one side equal to the diagonal of its squared projections (DB), and the other sides equal to the diagonal (CB—yellow) of the cube (violet) with the edge coincident to half of the same side (AB) (Fig. 11c).

A similar situation is seen in the projections in elevation of the dormers, in which the regularity often studied by Tyng is not easily recognisable: the pentagon is in fact irregular. Its genesis, however, appears to be determined by the intersection of a square with roof pitches inclined at 45° (Fig. 11b, c), a process that results in the removal of a corner of the generating square.

[4] A geometric figure at the center of Anne Tyng's studies, as in the case of the Super Pythagorean Theorem, a geometric definition that governs the relationship between the triangle, the Fibonacci series and divine proportion. Material within the manuscript, never published: "The Universe Plays Dice Itself in Cycles of Random Evolution with Thresholds of Synthesis" (Architectural Archives of Pennsylvania, cataloging: 74.II.121.1); (Tyng, Kirkbride 2005).

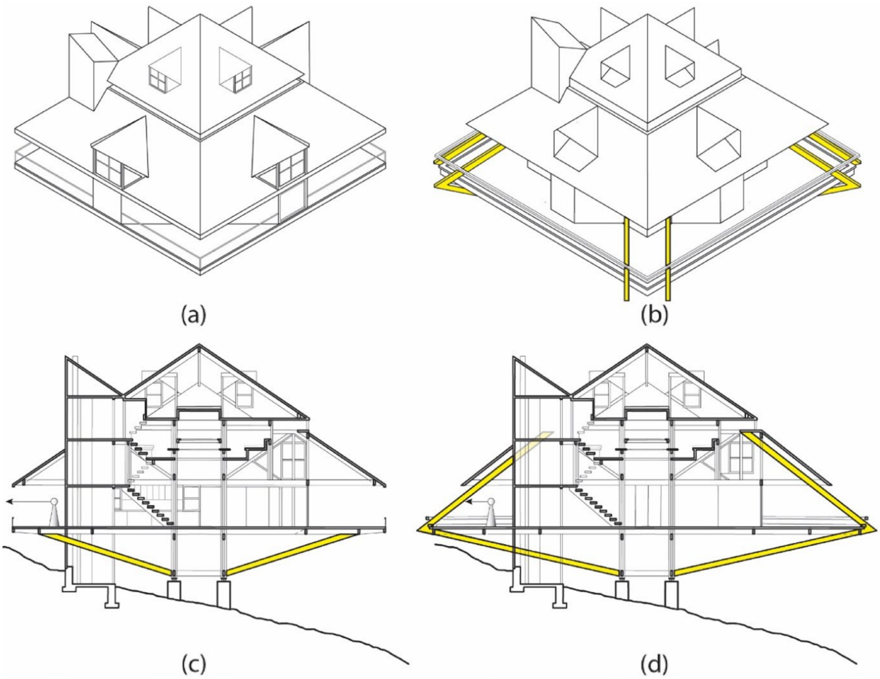

Fig. 12 Comparison between the two versions. Version A: **a** axonometric view; **c** diagonal section. Version B: **b** axonometric view; **d** diagonal section

This being said, the square is omnipresent but not immediately recognizable, revealing the propensity to show the geometric forms that are more closely linked to the natural environment, as the triangle with its archetypical meaning.

From the analysis carried out on version A, some differences with respect to version B can be observed (Fig. 12). For example, consider the inclined beams (yellow) that connect the first level to the central core. In version A they extend below the walking surface (Fig. 12a, c), while in the reconstruction from the wooden maquettes of version B (Fig. 12b, d) they exceed the perimeter, extending even above the first level and thus becoming an integral part of the pitch (Tyng 1996: 83). This different arrangement of the load-bearing structures implies dimensional variations of the platform housing the first level. The absence of inclined trusses in the upper part of the building, in the case of the version A, confers greater lightness to the structure, thus limiting the impact of the construction on the environment and without constituting a visual interruption from the terrace. Anne Tyng, in version A, seems to want to emphasise the perceived feeling of greater involvement within the natural context by those who would live in the space. The tree house typology is the most direct reference which Tyng herself emphasises through her design choices (The Drawing Board 2011), such as the construction system, similar to pile-dwelling structures, and the large windows at the dormers, which offer evocative views of the outside.

Conclusion

Two of Anne Tyng's architectural projects were investigated in this paper through her drawings and writings, which are interpreted both through bi-dimensional and three-dimensional reconstructions. In this way, something more specific about her original approach to geometry, which allowed her to develop projects combining a consideration of the ideal and symbolic value of geometry with real architectural spaces, can be noted. For example, in the project for Erdman Hall Tyng showed a complex "molecular scheme", where the planimetric conception of the alternate shifted planes is transformed into three dimensions in an overlapping of spaces.

The apparent simplicity of the two-dimensional drawings reveals a complex conception of space that must be investigated through the theoretical and material traces that Tyng herself left. Such complexity can be interpreted as a hypothetical tessellation of different solid figures and generates an architecture in which some elements, anticipating wayfinding principles, can be recognised, as the "clustered corridor" scheme shows.

Tyng's purpose to explore the meaning of geometric structures in their translation into architectural forms is appreciable, and sometimes leads to different interpretations. With the adoption of irregular octagons in Erdmann Hall, in fact, the configuration seems to lose regularity, but it gains architectural meaning and flexibility, also from an inclusive point of view that we today can use in the Universal Design discipline that values differences among people. A similar attention also appears in the adoption of the same 8×8 feet square module in the Four-Poster House. The latter design is one of the projects represented in the portrait of Anne Tyng painted by her daughter Alexandra Tyng (2011) which is probably inspired by the *Portrait of Luca Pacioli with a pupil* (1495). Pacioli's portrait included a rhombicuboctahedron and a dodecahedron, while Tyng's shows the Philadelphia City Tower, a representation of Platonic solids in the form of a triangulated structure, and the described four maquettes of the Four-Poster House. All of the subjects refer to the image of the triangle, although the elevation of the Four-Poster House, determined by the right and isosceles triangle, is revealed to represent half of a square that provides the geometric layout in plan and recurs as a generating figure of the pentagonal elevation of the dormers which protrude from the roof. The archetypal meaning of the triangle as a mountain remains in the background and it overlaps with the unexpected rule of the square.

Although the analysis of the two projects described in this paper, with their possible implications, cannot be extended to Tyng's entire work, they may constitute a starting point for a more in depth look at an original protagonist of the twentieth century architecture.

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Cristina Càndito PhD in Architectural Drawing and Survey (1999), is Associate Professor (Department Architecture and Design, University of Genoa, Italy). Her teaching and research interests are scientific and historic aspect of architectural drawing and its geometry and perception interpretation. She has been responsible for research projects at the University of Genoa, and she was a member of Research Projects of National Interest on Virtual Modeling and Perspective Architectures. She has conducted research in several European countries and has recently participated in research projects about accessibility and gender culture (RiseWise, Marie Skłodowska Curie, 2016–2021). She is author of over 100 publications, including 8 books.

Alessandro Meloni PhD Candidate in Architecture (Department Architecture and Design, University of Genoa, Italy), is graduated in Architecture (2018). His research focuses on the multisensory perception of space, with the aim of highlighting the most influential characteristics on the interpretation of architecture even for users with visual disabilities. He conducts seminars and teaching support activities at the University of Genoa. He is author of articles and speaker at conferences on geometric foundations and perception of architectural representation.