The Roman Villa in Rabaçal and Álvaro Siza

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Abstract

The residential area of the Roman villa in Rabaçal is a rare example of a house with an octagonal peristyle remarkable by its design coherence at all architectural levels, from the overall scale to decorative motifs. Everything is regulated by proportions derived from its octagonal plan naturally based in *ad quadratum* geometry. Recently, Siza was challenged to design covers and a visit tour in order to preserve this invaluable patrimony. Quite aware of the quality of the architecture displayed in this Roman villa he must have recognized *in-situ* many of his own architectural concerns. The sketchbook was opened, and the drawing search led him to propose two wood rectangular grid covers which, in spite of their modernity and technical sophistication, are still shapes with formal affinities with each part of the villa.

The Roman Villa in Rabaçal

The Roman road connecting Bracara Augusta (Braga) and Olisipo (Lisboa) passes through Rabaçal, a village 12 km south of the Roman town Conimbriga (Figure 1). In Rabaçal there is a Roman villa, possibly inhabited during the fourth and fifth centuries, whose excavation began in 1984. The *pars urbana* of this villa has a central octagonal peristyle with sides facing the cardinal points. The rooms and corridors define a beautiful radial structure around the peristyle and the East-West line through the centre of the octagonal peristyle is, broadly, a symmetry axis for the overall building (Figure 2).

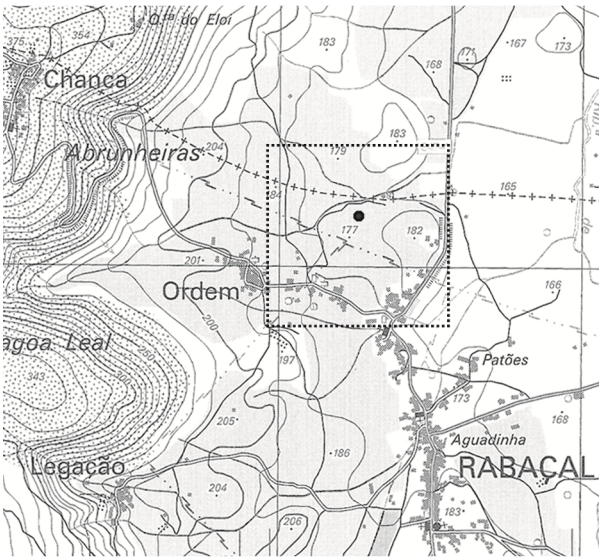

Figure 1: *Topographic map, 1:25.000*

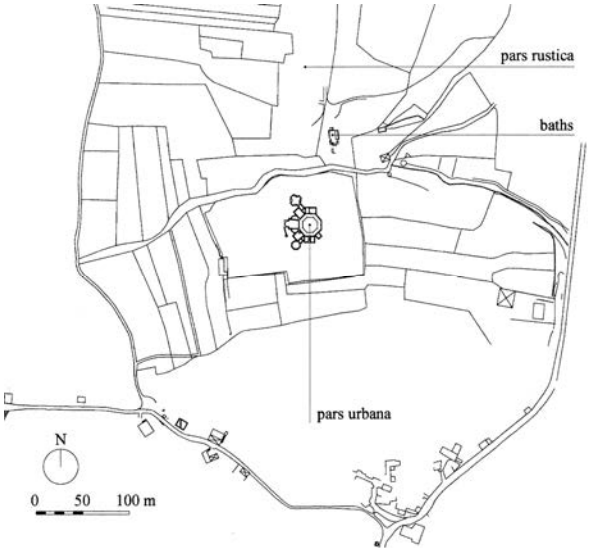

Figure 2: *Site plan of the villa, Rabaçal*

The villa has richly decorated mosaics, mainly geometrical, with several octagonal and octagonal-based patterns, and the twenty four columns of the peristyle also had an octagonal base (Figure 3-5). One of the figurative mosaics depicts the four seasons [1].

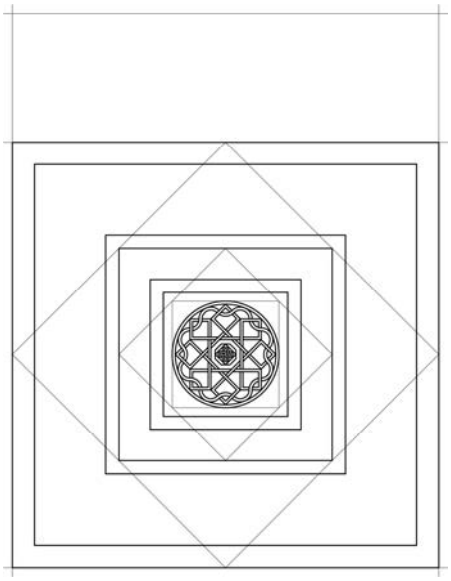

Figure 3: *Key pattern of the whole mosaic of the Southwest room*

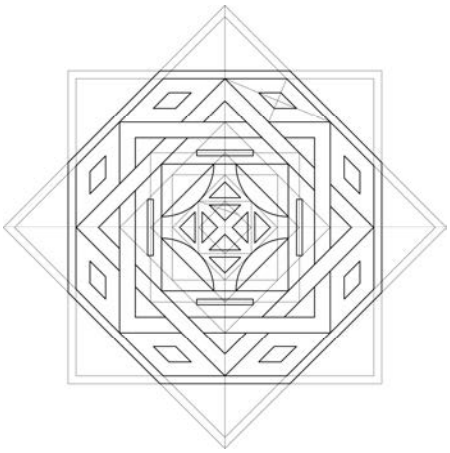

Figure 4: *Key pattern of one octagonal mosaic of the triclinium*

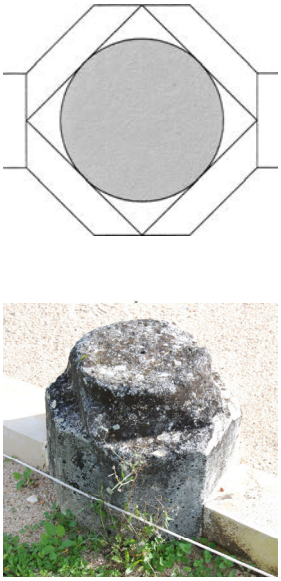

Figure 5: *The column: ϕ = 1 Roman foot*

The Roman Context. Roman architecture must be considered in a wider scope of subjects, based on Roman perception and planning of the territory.

Accurate measures, astronomical observations, and also the intuitive analysis of the landscape performed by the augurs, provide the Roman territory with significant spots and directions. These are translated into structural units, each unit being composed by two orthogonal directions and the point where they intersect. In the foundation of a Roman town this unit is imprinted by the *cardus* and the *decumanos* — a vivid and permanent reference to nature, not only ruling the overall setting but also echoing in the articulation of important buildings and on the inner shape of each construction [2]. This order spreads outside the urban settlements by means of roads and centuriations. Thus, territory, architectonical sets and each building, ornaments included, are strongly intertwined in a network of centres and axes, filled with cross references, allusions and the presence of nature.

The adoption of the octagonal shape in architecture is a Roman feature, having its symbol in the Tower of the Winds, on the Roman forum in Athens. In Book I, chapter 6, Vitruvius describes the ideal orientation of the urban grids in order to avoid the winds. Vitruvius claims that there are eight compass-oriented winds, as proved by Andronicus of Cyrrhus with the construction of the marble octagonal Tower of the Winds. A procedure to build an octagon in a horizontal surface is described — after drawing a circumference and finding the North-South direction, one sixteenth of the circumference is taken and the vertices of the inscribed octagon are drawn. A picture with the geometrical construction would follow.

The octagonal shape, with its clear centre and a radial structure that contains orthogonal directions, is, in itself, a tangible unit of structure for Roman design.

Roman architecture is based on additive procedures. The additive approach can be observed in a wide range of scales, from the construction of a building to a town planning, and operates both planimetrically and volumetrically. The octagon also fulfils the requirements of an additive construction, adapting to square and rectangular shapes, along its axes, and being easily inserted in a previous orthogonal structure. Adding an octagon to a larger structure brings it a perceivable centre or,

symbolically, an extra significance, and defines privileged directions. Nero's Domus Aurea (first century AD) is one of the first known buildings having an octagonal room. Although its function is not clearly stated, the room has a particular dignity, with an open oculus at the dome and surrounded by symmetrically disposed rooms.

The use of octagonal shapes is widespread in the following centuries, assigning dignity and meaning to baths and villas. Some Roman markets and villas have octagonal open spaces, and octagonal towers are usual in city walls. As a global shape, the octagon appears mainly in temples, whose Greek predecessor is the round tholos.

Romans use extensively the proportions based on the *ad quadratum* geometrical construction, both in the plan of the buildings and in the decorative elements, see [3], [4, Chapter V] and [5]. Vitruvius also refers and illustrates the *ad quadratum* geometrical construction. In the Introduction of Book IX, the problem of finding a square that doubles the area of a given square is described — if we have a square with a 10 ft side, then the square with twice its area "cannot be found by the aid of numbers". After drawing one diagonal of the 10 ft square, it is shown how a new square whose side is this diagonal solves the problem of doubling the area. In fact, the diagonal of the original square divides it into two triangles (with the area of 50 ft) and the new square is composed of four of those triangles, a demonstration which Vitruvius attributes to Plato.

Octagons are naturally related to *ad quadratum* geometry, and the ratio $1:\sqrt{2}$ defines the rhythm of concentric shapes in many Roman buildings.

Geometric Analysis. The octagonal peristyle determines the layout of the Roman villa in Rabaçal. The peristyle is 80 ft (1 Roman foot = 296 mm) in width between opposite sides and has an octagonal colonnade whose corresponding width is $80/\sqrt{2}$ ft, as outlined in Figure 6. Madeira [1, page 13] noticed an *ad quadratum* layout in Rabaçal and referred its likeness to the Gerasa's *macellum*. The room to the West, most likely a *triclinium*, is the largest room of the villa and has the floor covered with geometrical mosaics with a partially destroyed figurative central panel, depicting a woman on a chair. This room is drawn, together with its three semicircular recesses, according to a 5 feet grid having the centre of the peristyle as origin.

The two symmetrically disposed rooms, Northwest and Southwest of the peristyle, probably had different functions since the first one has no mosaics whereas the second has a beautiful mosaic with two panels, a square and a rectangular one. The square panel follows a schema based on a sequence of *ad quadratum* related shapes (Figure 3). This sequence links the width of the room to the inner motif in the central medallion and defines the radii of the intermediate frames — squares, octagonal structures and one circle. The two rectangular bodies, northwards and southwards the peristyle, preserve, up to their inner divisions, the axial symmetry of the villa. The South part corresponds to the entrance, thus leading the visitors through the peristyle colonnade in their way to the noble rooms, at West.

The rooms already described are radially distributed, according to axes that intersect in the centre of the octagonal peristyle. But two other elements arise along symmetrical axes that cross at the East side of the colonnade octagon. Each of these elements have a corridor that opens to a room with central plan, a square with four apses towards Northwest, and a regular octagon towards Southeast.

When square and rectangular elements are added, radially, to the sides of an octagon, void triangles emerge between the connected elements. The villa in Rabaçal presents two effective ways of using these wedge shapes — the semicircular recesses attached to the *triclinium*, and the eccentric corridors.

The representational part of the Roman villa in Palazzo Pignano, resembles the villa in Rabaçal. It has a radial structure connected to two concentric octagons, with radii related by a $\sqrt{2}$ factor. The same factor exists in the *macellum* of Gerasa, between each element in the sequences — square frame, octagonal courtyard, octagonal colonnade, in the designs of the Accademia complex and of the Teatro Marittimo at Hadrian’s villa, see [4, pages 94 and 95], and in the Diocletian's mausoleum in Split. This octagonal mausoleum was later used as a temple devoted to the Virgin Mary, an illustration of the symbolic transfer that took place in the Middle Ages with many Roman buildings. The octagon, and the number eight, symbols for the transition from one state to another and, in particular, as a junction of

Heaven and Earth in several faiths, have an influence on buildings related to birth, baptism, death, resurrection and religious foundation and conversion.

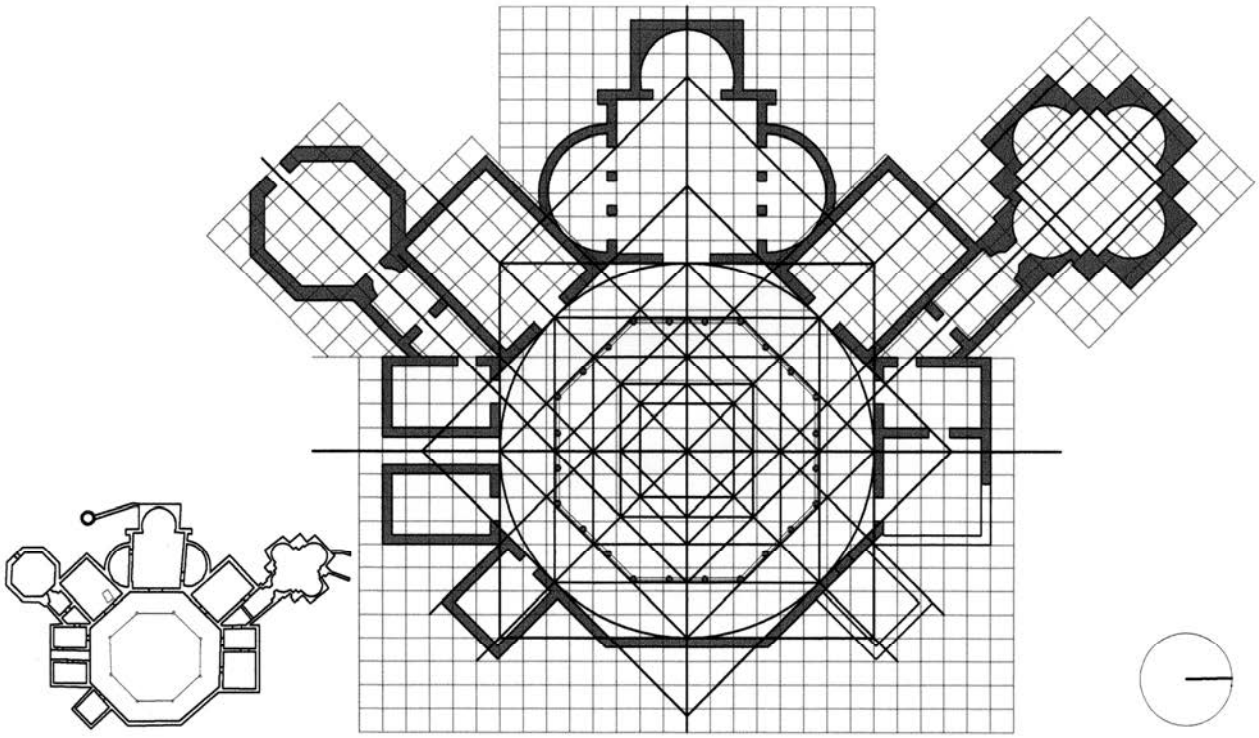

Figure 6*: Survey and hypothesis for the original plan of the villa in a 5 Roman feet grid*

Jones [4, page 74] analyses centralized buildings in and around Rome, built between 100 BC and AD 500, and observes that they can be classified into three distinct categories: externally orientated, internally orientated and bivalent buildings. In the externally orientated buildings the exterior is hierarchically superior to the interior — the interior design is poorer than the exterior one, the exterior shapes measure whole numbers of feet or cubits, and the entrance does not break the symmetry of the exterior, being thus projected into the interior. The internally orientated buildings have the reverse characteristics and in the bivalent buildings there is no hierarchy between interior and exterior.

Jones also observes that the externally orientated buildings were prevalent in late republican and early imperial Rome and, "with time the emphasis moved inwards" due to lack of space and social transformations. This same movement towards the interior is stressed by Marta [6, page 22] in his overview on the development from Greek into Roman architecture, and, subsequently, into Christian and Byzantine architectures. According to this author, the preeminence of the collective space in Greek society is shifted to the "direct relationship of man to the interior of buildings" in Roman culture, and the search for intimacy pursues with Christian and Byzantine churches.

The Roman villa of Rabaçal has an interior filled with significance — symmetry, including the decisive role of the octagonal peristyle, symbolic decorations and regular measures. Moreover, the exterior shows no regularity to those who approach the house. Generalising the classification of Jones in order to span a larger set of buildings, we can say that this villa is an internally orientated construction. However, it preserves one exterior reference due to its orientation along the compass directions.

Álvaro Siza

The Portuguese architect Álvaro Siza has a professional link to the Roman villa in Rabaçal, having accepted a commission to design covers and a route of access to the visitors, in order to preserve the ruins and, particularly, the remarkable collection of *in-situ* mosaics. However, there are also connections between the architectural character of the representational core of the villa and some recurring formal features of Siza's work.

Below we briefly describe how some principles of architectural composition, developed in Roman architecture and present in this villa, can be found in different historical periods and admit various changes in function and significance, and refer the way Siza employs these principles — the additive process (combination of identifiable units), the octagonal geometry, the fitness of the octagonal space to its function, combined symmetries, the apparent organicism of the architectonic object ruled by geometric laws, and the articulation with the site.

The additive method can be observed in the so-called Siza's Mickey house (the guest pavilion of Pego house, in Sintra), which shows, moreover, an obvious formal affinity with the Rabaçal villa, given that has an octagon-based geometry (Figure 7). The Mickey house was actually a dwelling to settle the family in the estate while building the main Pego house. The core volume of this prefab house is an octagonal prism, the living room, which organises and agglutinates the remaining volumes into a composition with axial symmetry. Two parallelepipeds, corresponding to the bedrooms, are attached to the octagon along directions 45º to the symmetry axis of the house, and are fused together by the bathroom's cubic volume. In Rabaçal villa, despite the core being an open space, there would have been an octagonal prism defined by the gallery around the colonnade. The adjoining bodies, with distinct functions, follow the East-West and North-South directions, as well as the directions that with these form angles of 45º.

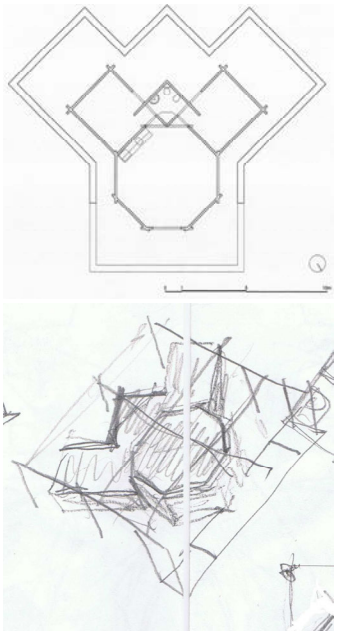

Figure 7: *Mickey house*

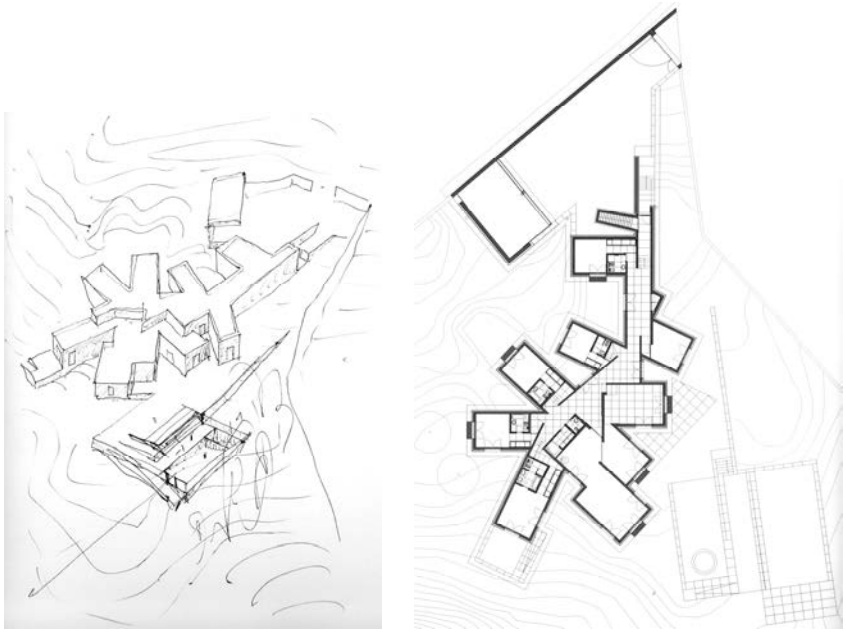

Figure 8: *Pego house: sketch and floor plan*

The addition of volumes and shapes, is inherited by Siza's work, mostly as a principle of architectural composition, and least as a style element. The Roman additive principle is usually dictated by axial symmetry but sometimes also by central symmetry, which crosses the history of architecture and

wins great emphasis during Renaissance — recall the centrally planned temples by Leonardo [7]. Mickey house, however, is an exception regarding Siza's use of axial symmetry. As a rule, the overall equilibrium of the composition is ensured by the balance distribution of the bodies following an explicit break of symmetry. Reasons of urgency, one week for the construction and the temporary nature of the pavilion, would have led to the simplicity of procedures and to the strict subordination to the axial symmetry. Siza, just as Loos, is an expert in apparent symmetry, subtle imbalances rooted in the comfortable possibility of recovering the generating order. The same way as the octagonal room provides the experience of central symmetry in a pavilion that, taken as a whole, has not that feature.

Another common feature to both the Rabaçal and Siza's approach is the assumption of convexities and concavities in the contour of the building. The main Pego house is a complex and rich composition of outstanding volumes, driven by topographical suggestions and the principle of associating volumes with functions (Figure 8). In this building Siza explores extensively the empty transition shapes in between the projecting bodies, small courtyards that open to the landscape… like petals of a flower as suggested. As in the Rabaçal Roman villa, the Pego house is a series of hollows and protrusions which, despite its organic appearance, develops along octagonal directions — two orthogonal axes, another axis angled 45º and two more orthogonal axes that bisect the previous angle. The octagonal geometry thus establishes a connection between the main house and the guest pavilion.

Without a clearly defined frame, besides the terrain itself, the geographical orientation and the suggestions of the magnificent landscape, Siza clearly assumes the individuality of this architectural object, entrusting his major concern of mediation with public space to the walls that delimit the site, an over 20.000 m^2 estate. Similarly, the freedom of the additive procedures in Rabaçal villa, can be related to the far boundaries of the plots of land that, according to Mantas as referred in [1], were defined by a centuriation grid with orientation 21º to Northwest and modulus 50 ha. This connection to a wide area is enhanced by the peristyle opening towards the valley, at East. Other Roman buildings include their own container. This is the case of the *macellum* in Gerasa, ruled by and integrated with the streets grid, according to the *cardus* and *decumanus* directions.

After the Roman era, the tradition of organising a building around an octagonal peristyle, or courtyard, vanishes. For the next thousand years a few examples are known, as the outstanding Castel del Monte, built by Frederick II in Apulia, possibly under the influence of Fibonacci. That tradition only reappears with the Renaissance treatises on palace architecture, where octagons are confined to quadrangular layouts, as in some of Francesco de Giorgio’s examples. The octagon achieves full expression in buildings with octagonal exterior shape, with Serlio and Cataneo but also with Inigo Jones and, later with the Poplar Forest by Thomas Jefferson (1806). Soon, the phrenologist and hygienist Fowler would write a treatise on the family house, where the superiority of the octagonal shape is advocated, mainly for functionalist reasons [8]. This work reinforced the interest in octagonal buildings, especially in the United States, where a great number of this kind of houses were built, some of which remain. Frank Lloyd Wright also explores this resource as in the large workspace of his first studio in Oak Park, but especially in the little jewel that is the so-called octagonal library.

This choice of the octagonal shape, however, has moved away from the principle of defining the space according to a pivot element, an octagonal core that could either be an open space — peristyle, courtyard — or a closed one — main hall, living-room — or even a semi-open space as the archetypal octagonal room of the Nero's Domus Aurea.

Innumerable examples from the treatises illustrate the second family of constructions with octagons, but it is worth highlighting the particular case of Villa Pisani by Scamozzi (1576), where an octagon is suggested by the insertion of niches in the central round space. The niches, at 45º angles with the major axes, reverberate on the octagonal prism that extends the space vertically, protruding over the roof. This is a variant of Palladio's Villa Rotonda (1565), which had numerous followers, particularly Lord Burlington, with the 1725's Chiswick Villa, and Thomas Jefferson, with his villa in Monticello (1796), see [9]. The last case, however, presents a remarkable difference in the non-central location of the octagonal parlor, which slides away from the hall and connects to a classical portico that opens to the garden (Figure 9). Interestingly, this refers to another work by Siza, Figueiredo house in Valbom, where a quadrangular

parallelepiped, an octagonal prism and a lying ogival shape, define a descending sequence that enters the garden like the prow of a boat (Figures 10-11). The overall composition has approximate axial symmetry, in agreement with the interior circulation lines and the external vertical edge of the ogive. This edge, in correspondence with the pediment apex of Jefferson's portico, reinforces the affinity between the two compositions, as well as the two wide horizontal windows of the ogival walls which bring the garden into the room, and vice versa. The ogival shape (a common feature in Siza), acting like a bow window, adds a cosy spot with two openings to the octagonal room on the ground floor, and a balcony to the upper floor octagonal room, overlooking the river Douro. Sintra was not, therefore, the first time Siza explored the potentiality of the octagonal plan spaces, in domestic architecture.

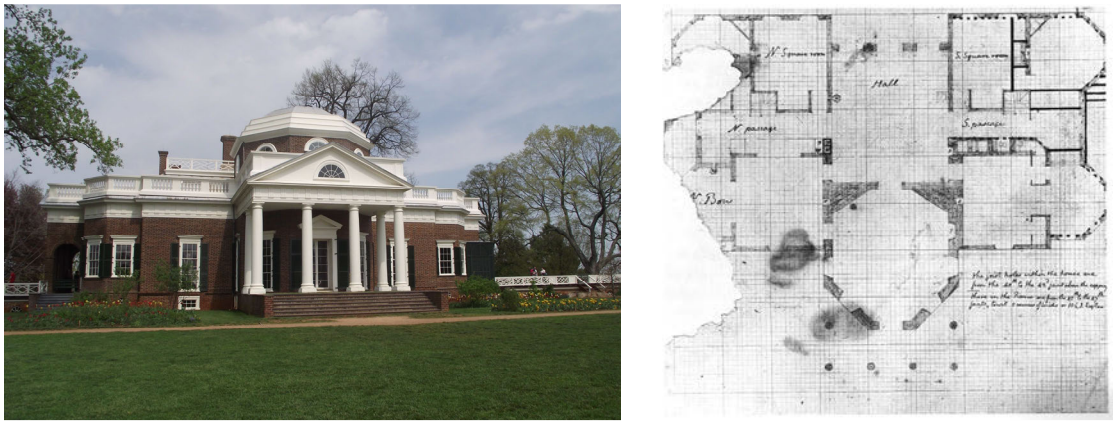

Figure 9: *Monticello, garden front and plan project (1796?), Jefferson*

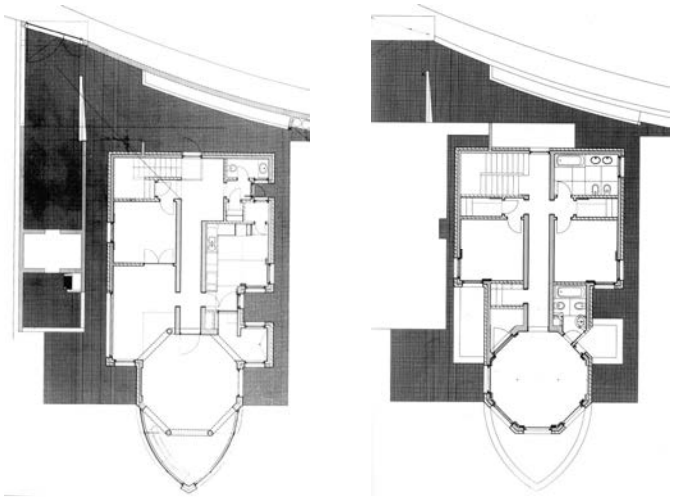

Figure 10: *Figueiredo house floor plans, Siza (1984)*

Figure 11: *View from the garden*

Faced with the need to preserve the valuable Rabaçal ensemble, Siza projects two covers, in 2006, one for the villa's *pars urbana*, where he finds the theme of octagonal composition, and another for the baths (Figures 12-13). The proposed solution consists of structures made with interlocking laminated wood beams. These define a square grid analogous to the Serpentine Gallery pavilion, in London, although the spans are much larger in Rabaçal and the nature of the site claims a purer geometry. The larger structure, above the main building, is a spherical section that reinforces the central quality of the Roman plan, while the smaller structure has a cylindrical shape that develops in accordance with the alignment of the baths ruins, which have a longitudinal arrangement of volumes.

We hope that these covers will become real, giving a future to the ruins and the possibility to enjoy them within a new dimension. Then, the exquisite ensemble of mosaics, which is now covered with sand for preservation reasons, will finally be visible to all.

Figure 12: *Searching for Rabaçal covers…*

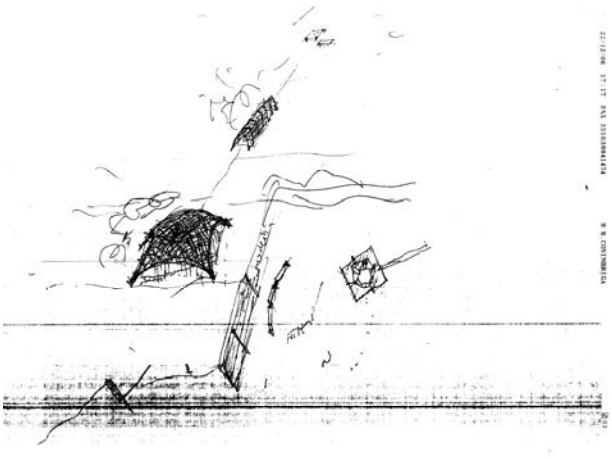

Figure 13: *Covers: pars urbana and baths*

Acknowledgments

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