

Licht – Konzepte

in der vormodernen Architektur

Diskussionen zur Archäologischen Bauforschung

10

SCHNELL + STEINER

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Deutsches Archäologisches Institut
Architekturreferat



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Band 10

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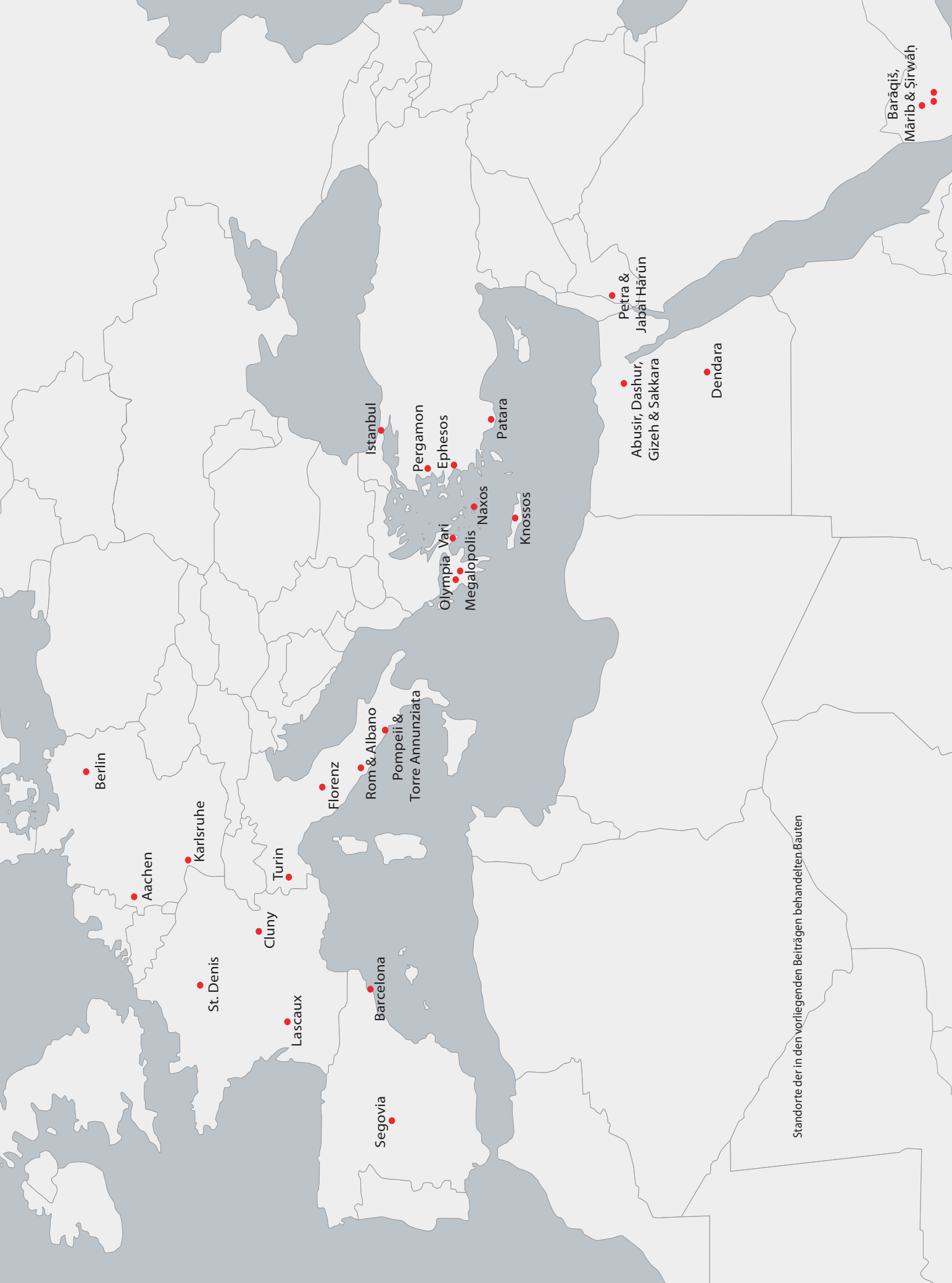
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Light Design Concepts In Roman Luxury Villa Architecture

Mantha Zarmakoupi

Bei der Ausgestaltung des in den Villen geführten luxuriösen Lebensstils setzten sich die Römer intensiv mit dem Zusammenhang zwischen Architektur und Landschaft auseinander.

Dabei schufen sie eine Architektur, die die Vorzüge der Umgebung und die visuelle Wirkung des Lichts nutzte. In diesem Beitrag sollen zwei miteinander im Zusammenhang stehende Veränderungen im architektonischen Entwurf frühkaiserzeitlicher Luxusvillen untersucht werden, um das Beleuchtungskonzept in den Residenzen zu veranschaulichen. Zum einen wandelt sich die Gestalt des Peristylgartens und zum anderen werden große multifunktionale Räume hinzugefügt, die den durch die Entstehung neuer Bankettsitten gewachsenen Raumbedarf decken. Die Analyse zeigt, dass die römische Architekten als Reaktion auf die sich wandelnden Bedürfnisse und Ansprüche des Villenlebens kreative architektonische Lösungen für die Beleuchtung und Belüftung des Hauses formulierten, und mit der visuellen Wirkung des Lichts spielten, um die Lage der Villa in der Landschaft hervorzuheben.

The cultural phenomenon of luxurious villas flourished in the Italian peninsula from the middle of the 1st century B.C.E. to the beginning of the 2nd century C.E.¹ After the conquest of the Hellenistic East in the 2nd century B.C.E. and the influx of resources that followed, Romans wished to display their new wealth in a private context and consequently transformed their plain country houses into sumptuous edifices. In designing for luxury, Romans developed a new design language between architecture and landscape by incorporating and appropriating elements of both Greek and Roman architectural vocabularies². The design of the spacious peristyle gardens exemplifies this novel architectural language. Peristyle gardens on the one hand emulated the porticoes of the royal and public architecture of the Hellenistic East and on the other followed the tradition of the Roman domestic garden³. The transformation of the strictly rectangular form of the peristyle garden to more fluid formulations of porticoes and gardens was not only related to an appreciation of the environmental and visual qualities of the Italian landscape, but also to the growing needs of dining practices in the villas.

In the context of social ascendancy, luxury villas operated as cultural status symbols. Even if the primary purpose

of these places was as retreats from the public life of political affairs, they were also loci of social interaction and political games. Prime occasions for social staging were the lavish dinner parties hosted by the senatorial and newly enriched equestrian owners. In the early imperial period, the growing social and political importance of the private loaded table with its accompanying entertainment rendered the smaller, traditional arrangement of dining in the triclinia insufficient to accommodate these augmented dining practices. In response to these needs designers created big multifunctional rooms that could accommodate the enlarged dining practices⁴.

In my analysis of luxury villa, I address how Roman designers by responding to the changing needs of life in these villas created an architecture whose spaces were permeated with light and whose volumes were highlighted by the play of light. Furthermore, I use contemporary literary sources, in particular Vitruvius, Pliny the Younger and Statius, to address the consideration of light in both its environmental qualities and its visual effects. Although their writings present a highly self-conscious representation that implicitly theorizes Roman culture and stages villa life and architecture in order to fit their sociopolitical ambitions⁵, they can be used to understand the ways in

- 1 On the cultural phenomenon of luxury villas, see D'Arms 1970; D'Arms 1979; Mielsch 1987; Frazer 1998; L. Romizzi 2001; Lafon 2001; Marzano 2007.
- 2 Zarmakoupi 2007.
- 3 Zarmakoupi (forthcoming b).
- 4 Dunbabin 1996.
- 5 On Vitruvius, see McEwen 2003; Wallace-Hadrill 2008, 144–210. On Pliny the Younger, see Hoffer 1999, 29–44; Riggsby 2003; McEwen 1995. On Statius, see Newlands 2002.

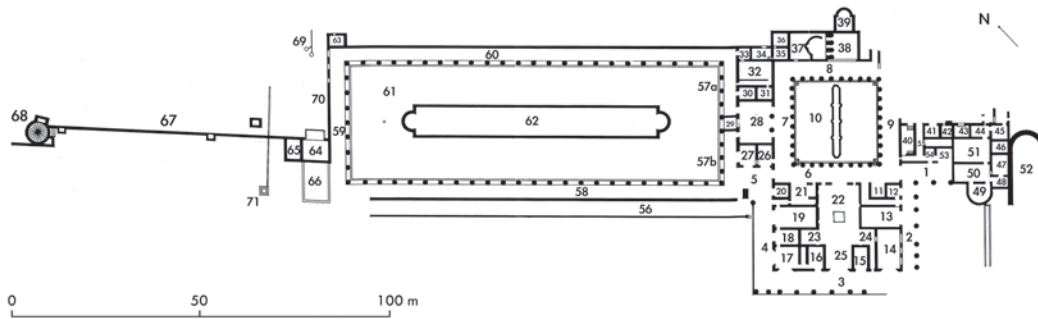


Fig. 1 Villa of the Papyri, plan

which the architecture accommodated the owners' daily activities⁶.

My discussion focuses on four well-preserved Roman luxury villas located around the bay of Naples: Villa of the Papyri on the outskirts of Herculaneum (fig. 1), Villa A at Torre Annunziata (fig. 2), Villa San Marco (fig. 3) and Villa Arianna A (fig. 4) in Stabiae⁷. These villas date roughly from the beginning of the 1st century B.C.E. to 79 C.E.

Formulating a Language of Architecture and Landscape

In the town, the *atrium* was the center of the architectural composition of the house. The physical requirements of air ventilation and light combined with the constraints of space led designers to organize the house around the *atrium*⁸. Its importance as the centre of the house is also reinforced by its function as the space for the owner's social staging (Vitr. 6, 5, 2):

Item feneratoribus et publicanis commodiora et speciosiora et ab insidiis tuta, forensibus autem et disertis elegantiora et spatiosiora ad conventus excipiendos, nobilibus vero, qui honores magistratusque gerundo praestare debent officia civibus, faciunda sunt vestibula regalia alta, atria et peristylia amplissima, silvae ambulationesque laxiores ad decorem maiestatis perfectae; praeterea bybliotheas, pina-

cothecas, basilicas non dissimili modo quam publicorum operum magnificentia comparatas, quod in domibus eorum saepius et publica consilia et privata iudicia arbitriaque conficiuntur.

»Again, the houses of bankers and farmers of the revenue should be more spacious and imposing and safe from burglars. Advocates and professors of rhetoric should be housed with distinction, and in sufficient space to accommodate their audiences. For persons of high rank who hold office and magistracies, and whose duty it is to serve the state, we must provide princely vestibules, lofty halls and very spacious peristyles (*atria et peristylia amplissima*), plantations and broad avenues finished in a majestic manner; further, libraries and basilicas arranged in similar fashion with the magnificence of public structures, because, in such palaces, public deliberations and private trials and judgments are often transacted«.

(Translation Granger 1934)

It is in this room that the owner received his clients and through views to this room that the passerby perceived the owner's position in society. Over time this role diminished, but the *atrium* retained its importance in the organization of most houses since it was also the ›face‹ of the house on to the street⁹. When designers started to build in the countryside, they adopted this central concept of the

6 For a methodology on the use of the letters of Pliny the Younger, see Förtsch 1993; about spatial representation in the villas letters of the same author, see Riggsby 2003.

7 Villa of the Papyri: Wojcik 1986; Mattusch 2005; Zarmakoupi (forthcoming a). New excavations: De Simone 1987; De Simone – Ruffo 2002; De Simone – Ruffo 2003; Guidobaldi – Esposito (forthcoming). – Villa A at Torre Annunziata: de Franciscis 1975; Fergola – Pagano 1998; Guzzo – Fergola 2000; Fergola 2004; Clarke – Thomas 2007. The owner of this villa has been argued to have been the consort of Nero, Poppaea Sabina: de Franciscis 1979; De Caro 1987, 131–133. – Villa San Marco: Barbet – Miniero 1999; Bonifacio – Sodo 2001. – Villa Arianna A: Bonifacio – Sodo 2001; Ciro Nappo 2002; De Simone 2002. No monograph has appeared on Villa Arianna A and Villa Arianna B. The following publications of conferences and exhibitions on the villas of Stabia include useful publications on these hitherto unpublished villas: Bonifacio – Sodo – Ascione 2001; Bonifacio – Sodo 2002; Camardo – Ferrara 2002; Pesce 2004. The diary of Libero D'Orsi, who excavated the Stabian villas in the 20th century, is useful: Carosella 1996.

8 Blanas 1990; Ratzka 1990.

9 Wallace-Hadrill 1994, 38–61; Wallace-Hadrill 1990, 166–170; Wallace-Hadrill 1997, 219–240.

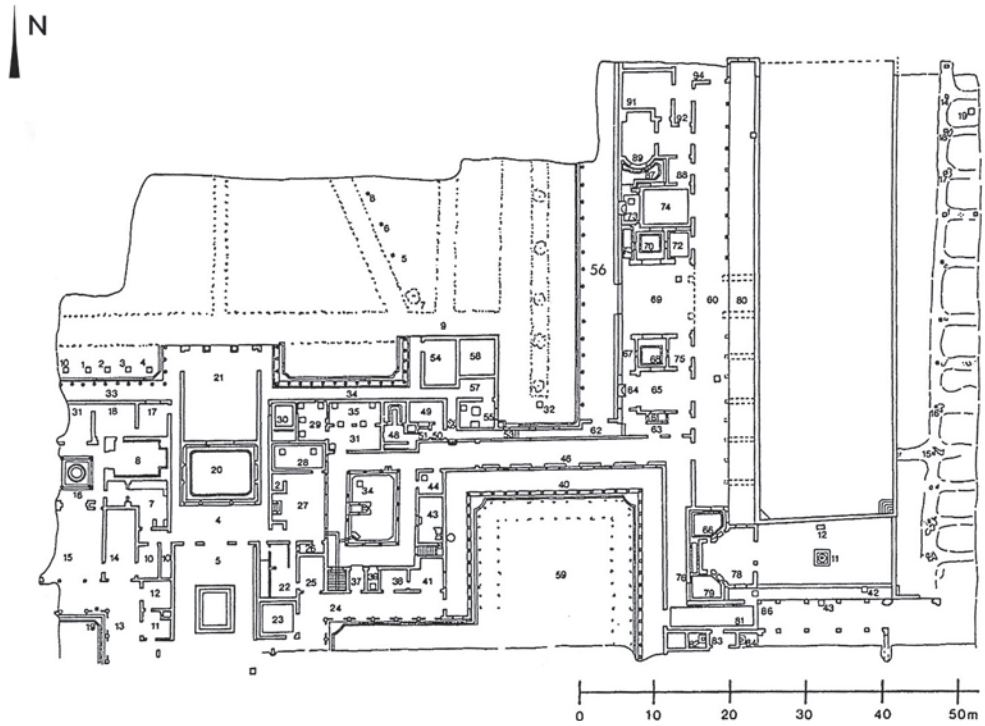


Fig. 2 Villa A at Torre Annunziata

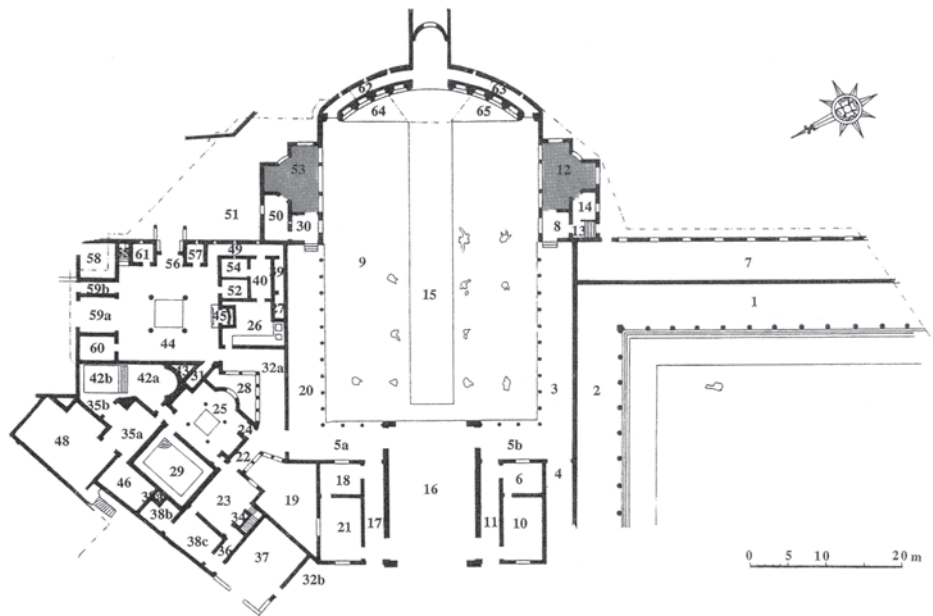


Fig. 3 Villa San Marco

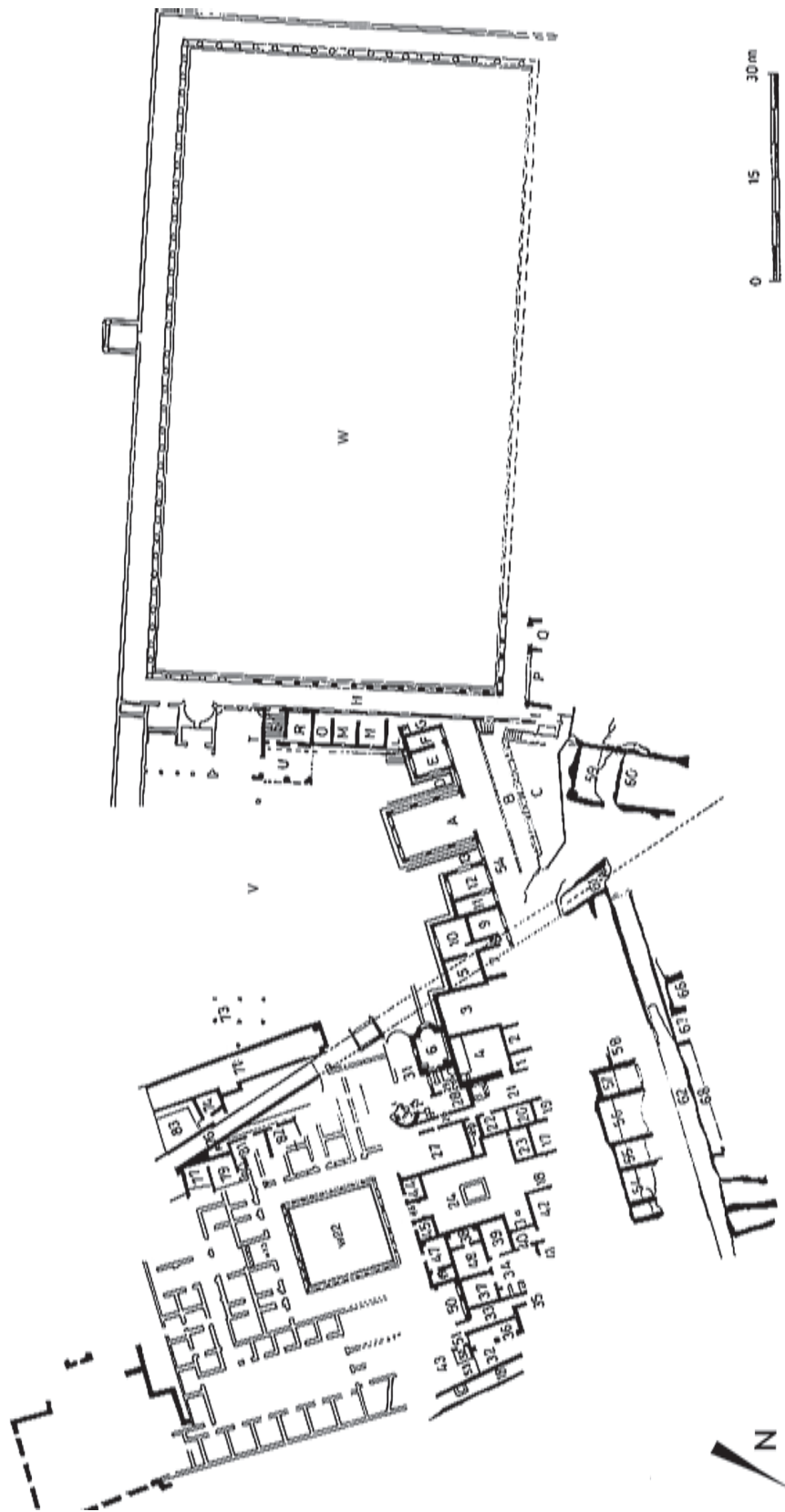


Fig. 4 Villa Arianna A, plan

town house and continued to use the *atrium* as the core of the architectural composition, for example in the first phases of Villa Arianna A and Villa A at Torre Annunziata. In the country houses, however, where there were no space restraints, the *atrium* was not needed as the primary source of light, air and ventilation.

Vitruvius describes a reverse in the order of the peristyle and the atrium that may have been a first attempt to approach new design issues vis-à-vis the landscape (6, 5, 3):

[...] quod in urbe atria proxima ianuis solent esse, ruri ab pseudourbanis statim peristylia, deinde tunc atria habentia circum porticus pavimentatas spectantes ad palaestras et ambulationes.

»[...] in the city the atria are customarily next to the entrance, whereas in the countryside and in pseudo-urban buildings the peristyle comes first, then afterwards the atria, and these have paved porticoes around them looking into palaestras and walkways«.

(Translation Rowland 1999)

We do find this order in the Late Republican phases of villas such as in the Villa of the Mysteries and Villa Arianna A¹⁰. However, more indicative of the ways in which designers responded to the new country-house situation is the transformation of the rectangular form of the peristyle garden to articulate physical and visual connections to the landscape around the villas.

During the 1st century B.C.E., the peristyle garden entered the design vocabulary of luxury villas as intact, rectangular or square porticoed structures, for example the ones in the Villa of the Papyri and Villa San Marco (figs. 1, 3). Towards the end of the 1st century B.C.E., designers started breaking the strict form of the peristyle and used portico structures in a freer manner. Although the rectangular porticoed enclosures were retained, there was a looser composition of porticoes and gardens. For example, porticoes and gardens followed the sprawling architectural body of the villas. We see this in Villa A at Torre Annunziata, where porticoes 40 and 60 contour the extension of the villa (beginning of 1st century C.E.) towards the east and formulate a freer relation to their adjacent gardens, garden 59 and the east garden respectively (fig. 2). In doing

so, designers opened up the villas' architectural composition and created spaces that had a more immediate relation to and mastering view of the surrounding landscapes, for example room 69 in the same villa (fig. 5).

The reformulation of the peristyle gardens is a prime example of the novel language of architecture and landscape that Roman designers articulated in luxury villas of the early Imperial period. Indeed luxury villas were part of the Roman cultural current that was concerned with the appreciation of landscape. From the late Republic onwards, landscape was singled out as a theme in its own right. Its qualities were eulogized in the pastoral poetry of Virgil and its idealized representations permeated both public and private spheres, for example, the garden painting from the underground dining room in Villa of Livia at Prima Porta¹¹ and the reliefs of landscape elements on the altar enclosure of the Ara Pacis¹². Literary and visual sources contemporary with these Roman luxury villas display a concern for the appreciation and praise of landscape, for example, the villa letters of Pliny the Younger, the villa poems of Statius¹³ and the villa landscapes in the panels of the late 3rd and 4th Pompeian styles¹⁴. The villas themselves were the architectural expressions of this cultural current in that their design articulated a sophisticated relationship with the landscape.

The architectural composition of the villas responded to the specificities of their location. The closed structures of the peristyle gardens were transformed to create a looser composition of porticoes and gardens that opened up to the surrounding landscape, for example in Villa Arianna A and Villa A at Torre Annunziata. This, in turn, facilitated the sprawl of the villas' spaces on the landscape, while large windows created physical and visual connections to it, for example room A in Villa Arianna A and rooms 21 and 69 in Villa A at Torre Annunziata (figs. 5, 6). These perforations into the villa opened up the interior space to the exterior view not only visually, but also allowed the interior space access to light and provided air circulation.

DESIGNING FOR THE LIFE IN THE VILLA

The transformation of the peristyle gardens in villas exemplifies not only the appreciation of landscape but also the integration of these structures in the life led in villas. This

10 On the dating of the Villa of the Mysteries, see Esposito 2007.

11 Settis – Donati 2002.

12 Zanker 1990, 179–183; Sauron 2000.

13 Pavlovskis 1973.

14 Peters 1963, 110–118 (late 3rd style). 155–166 (4th style).

reformulation was related to the increasing importance of dining practices and the change of the facilities that accommodated them. Similar to the integration of the peristyle in the town houses of Pompeii (e.g. House of the Faun) it was indicative of the reception of Hellenistic public architecture in the Roman private sphere¹⁵.

In the villas, although the *atrium* was copied over it was no longer the locus for the social staging of the owner. In the new countryside situation the face of the house was its porticoed façades and the social staging and political games were moved to the dining spaces. At first, the rooms that accommodated the symposium were the Roman *triclinia*. These were rooms designed for three couches of about 2.20/2.40 m by 1.20 m. and arranged in the form of the Greek letter Π, with a table standing in between them to serve the diners who reclined on the couches¹⁶. Vitruvius says that the ideal proportions for a *triclinium* are twice as long as wide (*tricliniorum quanta latitudo fuerit, bis tanta longitudo fieri debet*. Vit. 6, 3, 8). In the first phases of the villas examined here (1st century B.C.E.), the *triclinia* clustered around the *atrium* and replicated the situation in the town houses, for example rooms 13, 14 and 19 in the Villa of the Papyri (fig. 1). As dinner parties gained importance for the social and political games of the upper classes, they also became more elaborate¹⁷. Literary sources inform us that entertainment at dinner parties could include performances of music, dance and pantomime¹⁸. The life of pleasure that the elites led in their villas was in the company of actors and mimes, for example Varro described the spectacle for a dinner party at his villa, where a music player acted Orpheus in the midst of a park of wild animals (Rust. 3, 13, 2–3) and Diogenianus talked about mimes acting in the private dining parties in Plutarch's »Table talk« (quaest. conviv. 7, 8, 3 = 711 E). Dunbabin has analyzed the ways in which the increasing importance of the entertainment for the dinner parties in luxury villas led to a change in the form and size of the dining rooms in the villas of the late empire. For example, the triconch arrangement found in 4th-century villas provided a central space for the dinner entertainment that could be viewed equally from three



Fig. 5 Villa A at Torre Annunziata, view from room 69 towards north garden



Fig. 6 Villa A at Torre Annunziata, view from room 21 towards the north garden

- 15 In the town houses of Pompeii the peristyle was first integrated as an alien element at the end of the 2nd century B.C.E.; the subsequent shift of the main living-areas of the houses from the atrium to the peristyle indicates its incorporation as an instrumental element in the houses. Dickmann 1997. On the Hellenistic precedent in Roman architecture, see Rakob 1976; Fittschen 1976, 549–556; and especially in Roman villa architecture: Mielsch 1987, 120–125; Zanker 1998, 136–142; Tombrägel (forthcoming).
- 16 For the definition of the word *triclinium*: Dunbabin 2003, 38 n. 6. For a discussion on archaeological evidence of *triclinia*: Dunbabin 1991; Dunbabin 1998. For a discussion on archaeological evidence of open-air *triclinia*: Soprano 1950. For a discussion on archaeological evidence of water *triclinia*: Rakob 1964. For evidence on preserved beds and couches at Herculaneum: Mols 1999, 35–44; De Carolis 2007..
- 17 The planning of a banquet including the choice of guests and the seating arrangements was part of a networking scheme that promoted business allegiances: D'Arms 1990; Dunbabin 1998, 89; Dickmann 1999, 291–296; Stein-Hölkeskamp 2005, 101–111.
- 18 Griffin 1976, 94. Seneca complains that the noise of pantomime activity on the private stage was said to fill the whole city (Sen. quaest. nat. 7, 32, 3). Jones 1991; Slater 1994, 131; 1993, 205–211.

apses as in the Villa at Desenzano on Lake Garda¹⁹. In the early Imperial period the response to the needs of the dining practices and their accompanying entertainment was quite different²⁰. Instead of creating a centralized space for the entertainment around which the dining areas revolved, designers created several dining spaces that were visually connected through hypaethral or semi-hypaethral spaces that could be used to stage the spectacle for the participants of the symposium.

The narrow space of the *triclinia* rooms, in the strict Vitruvian sense, was no longer sufficient to satisfy the needs of the augmented dining practices. At first, this must have led owners to use a variety of rooms, which were not use-specific as the *triclinia* were, for their dinner parties and their accompanying entertainment. In fact, the villas dating from the 1st century B.C.E. and the 1st century C.E. provide no examples of built masonry couches and typical *triclinia* rooms are found only in their early phases, for example the *triclinium* 14 in Villa A at Torre Annunziata (fig. 2)²¹. Contemporary discussions of the dining rooms in luxury villas indicate that they could have a variety of forms and qualifications. The word *diaetae* designated nuclei of two or three rooms for day-time as opposed to strictly night-time use, one of which could be a *triclinium*²². The main concerns for the design of these rooms were their seasonal and spatial qualities (Vitr. 6, 4, 1–2; Varro Ling. 8, 29), and their view towards the landscape (Plin. epist. 2, 17, 13; 5, 6, 19; 5, 6, 29–30)²³. The enlarged rooms and *diaetae*-complexes that appeared towards the end of the 1st century B.C.E. in luxury villas accommodated both of those needs; for example, the big rooms 21 and 69 in Villa A at Torre Annunziata (fig. 2), 3 and A in Villa Arianna A, 13 in Villa Arianna B (fig. 4), 16 in Villa San Marco (fig. 3) and 28 in Villa of the Papyri (fig. 1); and the *diaetae*-complexes 66–78–79 in Villa A at Torre Annunziata (fig. 2), 53–50–30 and 12–8–4 in Villa San Marco (fig. 3)²⁴. The large dinner parties with live entertainment about which we hear in contemporary literature

required a number of rooms to accommodate them, and these rooms fit the qualities described²⁵.

The huge window openings of the villas' big rooms, for example, of room A in Villa Arianna A, and of the *diaetae*-complexes in Villa A at Torre Annunziata (66–78–79) and Villa San Marco (53–50–30 and 12–8–4), not only took advantage of the views to the surrounding exterior and interior landscapes but also opened up the stage for the dinner spectacle. We cannot definitely assert how the choice of entertainment affected the design of the dining spaces; nonetheless, we cannot fail to observe the staging qualities that the dining rooms have²⁶. The east wing of Villa A at Torre Annunziata is a prime example. The rooms 64/65, 69 and 73/74 could hold a single dinner party, while lightwells 68 and 70 in between them enlivened the atmosphere with painted and real vegetation. Whereas lightwells 68 and 70 allowed visual communication between rooms 64/65, 69 and 73/74 their raised sills did not allow physical communication between them (fig. 7). The rooms communicated physically through passages 71 and 72 (73/74 and 69) and through passages 67 and 75 (69 and 64/65), as well as portico 60. This interesting choreography of space, I propose, facilitated the staging of a show, whose actors could move through these passages to entertain the participants of the dinner attendants²⁷. The visual communications combined with the physical constraints between these spaces would have intensified the experience of the performance (fig. 8). Furthermore, visual communication was facilitated not only between the rooms in the east wing of this villa, but also with the gardens to their west (north garden, fig. 5) and to their east (fig. 10), in which performances could have been staged as well. For example, a performance taking place in area 98, to the east of pool 98, would have taken advantage of both the reflection of the pool as a liquid stage and the backdrop of the statues and trees along area 98 as a *scaenae frons*.

19 Dunbabin 1991; Dunbabin 1996; Rossiter 1991.

20 Dunbabin 1996, 68–72.

21 On the identification of rooms for dining in luxury villas, see Dunbabin 1996, 67–70.

22 Leach 1997, 67.

23 Dunbabin 1996, 66.

24 Indicative of this transformation of the spaces for dining is the change of the meaning of the word *triclinium* after the late Republican period to signify a dining room regardless of size, and, in the later Empire, regardless of shape. Dunbabin 1998, 89. Most of the rooms identifiable as *triclinia* in Italy date from the late Republican and early Imperial periods. In the Greek East, *triclinia* show the wholesale adoption of the Roman form: Dunbabin 1998, 92–95. From the end of the 1st century C.E. onwards, the size and form of *triclinia* changes, and by the 4th century C.E. the semicircular sigma-couch or *stibadium* prevails. For an assessment of the history of these sitting arrangements, see Dunbabin 1991.

25 In support of this argument: Leach 1997; Dunbabin 1996.

26 Bek 1980, 164–203; Bek 1983; Stewart 1977.

27 See Hall – Wyles 2008, esp. Hall's introduction, 1–40.

LIGHT: ENVIRONMENTAL QUALITIES AND VISUAL EFFECTS

Both the reformulation of the peristylia gardens and the creation of numerous large spaces with big openings to accommodate the dining practices in luxury villas raise a number of issues and questions vis-à-vis the provision for and protection from light as well as the environmental qualities associated with it, such as temperature and ventilation.

First, the large number of rooms for dining in these villas not only satisfied the need to accommodate big dining parties, but also the need to accommodate dinner parties in different seasons. The dining rooms in these villas could indeed accommodate a large dining party at the same time, for example rooms 64/65, 69 and 73/74 along the east wing of Villa A at Torre Annunziata. Zanker estimated that the dining arrangement in the Domus Flavia could accommodate a party of about 500 guests²⁸, and it is reasonable to assume that all the villas examined here could hold from 50 (Villa of the Papyri) to 100 or more guests (Villa Arianna A). However, Vitruvius indicates another, more practical, quality that suggests the need for more than one dining room, namely their orientation with respect to the landscape and seasonal change in light and ventilation (6, 4, 2)²⁹:

Triclinia verna et autumnalia ad orientem; tum enim praetenta luminibus adversus solis impetus progrediens ad occidentem efficit ea temperata ad id tempus, quo his solitum est uti. Aestiva ad septentrionem, quod ea regio, non ut reliquae per solstitium propter calorem efficiuntur aestuosae, eo quod est aversa a solis cursu, semper refrigerata et salubritatem et voluptatem in usu praestat.

»The spring and autumn dining-rooms should look to the east. For exposed as they are to the light, the full power of the sun moving to the west renders them temperate at the time when the need to use them is customary. The summer dining-rooms should have a northern aspect. For while the other aspects, at the solstice, are rendered oppressive by the heat, the northern aspect, because it is turned away from the sun's course, is always cool, and is healthy and pleasant in use.«

(Translation Granger 1934)



Fig. 7 Villa A at Torre Annunziata, view from room 73/74 through lightwell 70, room 69, lightwell 68 to room 64/65

Although we should read Vitruvius with caution as his concern was to provide ideal guidelines for design in the manner of an architectural manual and his project may be termed as »the rebuilding of Roman identity«³⁰, his directions point to the importance of light and temperature in the design of dining spaces. The position of these larger spaces in the layout of the villas suggested that they were alternative solutions vis-à-vis their exposure to light. For example rooms A and T in Villa Arianna A have a NW-SE and E-W orientation respectively and rooms 21 (fig. 4) and 69 in Villa A at Torre Annunziata have N-S and E-W orientation respectively (figs. 2. 5. 6. 9).

Second, we should consider how the large opening of these spaces were closed. There is no evidence of glass windows for these openings. Although the invention of blown glass around the middle of the 1st century B.C.E.³¹ enabled more widespread use, it was used moderately and selectively in the private sphere and mostly in bath buildings in the public sphere as it was still a luxury item³².

28 Zanker 2002.

29 Ratzka 1990, 102; Zarmakoupi 2008, 271 f.

30 Wallace-Hadrill 2008, 149. On the ideological underpinnings of Vitruvius' treatise: McEwen 2003; Wallace-Hadrill 2008, 144–210.

31 Kisa 1908, 299; Grose 1977; Platz-Horster 1979.

32 Sperl 1990; Broise 1991; Baatz 1991; Dell'Acqua 2004, 116–119.



Fig. 8 Villa A at Torre Annunziata, view from passage 71 through passage 67 (straight ahead) towards the south and into room 69 and lightwell 68 (left side of viewpoint) and through lightwell 68 into room 64/65

Even if blown glass was more translucent than poured glass, it was still not completely transparent and was consequently not the best choice for openings that were designed to provide an open view onto the landscape³³. Indeed the use of glass in the private sphere was reserved to small openings in order to protect their decoration, for example the small *oculi* of the rooms below the *atrium* quarter in the Villa of the Papyri³⁴, or in the more exposed areas of the open areas of the house, for example the east wing of the ›veranda‹ in the House of the Mosaic Atrium in

Herculaneum³⁵. It is indicative that of the villas examined here only the aforementioned small *oculi* at the Villa of the Papyri had glass slabs. Rather than covered with glass, the large openings of the villas were equipped with wooden folding doors that protected the interior spaces from the light, and in general from the elements, but also allowed for ventilation. The impression of carbonized folding doors can be seen in rooms 14 and 15 in Villa A at Torre Annunziata³⁶. Furthermore, the thresholds in rooms 21, 15 and 69 at the same villa show that they were closed with folding doors.

Third, diners would have continued well beyond the sunset after which artificial lavish lighting, such as marble and bronze *candelabra*, bronze lamps and lamps on bronze *lychnophoroi*, was used³⁷. As the party moved into its nocturnal phase, artificial light took the place of natural but the need to maintain a comfortable atmosphere in terms of air circulation and protection from the elements continued. From the villas studied here, only in the Villa of the Papyri bronze candelabra were found at the northwest side of the *atrium*, of which only one survives³⁸. The villas were undergoing renovations during the eruption and their lighting devices must have been removed³⁹. Most of the sumptuous *candelabra*, lamps and *lychnophoroi* found in houses and villas of the Pompeii and Herculaneum were found in the most prestigious areas of the house, such as *tablinia*, *triclinia*, baths, *cubicula* or around the peristyle garden; for example the basis of the marble *candelabrum* from the House of the Gilded Cupids (VI.16.7.38) was found in the *cubiculum*⁴⁰ and the tray-bearing kouros/Apollo from the House of Gaius Julius Polybius (IX.13.1–3) was found in the *triclinium* that looked on to the peristyle garden⁴¹.

Fourth, how did the reformulation of the peristyle garden and the creation of big spaces with big openings affect the overall design of the villas and especially in regards to light? In the fluid articulation of the villas' spaces, the porticoes mediated the entrance of the light in the house. In the peristyle gardens the porticoes did

33 Del'Acqua 2004, 115. On the translucency of glass: Sperl 1990, 68–70.

34 De Simone (forthcoming), II. The basis villae; Guidobaldi – Esposito (forthcoming), B. The rooms pertaining to the first lower level of the *basis villae*. For other evidence on glass in the Vesuvian area: Dell'Acqua 2004.

35 Maiuri 1958, 292.

36 For reconstructions of wooden partitions on the basis of archaeological evidence and wall paintings: Russo 2001.

37 Seidel 2009. On the luxury status of lighting objects: Wallace-Hadrill 2008, 371–391.

38 NM 73089: Comparetti – Petra 1883, 287 no. 114; Wojcik 1986, 242–244, L17, table 122. On marble candelabra, see Cain 1985; Cain – Dräger 1994. Also, painted thymiateria featured on the west walls of the *atrium* and *triclinium* 14 in Villa A at Torre Annunziata. De Franciscis 1975, tabl. 4. 5. 17. 23. Contemporary authors conflate *thymiateria* (incense burners) with *candelabra*. Wallace-Hadrill 2008, 372.

39 The people found trapped in the beach front of Herculaneum carried with them lamps. Seidel 2009, 37–39.

40 Inv. 20586, Seiler 1992, 48. 51. 119; Sogliano 1907, 585. Seidel 2009, electronic catalogue in CD-ROM, 188 (cat. no. 16.2.3.8).

41 Inv. 22924, Pesando 2002, 262–267; Mattusch 2008, 141–143. Compare to the lamp-bearing ephebe from the House of Fabius Rufus: IBM Gallery of Science and Art 1990, 257; Mattusch 1996, 139 f.

not merely frame the interior gardens of the house. Placed between the exterior and interior spaces of the villas, they were intermediate semi-exterior spaces that protected the interior of the villas from the elements and moderated the rays of the sun entering the house. This quality of the porticoes was further advanced in the reformulated design of the peristyle gardens. As the spaces of the villas were liberated from the rectangular formations of the peristyle gardens, the porticoes followed the expansion of the interior spaces out into the landscape. They protected the perforated architectural body now open to the landscape and more exposed to the weather than in the case of the formal design with peristyle gardens. The invention of the form of the covered and enclosed ambulatories, the *cryptoporticus*, as a variation of the colonnades, was probably a product of this concern, for example the *cryptoporticus* 13 and 24 in Villa A at Torre Annunziata⁴². Indeed the environmental advantages of the *cryptoporticus* are described by Pliny the Younger (epist. 2, 17, 16–19):

Hinc cryptoporticus prope publici operis extenditur. Utrimque fenestrae, a mari plures, ab horto singulae sed alternis pauciores. Hae, cum serenus dies et immotus, omnes, cum hinc vel inde ventis inquietus, qua venti quiescunt, sine iniuria patent. Ante cryptoporticum xystus violis odoratus. Teporem solis infusi repercussu cryptoporticus auget, quae, ut tenet solem, sic aquilonem inhibet summovetque, quantumque caloris ante tantum retro frigoris. Similiter Africum sistit, atque ita diversissimos ventos alium alio latere frangit et finit. Haec iucunditas eius hieme, maior aestate. Nam ante meridiem xystum, post meridiem gestationis hortique proximam partem umbra sua temperat, quae, ut dies crevit decrevitve, modo brevior, modo longior hac vel illa cadit. Ipsa vero cryptoporticus tum maxime caret sole, cum ardentissimus culmini eius insistit. Ad hoc patentibus fenestris favonios accipit transmittitque nec umquam aere pigro et manente ingravescit.

»Here begins a *cryptoporticus*, nearly as large as a public one. It has windows on both sides, but more facing the sea, as there is one in each alternate bay on the garden side. It has windows on both sides, more numerous from the side of the sea, where they occur in succession, but less from the side of the garden, where (corresponding to the sea side) they occur every other one. In front of the *cryptoporticus* there is a *xystus* scented with violets. As the sun beats down, the *cryptoporticus*



Fig. 9 Villa A at Torre Annunziata, view from space 69 to the east garden towards the west, over the pool to the backdrop of trees (in front of them statue bases have been found)

increases its heat by the reflection of the sun; it not only retains the sun but also drives back the north wind; and as much as it is hot in the front side that much it is cold on the back side. In the same way it stops the southwest wind, thus breaking and restraining the various winds on each side; it is pleasant in winter but still more so in summer when the terrace is kept cool in the morning and the drive and nearer part of the garden in the afternoon, as its shadow falls shorter or longer on one side or the other while the day advances or declines. The *cryptoporticus* itself does not receive the sun to a great extent because at its highest point the sun stops at the top (*sc.*, of the *cryptoporticus*), and as its open windows allow the western breezes to enter and circulate, the atmosphere is never heavy with stale air«.

(Translation Radice 1969 [adapted])

Furthermore, by joining together the architectural members that spread out on the landscape, the colonnades

42 Zarmakoupi (forthcoming c).



Fig. 10 Villa A at Torre Annunziata, view of villa from the north. The large propylon to the right marks room 21. The large opening to the left marks room 69, whose propylon faced the east garden (not visible here)

masked the villas' façade and signified their presence in the landscape. In the Mediterranean climate, where the strong sun accentuates the volumes and features of an architectural object located in different perspectival depths by casting deep shadows, a colonnaded structure and its variations can be creatively used to embellish a façade that would strike a viewer from afar. The appreciation of the visual effect of the sun's light entering the retreating volumes created by the *porticus* and *cryptoporticus* structures is revealed in Pliny's description of his villa in Tusculum, where he speaks about the way in which the protruding *porticus*, that masked its south façade and entrance, received the sun (epist. 5, 6, 15):

*Magna sui parte meridiem spectat aestivumque solem ab hora sexta, hibernum aliquanto maturius quasi invitat, in porticum latam et prominulam*⁴³. *Multa in hac membra, atrium etiam ex more veterum.*

»It faces mainly south, and so from midday onwards in summer, a little earlier in winter, it seems to invite the sun into the wide and protruding colonnade. Many chambers (open) in this (colonnade), as well as an entrance hall of the old-fashioned type«.

(Translation Radice 1969 [adapted])

While the porticoes connected the sprawling rooms onto the landscape, the big monumental *propyla* disrupted

them and marked the presence of the dining facilities, as does the *propylon* in front of room 69 and also room 21 in Villa A at Torre Annunziata (fig. 10). In this way, the architectural design of the villas' large multi-functional spaces satisfied the owners' social staging within the villa as well as the staging of their villas in the landscape.

Whether the liberation from the austere architectural form of the peristyle garden or the sprawl of dining spaces on the landscape came first is something that we cannot know. Both architectural design decisions expressed equivalent concerns about social staging and landscape appreciation and were facets of the same architectural language. As design solutions, they are indicative of the ways in which the architectural design of luxury villas responded to the changing needs of Roman elite society. Roman designers transformed the architectural structure of the peristyle-garden to create large rooms dispersed onto the landscape that could accommodate the enlarged symposium with its accompanying entertainment. These big rooms were opened through large windows to take advantage of the views to the surrounding landscape as well as its environmental qualities, such as light and air. In this fluid architecture the colonnaded structures were, on the one hand, the connecting element, which provided access to the rooms and protected them from the weather, and on the other, monumental markers whose volumes played with the sun's light and signified and accentuated the presence of the villas in the landscape. In designing for luxury Romans created an architecture that articulated

43 Nota bene: *prominulam* and not *pro modo lungam* after the Teubner, Oxford and Budé editions of the text that follows the tradition of Codex Medicus.

a dialogue with the landscape and took advantage of the qualities of light. In doing so they formulated in space the contemporary preoccupation with landscape that literary and visual representations described.

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BIBLIOGRAPHY

- Baatz 1990
D. Baatz, Fensterglastypen, Glasfenster und Architektur, in: A. Hoffmann (ed.), Bautechnik der Antike, DiskAB 5 (Mainz 1991) 4–13
- Barbet – Miniero 1999
A. Barbet – P. Miniero (eds), La Villa San Marco a Stabia (Rome 1999)
- Bek 1980
L. Bek, Towards Paradise on Earth. Modern Space Conception in Architecture. A Creation of Renaissance Humanism, AnalRom Suppl. 9 (Odense 1980)
- Bek 1983
L. Bek, *Quaestiones convivales*. The Idea of the *Triclinium* and the Staging of Convivial Ceremony from Rome to Byzantium, AnalRom 12, 1983, 81–107
- Blanas 1990
A. Blanas, Kryptoportiken, in: W.-D. Heilmeyer – W. Hoepfner (eds), Licht und Architektur (Tübingen 1990) 115–122
- Bonifacio – Sodo 2001
G. Bonifacio – A.M. Sodo, Stabiae: guida archeologica alle ville (Castellammare di Stabia 2001)
- Bonifacio – Sodo 2002
G. Bonifacio – A.M. Sodo (eds), Stabiae: storia e architettura: 250° anniversario degli scavi di Stabiae 1749–1999: Convegno internazionale, Castellammare di Stabia, 25–27 marzo 2000 (Rome 2002)
- Bonifacio – Sodo – Ascione 2001
G. Bonifacio – A.M. Sodo – G.C. Ascione (eds), In Stabiano: cultura e archeologia da Stabiae, la città e il territorio tra l'età arcaica e l'età romana, catalogo della mostra, Castellammare di Stabia, Palazzetto del mare, 4 novembre 2000–31 gennaio 2001 (Castellammare di Stabia 2001).
- Broise 1991
H. Broise, Vitrages et rolet des fenêtres thermales à l'époque impériale, in: Les Thermes romains: actes de la table ronde organisée par l'École française de Rome, Rome, 11–12 novembre 1988, Collection de l'École Française de Rome 142 (Rome 1991) 61–78
- Cain 1985
H.-U. Cain, Römische Marmorkandelaber (Mainz 1985)
- Cain 1994
H.-U. Cain – O. Dräger, Die Marmorkandelaber, in: G. Hellenkemper Salies (ed.), Das Wrack. Der antike Schiffsfund von Mahdia (Köln 1994), 239–257
- Camardo – Ferrara 2001
D. Camardo – A. Ferrara (eds), Stabiae, dai Borbone alle ultime scoperte (Castellammare di Stabia 2001)
- Garosella 1996
A. Garosella (ed.), Libero d'Orsi. Gli scavi di Stabiae. Giornale di scavo (Rome 1996)
- Ciro Nappo 2002
S. Nappo, Villa Arianna: configurazione della villa verso il pianoro, in: G. Bonifacio – A. M. Sodo (eds), Stabiae: Storia e Architettura. 250o anniversario degli scavi di Stabiae 1749–1999. Convegno internazionale, Castellammare di Stabia, 25–27 marzo 2000 (Rome 2002) 56–63

Clarke – Thomas 2007

J. R. Clarke – M.L. Thomas, *The Oplontis Project 2005–6: Observations on the Construction History of Villa A at Torre Annunziata*, JRA 20, 2007, 223–232

Comparetti – de Petra 1972

D. Comparetti – G. de Petra, *La villa ercolanese dei Pisoni i suoi monumenti e la sua biblioteca* (Turin 1883, reprint Naples 1972)

D'Arms 1970

J. H. D'Arms, *Romans on the Bay of Naples: a Social and Cultural Study of the Villas and Their Owners from 150 B.C. to A.D. 400* (Cambridge, MA 1970)

D'Arms 1979

J. H. D'Arms, *Ville rustiche e ville d'otium*, in: F. Zevi (ed.), *Pompei 79. Raccolta di studi per il decimonono centenario dell'eruzione vesuviana* (Naples 1979) 206–40

D'Arms 1990

J. H. D'Arms, *The Roman convivium and the Idea of Equality*, in: O. Murray (ed.), *Symptica: a Symposium on the Symposion* (Oxford 1990) 308–320

De Caro 1987

S. De Caro, *The Sculptures of the Villa of Poppaea at Oplontis: a Preliminary Report*, in: W. Jashemski (ed.), *Ancient Roman Gardens, Dumbarton Oaks Colloquium on the History of Landscape 1* (Washington 1987) 79–133

De Carolis 2007

E. De Carolis, *Il mobile a Pompei ed Ercolano: letti, tavoli, sedie e armadi: contributo alla tipologia dei mobili della prima età imperiale* (Rome 2007)

de Franciscis 1975

A. de Franciscis, *La villa romana di Oplontis*, in: B. Andreae – H. Kyrieleis (eds), *Neue Forschungen in Pompeji und den anderen vom Vesuviusbruch 79 n. Chr. verschütteten Städten* (Recklinghausen 1975) 53–59

de Franciscis 1979

A. de Franciscis, *Beryllos e la villa »Di Poppea« ad Oplontis*, in: M. B. Moore – G. Köpcke (eds), *Studies in Classical Art and Archaeology. A Tribute to Peter Heinrich von Blanckenhagen* (New York 1979) 231–233

De Simone 1987

A. De Simone, *La Villa dei Papiri. Rapporto preliminare: gennaio 1986 – marzo 1987*, *CronErcol* 17, 1987, 15–36

De Simone 2002

A. De Simone, *Villa Arianna: configurazione delle strutture della basis villae*, in: G. Bonifacio – A.M. Sodo (eds), *Stabiae: Storia e Architettura. 250° anniversario degli scavi di Stabiae 1749–1999. Convegno internazionale, Castellammare di Stabia, 25–27 marzo 2000* (Rome 2002) 41–52

De Simone (forthcoming)

A. De Simone, *Rediscovering the Villa of the Papyri*, in: M. Zarmakoupi (ed.), *The Villa of the Papyri at Herculaneum. Archaeology, Reception, and Digital Reconstruction, Sozomena 1* (Berlin [forthcoming])

De Simone – Ruffo 2002

A. De Simone – F. Ruffo, *Ercolano 1996–1998. Lo scavo della Villa dei Papiri*, *CronErcol* 32, 2002, 325–344

De Simone – Ruffo 2003

A. De Simone – F. Ruffo, *Ercolano e la Villa dei Papiri alla luce dei nuovi scavi*, *CronErcol* 33, 2003, 279–311

Dell'Acqua 2004

F. Dell'Acqua, *Le finestre invetriate nell'antichità romana*, in: M. Beretta – G. Di Pasquale (eds), *Vitrum: il vetro fra arte e scienza nel mondo romano* (Florence 2004) 109–119

Dickmann 1997

J.-A. Dickmann, *The Peristyle and the Transformation of Domestic Space in Hellenistic Pompeii*, in: R. Laurence – A. Wallace-Hadriell (eds), *Domestic Space in the Roman World: Pompeii and Beyond*, JRA Supplement 22 (Portsmouth, RI 1997) 121–136

Dickmann 1999

J.-A. Dickmann, *Domus frequentata. Anspruchsvolles Wohnen im pompejanischen Stadthaus* (Munich 1999)

Dunbabin 1991

K. M. D. Dunbabin, *Triclinium and stibadium*, in: W. J. Slater (ed.), *Dining in a Classical Context* (Ann Arbor 1991) 121–148

Dunbabin 1996

K. M. D. Dunbabin, *Convivial Spaces: Dining and Entertainment in the Roman Villa*, JRA 9, 1996, 66–80

Dunbabin 1998

K. M. D. Dunbabin, *Ut Graeco more biberetur: Greeks and Roman on the Dining Couch*, in: I. Nielsen – H. S. Nielsen (eds), *Meals in a Social Context: Aspects of the Communal Meal in the Hellenistic and Roman World* (Aarhus 1998) 81–101

Esposito 2007

D. Esposito, *Pompei, Silla e la Villa dei Misteri*, in: B. Perrier, *Villas, maisons, sanctuaires et tombeaux tardo-républicains. Découvertes et relectures récentes. Actes du colloque international de Saint-Romain-en-Gal en l'honneur d'Anna Gallina Zevi*, Vienne, Saint-Romain-en-Gal, 8–10 février 2007 (Rome 2007) 441–465

Fergola 1998

L. Fergola – M. Pagano, *Oplontis: le splendide ville romane di Torre Annunziata. Itinerario archeologico ragionato* (Torre del Greco 1998)

Fergola 2001

L. Fergola, *Oplontis e le sue ville* (Pompei 2004)

Fittschen 1976

K. Fittschen, *Zur Herkunft und Entstehung des 2. Stils – Probleme und Argumente*, in: P. Zanker (ed.), *Hellenismus in Mittelitalien, Kolloquium in Göttingen vom 5. bis 9. Juni 1974, II* (Göttingen 1976) 539–563

Förtsch 1993

R. Förtsch, *Archäologischer Kommentar zu den Villenbriefen des jüngeren Plinius* (Mainz 1993)

Frazer 1998

A. Frazer (ed.), *The Roman Villa: Villa Urbana*, University Museum Monograph 101 (Philadelphia 1998)

Granger 1934

F. Granger (ed.), *Vitruvius. On Architecture, II. Books 6–10* (London 1934)

Griffin 1976

J. Griffin, *Augustan Poetry and the Life of Luxury*, JRS 66, 1976, 87–105

Grose 1977

D. F. Grose, *Early Blown Glass: The Western Evidence*, JGS 19, 1977, 9–29

- Guidobaldi – Esposito (forthcoming)
M. P. Guidobaldi – D. Esposito, *New Archeological Research at the Villa of the Papyri in Herculaneum*, in: M. Zarmakoupi (ed.), *The Villa of the Papyri at Herculaneum. Archaeology, reception, and digital reconstruction*, *Sozomena 1* (Berlin [forthcoming])
- Guzzo – Fergola 2000
P. G. Guzzo – L. Fergola, *Oplontis. La Villa di Poppea* (Milan 2000)
- Günter 1968
R. Günter, *Wand, Fenster und Licht in der Trierer Palastaula und in spätantiken Bauten* (Herford 1968)
- Hall – Wyles 2008
E. Hall – R. Wyles (eds), *New Directions in Ancient Pantomime* (Oxford 2008)
- Hoffer 1999
S. E. Hoffer, *The Anxieties of Pliny, the Younger*, *American Classical Studies 43* (Atlanta 1999)
- IBM Gallery of Science and Art 1990
IBM Gallery of Science and Art (ed.), *Rediscovering Pompeii, Exhibition on New York 12 July–15 September 1990* (Rome 1990)
- Jones 1991
C. P. Jones, *Dinner Theater*, in: W. J. Slater (ed.), *Dining in a Classical Context* (Ann Arbor 1991) 185–198
- Kisa 1908
A. C. Kisa, *Das Glas im Altertume* (Leipzig 1908)
- Lafon 2001
X. Lafon, *Villa maritima. Recherches sur les villas littorales de l'Italie romaine (IIIe siècle av. J.-C. / IIIe siècle ap. J.-C.)* (Rome 2001)
- Leach 1997
E.W. Leach, *Oecus on Ibycus: Investigating the Vocabulary of the Roman House*, in: S. E. Bon – R. Jones (eds), *Sequence and Space in Pompeii* (Oxford 1997) 50–72
- Maiuri 1958
A. Maiuri, *Ercolano. I nuovi scavi (1927–1958)* (Rome 1958)
- Marzano 2007
A. Marzano, *Roman Villas in Central Italy: a Social and Economic History*, *Columbia Studies in the Classical Tradition 30* (Leiden 2007)
- Mattusch 1996
C. C. Mattusch, *Classical Bronzes: The Art and Craft of Greek and Roman Statuary* (Ithaca 1996)
- Mattusch 2005
C. C. Mattusch, *The Villa dei Papiri at Herculaneum: Life and Afterlife of a Sculpture Collection* (Los Angeles 2005)
- Mattusch 2008
C. C. Mattusch (ed.), *Pompeii and the Roman Villa: Art and Culture Around the Bay of Naples*, *Exhibition catalogue*, National Gallery of Art, Washington D.C. (London 2008)
- McEwen 1995
I. K. McEwen, *Housing Fame. In the Tuscan Villa of Pliny the Younger*, *Res 27*, 1995, 11–24
- McEwen 2003
I. K. McEwen, *Vitruvius. Writing the Body of Architecture* (Cambridge, MA 2003)
- Mielsch 1987
H. Mielsch, *Die römische Villa. Architektur und Lebensform* (Munich 1987).
- Mols 1999
S. T. Mols, *Wooden Furniture in Herculaneum. Form, Technique and Function* (Amsterdam 1999)
- Newlands 2002
C. E. Newlands, *Statius' Silvae and the poetics of Empire* (Cambridge 2002)
- Pavlovskis 1973
Z. Pavlovskis, *Man in an Artificial Landscape: the Marvels of Civilization in Imperial Roman Literature*, *Mnemosyne Suppl. 25* (Leiden 1973)
- Pesando 2002
F. Pesando, *House of Julius Polybius*, in: F. Coarelli (ed.), *Pompeii* (New York 2002) 262–267
- Pesce 2004
A. Pesce (ed.), *In Stabiano. Exploring the Ancient Seaside Villas of the Roman Elite* (Naples 2004)
- Peters 1963
W. J. T. Peters, *Landscape in Romano-Campanian mural painting* (Assen 1963)
- Pisapia 1989
M. S. Pisapia, *Mosaici antichi in Italia. Regione prima, Stabiae* (Rome 1989)
- Platz-Horster 1979
G. Platz-Horster, *Zu Erfindung und Verbreitung der Glasmacherpfeife*, *JGS 21*, 1979, 27–31
- Radice 1969
B. Radice (ed.), *Pliny the Younger, Letters* (London 1969)
- Rakob 1964
F. Rakob, *Ein Grottentriklinium in Pompeji*, *RM 71*, 1964, 182–194
- Rakob 1976
F. Rakob, *Hellenismus in Mittelitalien. Bautypen und Bautechnik*, in: P. Zanker (ed.), *Hellenismus in Mittelitalien, Kolloquium in Göttingen vom 5. bis 9. Juni 1974*, II (Göttingen 1976) 366–386
- Ratzka 1990
T. Ratzka, *Atrium und Licht*, in: W.-D. Heilmeyer – W. Hoepfner (eds), *Licht und Architektur* (Tübingen 1990) 95–106
- Riggsby 2003
A. M. Riggsby, *Pliny in Space (and Time)*, in: R. Morello – R. K. Gibson (eds), *Re-Imagining Pliny the Younger*, *Arethusa 36*, 2003, 167–186
- Romizzi 2001
L. Romizzi, *Ville d'otium dell'Italia antica (II sec. a.C.–I sec. d.C.)* (Perugia 2001)
- Rossiter 1991
J. Rossiter, *Convivium and Villa in Late Antiquity*, in: W. J. Slater (ed.), *Dining in a Classical Context* (Ann Arbor 1991) 199–214
- Rowland – Howe 1999
I. D. Rowland – T. N. Howe, *Vitruvius: Ten Books on Architecture* (New York 1999)

Russo 2001

A. Russo, ›Ostia‹ Pompeiana: una proposta di classificazione, ricomposizione e valorizzazione (Diss. University of Florence, Faculty of Architecture, Florence 2001)

Sauron 2000

G. Sauron, *L'histoire végétalisée: ornement et politique à Rome* (Paris 2000)

Seidel 2009

Y. Seidel, *Künstliches Licht im individuellen, familiären und öffentlichen Lebensbereich*, electronic catalogue in CD-ROM (Vienna 2009)

Seiler 1992

F. Seiler, *Häuser in Pompeji, 5. Casa degli amorini dorati (VI.16.7.38)* (Munich 1992)

Settis – Donati 2002

S. Settis – F. Donati, *Le pareti ingannevoli: la Villa di Livia e la pittura di giardino* (Milan 2002)

Slater 1993

W.J. Slater, *Three problems in the history of drama*, *Phoenix* 47, 1993, 189–212

Slater 1994

W.J. Slater, *Pantomime Riots*, *CIAnt* 13, 1994, 120–144

Sogliano 1907

A. Sogliano, *Campania. VI. Pompei – Relazione degli scari fatti dal dicembre 1902 tutto marzo 1905*. *NSc* 1907, 549–593

Sorano 1950

P. Soprano, *I triclini all'aperto di Pompei*, in: A. Maiuri (ed.), *Pompeiana. Raccolta di studi per il secondo centenario degli scavi di Pompei* (Naples 1950) 288–310

Sperl 1990

D. Sperl, *Glass und Licht in Architektur und Kunst*, in: W.-D. Heilmeyer – W. Hoepfner (eds), *Licht und Architektur* (Tübingen 1990) 61–71

Stein-Hölkeskamp 2005

E. Stein-Hölkeskamp, *Das römische Gastmahl. Eine Kulturgeschichte* (Munich 2005)

Stewart 1977

A.F. Stewart, *To entertain an emperor: Sperlonga, Laokoon and Tiberius at the Dinner-table*, *JRS* 67, 1977, 76–90

Tombrägel (forthcoming)

M. Tombrägel, *Überlegungen zum Luxus in der hellenistischen Wohnarchitektur. Das Bild der römischen Otiumvillen*, in: S. Ladstätter – V. Scheibelreiter, *Städtisches Wohnen im östlichen Mittelmeerraum. 4. Jh. v.–1. Jh. n. Chr., Akten des Kolloquiums vom 24.–27. Okt. 2007* (Vienna [forthcoming])

Wallace-Hadrill 1990

A. Wallace-Hadrill, *The Social Spread of Roman Luxury: Sampling Pompeii and Herculaneum*, *BSR* 58, 1990, 145–192

Wallace-Hadrill 1994

A. Wallace-Hadrill, *Houses and Society in Pompeii and Herculaneum* (Princeton 1994)

Wallace-Hadrill 1997

A. Wallace-Hadrill, *Rethinking the Roman Atrium House*, in: R. Laurence – A. Wallace-Hadrill (eds), *Domestic Space in the Roman World: Pompeii and Beyond*, *JRA Suppl.* 22 (Portsmouth, RI 1997) 219–240

Wallace-Hadrill 2008

A. Wallace-Hadrill, *Rome's Cultural Revolution* (Cambridge 2008)

Wojcik 1986

M. R. Wojcik, *La Villa dei Papiri ad Ercolano: Contributo alla ricostruzione dell'ideologia della nobilitas tardorepubblicana* (Rome 1986)

Zanker 1987

P. Zanker, *The Power of Images in the Age of Augustus* (Ann Arbor 1990). English translation of: P. Zanker, *Augustus und die Macht der Bilder* (Munich 1987)

Zanker 1998

P. Zanker, *Pompeii. Public and Private Life* (Cambridge 1998)

Zanker 2002

P. Zanker, *Domitian's Palace on the Palatine and the Imperial Image*, in: A. K. Bowman (ed.), *Representations of Empire: Rome and the Mediterranean World* (Oxford 2002) 105–130

Zarmakoupi 2007

M. Zarmakoupi, *Villae exolitae: Aspects of the Architecture and Culture of Roman Country Houses on the Bay of Naples (c. 100 BCE–79 CE)*, 2 vols. (Diss. University of Oxford 2007)

Zarmakoupi (forthcoming a)

M. Zarmakoupi (ed.), *The Villa of the Papyri at Herculaneum. Archaeology, Reception, and Digital Reconstruction*, *Sozomena* 1 (Berlin [forthcoming])

Zarmakoupi (forthcoming b)

M. Zarmakoupi, *The architectural design of the peristylum-garden in early Roman luxury villas*, in: S. Ladstätter – V. Scheibelreiter, *Städtisches Wohnen im östlichen Mittelmeerraum. 4. Jh. v.–1. Jh. n. Chr. Akten des Kolloquiums von 24.–27. 10. 2007* (Vienna [forthcoming])

Zarmakoupi (forthcoming c)

M. Zarmakoupi, *Porticus and cryptoporticus in Roman luxury villas: architectural design and cultural implications*, in: K. Cole – E. Poehler – M. Flohr (eds), *Pompeii: Cultural Standards, Practical Needs* (Oxford [forthcoming])

ILLUSTRATION CREDITS

Fig. 1: after Wojcik 1986, pl. 1. – Fig. 2: Förtsch 1993, pl. 69, 4. – Fig. 3: Barbet 2002, p. 32 fig. 1. – Fig. 4: after Pisapia 1989, p. 37 fig. 10. – Fig. 5–10: author (all the images taken from the villas are taken by the author and are published by courtesy of the Ministero per i Beni e le Attività Culturali and the Soprintendenza Speciale per i Beni Archeologici di Napoli e Pompei).



Licht ist ein ebenso grundlegendes wie symbolisch aufgeladenes Phänomen der sinnlich erfahrbaren Welt – es ist die Voraussetzung für jede visuelle Wahrnehmung, es beeinflusst das subjektive Empfinden und vermag so auch starke emotionale Wirkungen hervorzurufen. In vielen Kulturen ist es deswegen mit metaphorischen und symbolischen Konnotationen verbunden. Auch in der Architektur ist Licht die Grundvoraussetzung jeder visuell räumlichen Erfahrung: Es ermöglicht Orientierung, kann die Funktionalität bestimmen, die Raumwahrnehmung nachhaltig prägen und als Energieträger das Raumklima erheblich beeinflussen. Mit Hilfe von Licht und Schatten werden Körper im Raum, seien es gebaute Räume, Stadträume oder Landschaftsräume, strukturiert und in ihrer Plastizität moduliert.

Obwohl jede räumliche Gestaltung unausweichlich von dem Medium Licht beeinflusst wird und entsprechende Berücksichtigung bei der Planung erfahren muss, ist dem Licht als Element der Gestaltung in der vor-modernen Architektur bislang wenig Beachtung von seiten der historischen Bauforschung geschenkt worden.

Im Band 10 der Diskussionen zur Archäologischen Bauforschung wird anhand von 30 Beiträgen versucht, einen Beitrag zur Schließung dieser Forschungslücke zu leisten. Es wird der Einsatz von Licht zur Gestaltung von Architektur und zur bewussten Inszenierung von räumlichen Effekten facettenreich diskutiert. Das zeitliche Spektrum reicht dabei von der Prähistorie bis in die Romantik mit einem Schwerpunkt in der Antike. Es werden Beleuchtungskonzepte unterschiedlicher Kulturen nicht nur für den Sakral- und den Hausbau, sondern auch für Höhlen und einfache Werkstätten vorgestellt. Der breite zeitliche und inhaltliche Bogen ermöglicht es dabei auch, Fragen nach Kontinuitäten und Brüchen zwischen den verschiedenen Epochen hinsichtlich des Umgangs mit Beleuchtung und Licht nachzugehen.