Perspective Systems in Roman Second Style Wall Painting

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Abstract

There is still much to be learned about architectural perspective from the study of Roman wall paintings dating to the first century B.C.E. This article demonstrates that Second Style wall paintings of houses and villas in Rome and Campania hold evidence for different types of perspective: convergence perspective and parallel perspective. A special variation involves multiple systems of convergence perspective. Analyses of these different perspective systems and reconstructions of painters' methodologies demonstrate the sensitivity and adaptability of wall painters to the physical and social parameters of Roman domestic space. The use of different perspective systems reflects the role of painters in crafting the complex form of perspective found in Second Style wall painting. While being adjustable to many variables, the type of perspective found in the Second Style offered viewers impressions of perspectival convergence, a visual function analogous to contemporary applications of perspective in other media, such as architects' drawings and theater scenery painting.*

INTRODUCTION

Architectural perspective in Roman Second Style[1] wall painting is often studied in Roman art history.[2] This article presents new research on the different kinds of perspective found on Roman walls. It takes significant steps toward understanding the practice of perspective in Second Style wall painting, the principles underlying the practice, and the general cultural context for the practice. It also places the uses of perspec-tive within a broader historical context. Examples from Campania and Rome are presented with emphasis on the Villa of Oplontis, the murals of which hold the most complex displays of architectural perspective known from antiquity. (Table 1 offers a wide spectrum of corroborating evidence for these different kinds of perspective.) My methodology uses digital technologies to understand the elaborate underlying compositions in wall paintings and to identify two different main types of perspective: convergence and parallel. A distinctive variation on the former involved the coordination of multiple systems of convergence perspective. Furthermore, wall painters in Campania and Rome in the first century B.C.E. used a flexible and adaptable form of perspective. Their working methods, which provide a vital body of evidence, are reconstructed with special attention given to the physical and social parameters of Roman domestic space.

Although it is still a contentious issue, many scholars today believe that knowledge of scientific one-point perspective did not exist in antiquity.[3] I leave the question open for debate. The term "vanishing point," however, is not used in this study for descriptions of orthogonal convergence because it has imprecise meaning for the kinds of perspective found in Roman wall painting. Scholarship on this subject has enjoyed a long tradition of comparisons with the modern archetypal one-point form of perspective. Called variously linear, scientific one-point, mathematical,

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[1] Roman Second Style (or Architectural Style) wall painting is generally known, in comparison with earlier and later developments in wall decoration, for its architectural imagery. Its chronological range traditionally starts ca. 100 B.C.E. and ends ca. 20 B.C.E. Strocka (*EAA* Suppl. 2, s.v. "Pompeiani, Stili" [esp. 4:418–19]; 2007, 308–11) proposed moving the traditional dating sequence for the Second Style back 10–20 years. This study uses Strocka's adjusted chronology but also cites the earlier dating as summarized by Ling (1991, 23–51). For discussion, see Tybout 2001, 55–6.

[2] For major assessments in chronological order, see Panofsky 1927, 1997 (English trans.); Little 1936, 1937; Richter 1937; Kern 1938; Beyen 1939; Bunim 1940; Rumpf 1947; Lehmann 1953; White 1956; Gioseffi 1957; Schnyder 1962; Gioseffi 1966; Engemann 1967; White 1967; Wesenberg 1968; Richter 1970; Little 1971; Borbein 1975; Gigante 1980; Rouveret 1989, 65–127; Tybout 1989a; Mikocki 1990; Ehrhardt 1991; Knorr 1991; Lephas 1998; Camerota 1999; Christensen 1999; Gros 2008.

[3] See Gros 2008, 17.

Table 1. Perspective Systems in Roman Second Style Wall Paintings.

Location of Wall Paintings	Convergence Perspective	Parallel Perspective
House of the Griffins, Rome, 100–90 B.C.E.		
Room 2		
Back wall (south)	x	x[a]
Left wall (east)	x	x[a]
Right wall (west)	x	x[a]
Antechamber, left wall (east)	x	x
Villa of the Mysteries, Pompeii, after 80 B.C.E.		
Room 6		
Back wall (north)	x	x
Left wall (west)	x	x
Right wall (east)	x	x
Antechamber, left wall (west)	–	x
Antechamber, right wall (east)	–	x
Antechamber, front wall (south)	–	x
Room 8		
Alcove A, back wall (north)	x	–
Alcove B, back wall (west)	x	x[a]
Alcove B, left side wall (south)	x	–
Alcove B, right side wall (north)	x	–
Antechamber, right wall (east)	–	–
Room 16		
Alcove A, back wall (east)	x	x
Alcove A, left side wall (north)	x	x
Alcove A, right side wall (south)	x	x
Alcove B, back wall (south)	x	x
Alcove B, right wall (west)	x	x
Antechamber, right wall (west)	–	x
Villa A, Oplontis, 60–50 B.C.E.		
Room 14		
Back wall (north)	x	x
Left wall (west)	x[b]	x
Right wall (east)	x[b]	x
Antechamber, left wall (west)	–	x
Antechamber, right wall (east)	–	–
Antechamber, front wall (south)	–	–

Table 1 (continued).

Location of Wall Paintings	Convergence Perspective	Parallel Perspective
Villa A, Oplontis, 60–50 B.C.E.		
Room 15		
Right wall (east)	x	x
Room 23		
Back wall (west)	x[b]	x
Left wall (south)	x	x
Right wall (north)	x	x
Villa of Publius Fannius Synistor, Boscoreale, 60 B.C.E.		
Room M[c]		
Forepart, left wall	x	x
Forepart, right wall	x	x
Alcove, back wall	x	x
Alcove, left wall	x	x
Alcove, right wall	x	x
House of Augustus, Rome, 30 B.C.E.		
Room 5 (Room of the Masks)		
Back wall (south)	x	x
Left wall (east)	x	x
Right wall (west)	x	x
Front wall (north)	x	x

[a] There is a possibility that convergence perspective was used in the lower parts of the wall painting as well.
[b] Multiple systems of convergence perspective
[c] Paintings are held in the Metropolitan Museum of Art, New York.

geometrical, or "rational" perspective, the modern form is a product of the 16th and 17th centuries.[4] While these comparisons are unavoidable, making such comparisons has arguably slowed our understanding of ancient perspective in Roman wall painting. I use the term "perspective" here to refer to two nonscientific types of architectural perspective—convergence and parallel—which are both found in Second Style wall paintings. These are modern terms. Convergence perspective in Second Style wall painting only superficially resembles one-point perspective. I argue below that the word "convergence" is appropriate, because it was the visual experience of perspectival convergence that

painters imparted to Roman viewers, not the abstract notion of infinity that the vanishing point in scientific one-point perspective signifies. A second type of perspective found in Roman Second Style wall painting, parallel perspective, involves parallel orthogonals, or "parallelisms," but no convergence occurs, even if the intention of the painter was to give the general impression of convergence. Convergence and parallel perspective are sometimes conflated in studies of ancient perspective. Although they are often coordinated in wall paintings, it is important to keep in mind that each system of perspective served a different purpose. A rare and interesting variation on the convergence

[4] Elkins 1994.

type of perspective involved the use of multiple convergence systems, and examples from Oplontis are discussed below.

PREVIOUS SCHOLARSHIP

The conventional views on ancient perspective developed in the 19th and early 20th centuries, especially in the work of two pioneers, Panofsky and Beyen, who were at the center of a fierce debate on the subject. Controversy arose when Panofsky, in his seminal essay, "Perspective as Symbolic Form," questioned the accepted 19th- and early 20th-century translations of two passages from Vitruvius (*De arch.* 1.2.2; 7, pref. 11), which by and large assumed knowledge of geometrically unified, one-point perspective.[5] Panofsky argued that extant spatial representation in ancient Greek vase painting and, later, Roman wall painting suffered from the artists' inability to portray the foreshortening of objects in a constant state of distortion, as scientific one-point perspective does, at least in theory.[6] A heated dialogue ensued that focused primarily on the key phrases in the passages from Vitruvius, with some in favor of an ancient "perfect perspective," and some not.[7]

Vitruvius

The ancient terms most associated with perspective are σκηνογραφία and *scaenographia*,[8] and Vitruvius is our primary written source for them. He refers to *scaenographia* as a method used by Roman architects for drawing buildings, along with two other forms of drawing: *ichnographia*, the plan, and *orthographia*, the elevation:[9]

Item scaenographia est frontis et laterum abscedentium adumbratio ad circinique centrum omnium linearum responsus.

As for *scaenographia*, it is the shaded rendering of the front and the receding sides, and the convergence of all lines to the center of a circle.

One traditional interpretation of the text finds the center of a vanishing point construction in *ad circinique centrum*, but this view is usually considered erroneous today.[10] Others have suggested that Vitruvius means that the converging orthogonals of a perspective drawing or painting are analogous to the rays of vision that meet at the apex of the visual cone as defined by Euclid and observed by Lucretius.[11] In another, equally debated passage, Vitruvius mentions something resembling perspective that was invented for representing architecture in painted scenery for the Greek theater of the fifth century B.C.E., which is likely to be the technique *skenographia*. This is widely held to have developed as a branch of the science of optics, but the evidence is limited:[12]

For in the beginning in Athens, when Aeschylus was presenting a tragedy, Agatharcus set the stage, and left a commentary upon the matter. Instructed by this, Democritus and Anaxagoras wrote about the same thing, how it was necessary that, a fixed center being established, the lines correspond by natural law to the sight of the eyes and the extension of the rays, so that from an uncertain object certain images may render the appearance of buildings in the paintings of the stages, and things which are drawn upon vertical and plane surfaces may seem in one case to be receding, and in another to be projecting.[13]

Scaenographia is related to *skenographia* at least in name if not in theory and practice. Vitruvius (*De arch.* 7.5.2) links both these traditions, Roman architectural drawing and Greek scenery painting, to a third medium, Roman wall painting, when he states that stage scenery, *scaenarum frontes*, is appropriate for the painted decorations of certain rooms in houses. Apart from the many difficulties of interpretation, only examples from one of these three media thought today to have involved perspective—Roman wall painting—survive.[14]

Beyen

Beyen was the first to couple literary sources with involved analyses of Roman Second Style wall paint-

[5] Panofsky 1997, 38–9; see also Panofsky 1960, 121–23. For earlier assessments of ancient perspective in the 19th and early 20th centuries, see Richter 1937, 382 n. 1; Bunim 1940, 23 n. 35; Panofsky 1997, 100–5 nn. 19–23.

[6] Panofsky 1997, 41, 43.

[7] Little 1937, esp. 488; Richter 1937, esp. 382–83; Kern 1938. Bunim (1940, 23–7) summarizes the ongoing debate.

[8] *Skiagraphia*, or "shadow painting," is also sometimes associated with perspective; see Pollitt 1974, 247–54; Keuls 1978, 72–87, esp. 74; Rouveret 1989, 13–63, 117–27.

[9] Vitr. *De arch.* 1.2.2. Translation by the author (similar to most recent translations); cf. Morgan 1960, 14; White 1967, 251; Ehrhardt 1991, 31; Corso and Romano 1997, 27; Row-

land 1999, 25; Schofield 2009, 14.

[10] Gros 2008, 17.

[11] Euc. *Optica* theorem 2; Lucr. *De rerum natura* 4.426–31.

[12] Pollitt (1974, 245–47) summarizes the possible connections to optics; see also Gros 2008, 6–9.

[13] Vitr. *De arch.* 7, pref. 11. Translation by White 1967, 251. For discussions demonstrating the range of interpretations for both passages from Vitruvius, see Richter 1937, 382–83; 1970, 384; White 1967, 253; Pollitt 1974, 240–47; Bek 1980, 166–67; Gigante 1980, 1–52; Panofsky 1997, 38. In recent years, these passages have been most thoroughly examined by Rouveret 1989, 65–127; Tybout 1989b; Gros 2008, 11–12.

[14] Greek red-figure vase painting of the fifth century B.C.E.

ings in his study of the ancient understanding of perspective.[15] His research focused on the then recently discovered Second Style wall paintings from the Villa of the Mysteries.[16] He proposed that Greek scenographers once practiced a mathematically rigorous form of perspective and that the methods of perspective found in Second Style wall painting were attempts on the part of mere "dekorateurs" to imitate techniques of Greek origin.[17] Thus, he argued, we possess in the Second Style an imperfect reflection of the true perspective once practiced by Greek painters.[18] Despite this conclusion, Beyen went on to suggest that some wall paintings in the Villa of the Mysteries showed a theoretical and practical knowledge of geometrically unified perspective, even if it was botched by the Pompeian painters.[19] Although Beyen's conclusions were controversial, his basic observations of the structural characteristics found in Second Style wall paintings established the groundwork for many subsequent studies, including this one.[20]

Introduction of Social Factors

In the second half of the 20th century, interest in the subject of ancient perspective waned, while scholarship on Roman art in general began to take cultural context into account.[21] For analyses of Roman wall painting, this meant that scholars paid more attention to the social functions of the Roman house and how those functions affected decoration. A significant advance in perspective studies in the postwar period was made in the early 1950s by Lehmann, who criticized the frequent assumption that scientific one-point perspective was the only correct method for conveying

spatial impressions on a two-dimensional surface. She argued it was not that Roman wall painters wished to create mathematically based perspective but could not achieve it; rather, their interests and aims were different, which resulted in the formation of a set of pictorial conventions that might seem alien to modern viewers.[22] Gioseffi contributed to the new discourse with his observation that Roman wall painters had the problem of organizing a series of prospects on a single wall and that the architectonic frame of the room may have factored into the process of constructing a perspective vista.[23] In 1959, Drerup, in his seminal essay, "Bildraum und Realraum in der römischen Architektur," grounded the architectural configuration of the Roman house in a social context that also had repercussions for studies on perspective.[24] Engemann, agreeing with Lehmann, conjectured that some features of Roman perspectival wall painting that seem foreign to modern viewers were not mistakes but were intentional artistic choices. Engemann, followed by Wesenberg and others and building on Drerup's ideas, coined the phrase "asymmetrical perspective" to describe the way some Second Style paintings wrap around the inside corners of rooms; he suggested a conscious coordination of perspective ensembles to orient views of observers and dining participants toward one direction or another.[25] Strikingly, the discoveries of many perspectival Second Style wall paintings in Italy in the 1960s and 1970s, notably in the so-called House of Augustus in Rome and in Villa A of Oplontis at Torre Annunziata, have neither revived the 1930s debate on perspective nor inspired significantly different approaches. Refinements to the interpretations of

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holds examples of parallel perspective and perhaps convergence perspective, too, but the evidence for the latter is unclear, and conclusions must be conjectural. For discussion, see Bunim 1940, 20–9; White 1967, 241–49; Richter 1970, 21–48; Christensen 1999.

[15] Beyen 1939; see also Beyen 1938, 157–63.

[16] First published in Maiuri 1931, 188–91.

[17] Beyen (1938, 1939, 1957, 1964) also felt that the architectural imagery found in Second Style wall paintings was derived from actual theatrical stage scenery, which has not been met with total approval. Engemann (1967, 76–9) instead proposed that contemporary architecture was the primary inspiration. Later, scholars such as Tybout (1989a) proposed broad Hellenistic architectural origins (reviewed in Kuttner 1993). There is no consensus today; for recent views, see McKenzie 2007, 105–12 (reviewed by Haselberger 2008, 710–11). I agree with Strocka (2007, 308), who states that early Second Style wall painting benefited from theatrical painting, which had used perspectival imagery for generations beforehand (both in Greece and Rome [see below]), and Wallace-Hadrill (1994, 27), who states that, although explicit references to the

stage exist in Roman wall painting, on the whole there is a "rich world of public architecture evoked."

[18] See also White 1967, 260–61; Little 1971, 8–9.

[19] Beyen 1939, col. 56.

[20] See Engemann (1967, 74–9) for criticism of Beyen's observations and ideas.

[21] Elkins (1994, 217–61) describes the "fossilization" of perspective in the 20th century.

[22] Lehmann 1953, 146–52, esp. 149. For a response, see Richter 1955, 85 n. 58.

[23] Gioseffi 1957, 43–4; see White (1956, 1967) and Gioseffi (1966) for the state of scholarship in the mid 20th century.

[24] Drerup 1959.

[25] Engemann 1967, esp. 64 n. 280, 78; see also Wesenberg (1968) for elaboration on "asymmetrical perspective." For further development of Drerup's ideas, see Scagliarini Corlàita 1974–1976; Bek 1980; Jung 1984; Clarke 1991, 12–19, 43–5; Ling 1991, 23–4. For the role of Roman wall painting in society in general, see Wallace-Hadrill 1994, esp. chs. 1–3; Leach 2004.

the literary evidence for ancient perspective have been
made recently by Tybout and Gros.[26]

CHARACTERISTICS OF PERSPECTIVE IN SECOND STYLE WALL PAINTINGS

The following discussion rebuilds the characteristics
of perspective in Second Style wall painting from the
ground up. I identify different perspective systems in
a group of Second Style wall paintings selected from
the Villa of the Mysteries at Pompeii, Villa A of Op-
lontis, and the House of Augustus in Rome. These
wall paintings hold the most significant evidence from
ancient art for knowledge of perspective in classical
antiquity, including the most complex example known
anywhere at Oplontis. Comparanda are included in
table 1. Building on previous research, especially that
of Engemann, this section and the following one dem-
onstrate that some characteristics of perspective are
responses to practical and artistic challenges faced by
painters working in Roman houses, while others open
a window onto the guiding principles of perspective
not possible to understand from analysis of literary
evidence alone.

Alcoves A and B, Room 16, Villa of the Mysteries, Pompeii

The back wall of Alcove A in Room 16 of the Villa
of the Mysteries, decorated after 80 B.C.E., is gener-
ally considered to be one of the archetypal examples
of perspective in Second Style wall painting (figs. 1,
2).[27] Since Beyen and later Engemann, however, the
clear and sophisticated formal organization of this
wall painting has been largely overlooked. The up-
per and lower parts of the back wall of Alcove A make
use of differing perspectival constructions organized
symmetrically along a vertical axis (fig. 3, left).[28] The
upper part of the arcuated Corinthian colonnade and
the coffered ceiling above are regulated by a group of
many tightly converging lines—the orthogonals. The
wooden coffers depicted inside the vaults recede, al-
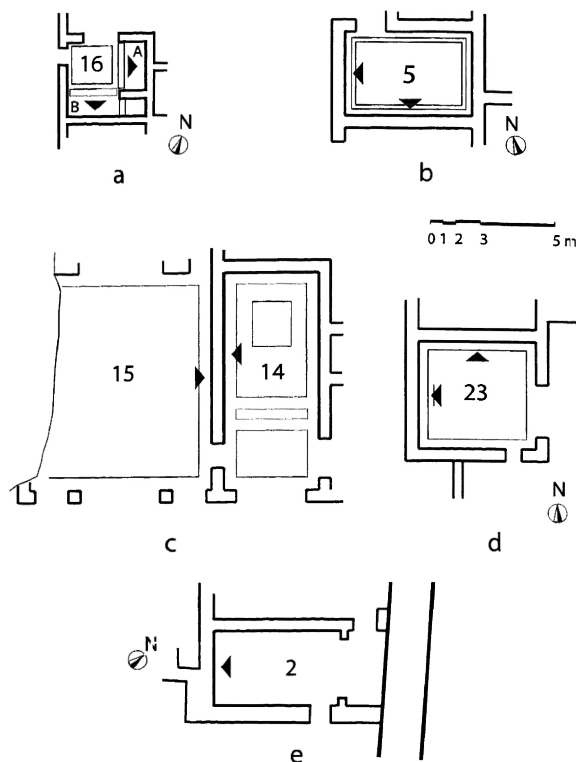luding to real spatial relationships; those at the front

Fig. 1. Plans showing locations of wall paintings discussed
in this article: *a*, Room 16, Villa of the Mysteries, Pompeii;
b, Room 5 (Room of the Masks), House of Augustus, Rome;
c, Rooms 14 and 15, Villa of Oplontis; *d*, Room 23, Villa of
Oplontis; *e*, Room 2, House of the Griffins, Rome.

of the left and right vaults disappear "behind" the arcu-
ated architrave (see fig. 3, left). Since Beyen, scholars
have noted the great care taken in the construction
of the converging orthogonals in the upper zone, but
they have also observed that not all the orthogonals in
the upper part of this wall painting converge precisely
on a single point. Using digital methods, the paths of
the orthogonals can be more accurately documented
than was previously possible.[29] The results reveal it is

[26] For refinements to the interpretations of the literary evi-
dence, see Tybout 1989b; Gros 2008. The terms "linear per-
spective" and "vanishing point" frequently appear today in
handbooks on Roman art without clarification. It is also in-
teresting that although the 1990s is widely considered to be
a turning-point period for Roman wall-painting studies (cf.
comments by Elsner 2004), perspective played no substantial
role in groundbreaking scholarship.

[27] The architectural perspective of Alcove A was discussed
first in Beyen (1939, cols. 48–55) and subsequently by White
1956, 64–5; 1967, 259–60; Gioseffi 1957, 43–7; Engemann
1967, 68–73; Ehrhardt 1991, 37–42.

[28] Fig. 3 (left) is not intended to "restore" orthogonals or to

imply any sense of "ideal" perspective. In this study, I have at-
tempted to map the actual trajectories and patterns of orthog-
onals visible in the final painted outcome by overlaying lines
in digital composite photographs, with the understanding
that the underdrawing may have been different. I would ar-
gue that the orthogonals in this painting have been "restored"
to a precise point in previous studies (Beyen 1939, fig. 6; Enge-
mann 1967, pl. 19). For discussion of the long tradition of
drawing lines on photographs of perspectival paintings, see
Elkins 1994, 217–61.

[29] The photographic elevations of walls used in this ar-
ticle are rectified digital photographs created using image-
processing and computer-aided-design software, which was

Fig. 2. Computer model of Room 16 in the Villa of the Mysteries, Pompeii, showing actual state of wall paintings with restored ceilings and lighting conditions: *left*, Alcove A; *right*, Alcove B (courtesy UCLA Cultural VR Lab; © Regents of the University of California 1999; all rights reserved).

more correct to state that all orthogonals converge within a small area that corresponds to the size of a fist or slightly larger and not on a single point (see fig. 3, left). Earlier scholars have attributed the fact that there is an "area" of convergence rather than a single point to mistakes made by the painters. I argue instead that it reveals significant information about the working methods of the wall painters.

The lower area of this painting differs markedly from the upper area. First of all, the lower area representing a socle with pedestals is rendered less three-dimensionally (see fig. 3, left). Importantly, the lower zone also contains no applications of convergence perspective and instead consists solely of parallel orthogonals. As one might expect, minor details such as the small consoles on the ashlar wall "behind" the three projecting columns are depicted using parallel

perspective. Simple layering of planes also occurs. The Corinthian columns are superimposed over a polychromatic ashlar screen-wall.[30] Finally, there are also piers in the alcove's corners, which appear to rise from the floor of the room to support the ceiling (see figs. 2; 3, left). The general effect of the coordination of different upper and lower perspective systems in the Alcove A painting is a bit like looking through a window. The lower part, which is closer and more tangible, is less three-dimensional, while the upper part is farther away; the latter opens onto greater distances and thus is rendered with more depth. Alcove A illustrates well the different types of architectural perspective commonly found in Second Style wall paintings. The side walls of Alcove A, the paintings of Alcove B in Room 16, and several other rooms in the villa illustrate the same methods (see table 1).[31]

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also used to visually inspect and analyze the images. I drew the major orthogonals over the wall elevations using Adobe Illustrator.

[30] For discussion of the polychromatic ashlar screen-walls

found in many Second Style wall paintings, see Borbein 1975.
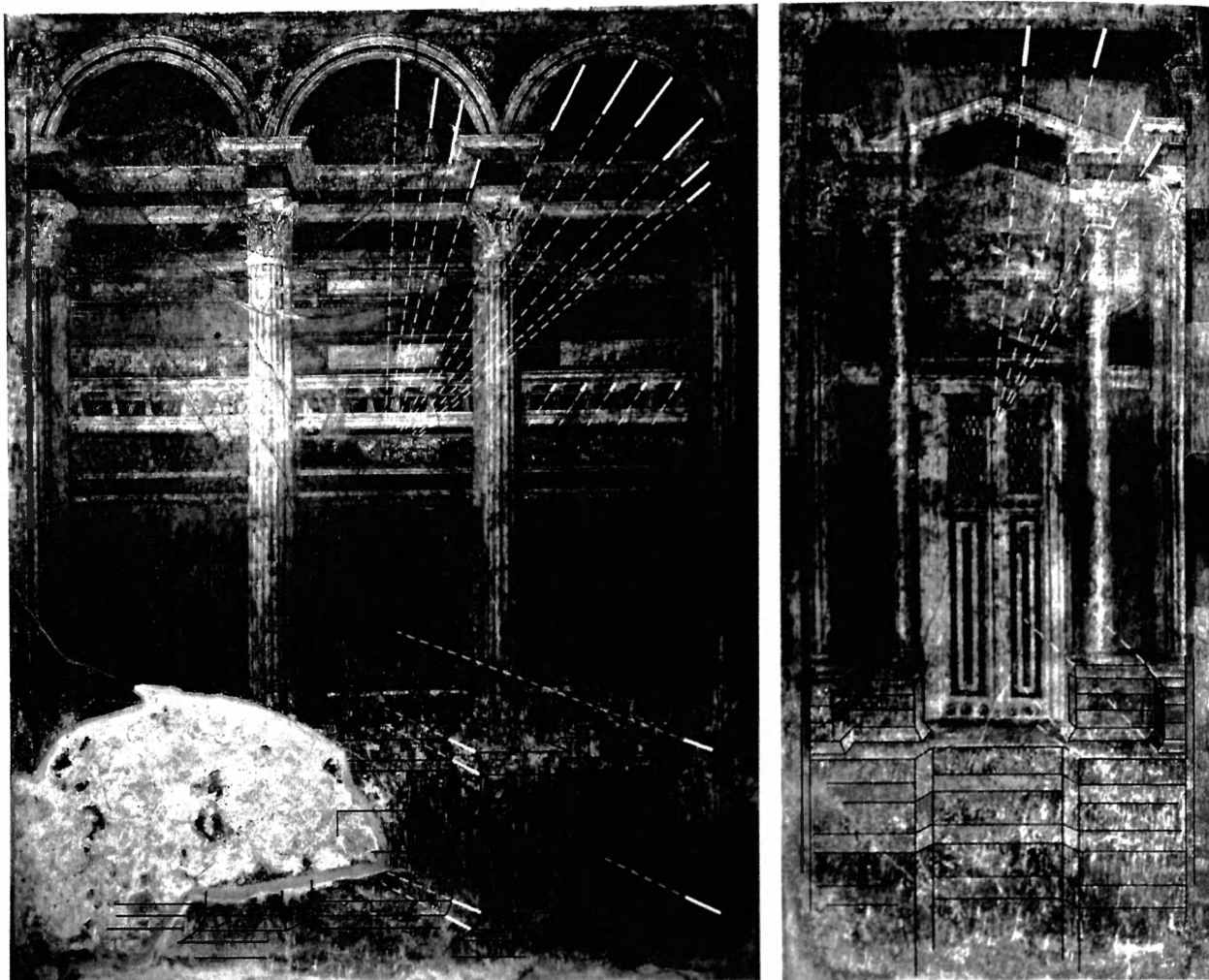
[31] Engemann 1967, pls. 8–32.

Fig. 3. *Left*, diagram showing perspective systems on the back wall of Alcove A, Room 16, Villa of the Mysteries, Pompeii. Deteriorated lower portion of wall painting is reconstructed after Beyen 1938, figs. 16, 19 (courtesy Ministero per i Beni e le Attività Culturali, Soprintendenza Speciale per i Beni Archeologici di Napoli e Pompei); *right*, diagram showing perspective systems on the right side wall of Alcove A, Room 16, Villa of the Mysteries, Pompeii. Deteriorated lower portion of wall painting is reconstructed after Engemann 1967, pl. 21.1 (courtesy Ministero per i Beni e le Attività Culturali, Soprintendenza Speciale per i Beni Archeologici di Napoli e Pompei).

The nearly identical compositions on the two narrow side walls of the alcove exhibit the same perspectival structures as the one on the back wall (see figs. 2; 3, right). A single upper convergence system governs four subjects: the coffered ceiling plane at the top of the wall; below that, the coffered underside of the segmental pediment with omitted center; the right and left projecting entablatures; and, lastly, the (faint) right and left entablatures of a portico surrounding a courtyard and facade in the distance, which is revealed to the observer by a lowered black curtain (see fig. 3, right). The lower area of the wall is less three-dimensional. No converging orthogonals appear there; parallel lines were used for the top and bottom moldings of projecting pedestals and a lower

socle or podium. While the two compositions on the upper portions of the side walls were constructed independently of the primary one on the back wall, an entablature links the three walls, taking advantage of the real spatial parameters of the room.

Alcove B

The painted decoration of Alcove B in Room 16 uses some of the same systems of perspective found in Alcove A and provides additional insights into the system (see fig. 1). As in Alcove A, convergence perspective is concentrated in the upper half of the wall (see figs. 2, 4, 5). Here, more than 25 lines converge into a small zone located approximately 1.60 m above the floor in the center of the wall. The sys-
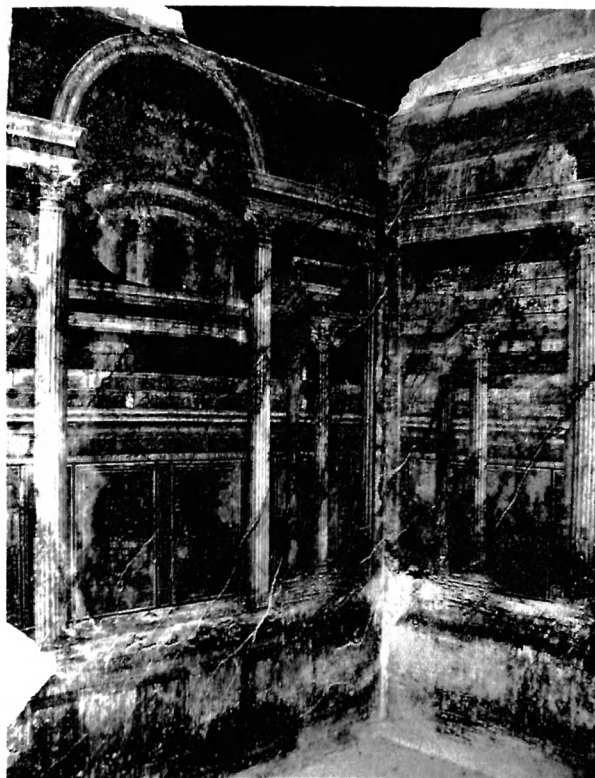
Fig. 4. Back wall and right side wall of Alcove B, Room 16, Villa of the Mysteries, Pompeii (courtesy Ministero per i Beni e le Attività Culturali, Soprintendenza Speciale per i Beni Archeologici di Napoli e Pompei).

Fig. 5. Diagram showing perspective systems on the back wall of Alcove B, Room 16, Villa of the Mysteries, Pompeii (courtesy Ministero per i Beni e le Attività Culturali, Soprintendenza Speciale per i Beni Archeologici di Napoli e Pompei).

tem coordinates three zones of ceiling coffers and projecting entablatures in two layers of space. The lower part of the wall is almost one-dimensional by comparison and uses parallel orthogonals for column bases and a band of small brackets on the ashlar wall behind the columns. The central focus of the painting, the upper half of a round Corinthian temple in the distance framed by an arch, offers observers an additional dimension, recalling the compositions of both side walls in Alcove A. The diving orthogonals of the temple's surrounding portico, however, just barely peek out from the upper right and left corners of the wall (see fig. 5).

The right side wall of Alcove B presents a variation on these approaches. Like Alcove A, the architectural imagery on the rear wall continues around onto the left and right side walls, but unlike Alcove A, perspective also seems to come along with the imagery (see fig. 4). Importantly, the right side panel's upper convergence system is not bilaterally organized about a

vertical central axis (fig. 6). Often referred to as asymmetrical perspective, the upper orthogonals converge not on the wall surface but approximately 0.50–0.60 m beyond the corner. As a result, the Second Style wall painting in Alcove B achieves a greater level of complexity. It coordinates two independent convergence systems on adjacent wall surfaces and offers observers an impression of harmony within an ensemble of paintings. Although the paintings on the two remaining walls of Room 16 belong to the antechamber and are nearly two-dimensional (see fig. 6), they are nonetheless important. They offer information about the social function of perspective in Second Style wall painting and will be relevant below.

Rooms 14, 15, and 23, Villa A of Oplontis

Second Style wall paintings dating between 60 and 50 B.C.E. were found in five well-preserved rooms in Villa A of Oplontis.[32] The murals of Oplontis are generally larger and more elaborate than the paintings preserved in the Villa of the Mysteries but nonetheless share perspectival characteristics with them, with

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[32] De Franciscis 1975a, 1975b; Mikocki 1990, 81; Clarke 1991, 112–23; Ehrhardt 1991, 47–51; Ling 1991, 28, figs. 25, 26; Strocka 2007, 306. For recent research at the villa, see Thomas and Clarke 2007, 2009.
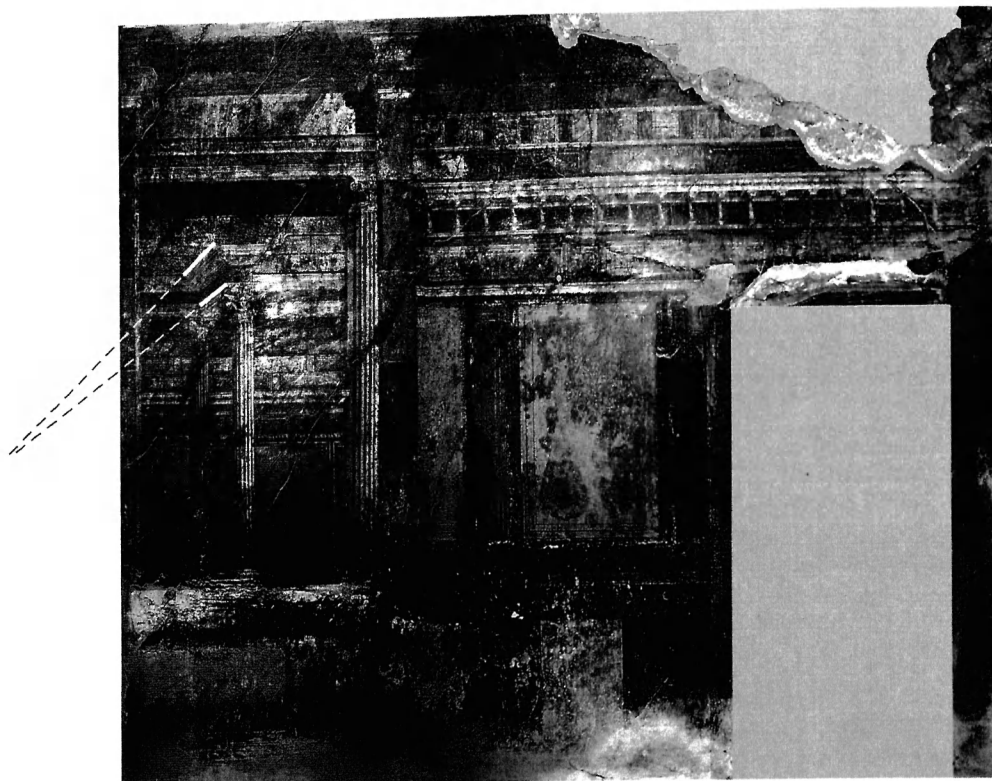
Fig. 6. Diagram showing perspective systems on the right side wall of Alcove B, Room 16, Villa of the Mysteries, Pompeii (courtesy Ministero per i Beni e le Attività Culturali, Soprintendenza Speciale per i Beni Archeologici di Napoli e Pompei).

convergence perspective above and parallel perspective below. The Oplontis paintings also place more emphasis on depictions of expansive depth. Of the five rooms at Oplontis with detailed Second Style wall paintings, I focus here on four examples from Rooms 14, 15, and 23 (see fig. 1).

The nearly identical design found on the east and west walls of Room 14 is a compositional tour de force and constitutes perhaps the most complex example of perspective in Second Style wall painting anywhere. The west wall is discussed here (fig. 7). Strikingly, not one but three convergence systems (labeled nos. 1–3 on fig. 7) are at work in the upper part of this mural. Orthogonals from the entablatures of the two central Corinthian columns converge into the clipeus, or shield medallion; those from a pair of colonnades in the distance converge somewhat above the shield, and those from the far left and right entablatures, arcuated lintels, and columns beyond converge well below the shield or near the bottom of the door (see fig. 7).

The use of more than one convergence system in a Second Style wall painting, sometimes referred to as "multiple vanishing points," is referred to here as "multiple convergence systems." This term should be taken to mean the coordination of more than one system of convergence perspective in the upper portion of a wall painting. Multiple convergence systems should not be confused with the so-called fishbone pattern, or "vanishing axis," discussed by Panofsky. Fishbone patterns are found mainly in the upper zones of Roman Third Style and Fourth Style wall paintings and result from the predominant use of parallel perspective.[33] Convergence perspective seems to have been a characteristic of Second Style wall painting alone. Fishbone patterns, however, could be said to occur wherever parallel perspective is used, including the lower parts of Second Style wall paintings. Although multiple convergence systems are rare in the corpus of preserved Second Style wall paintings (see table 1), painters used them for important reasons, as discussed below.[34]

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[33] Panofsky 1997, 38–9, pl. 1.

[34] For another possible instance of multiple convergence

systems, see the later Second Style wall paintings in Room 20 of the House of the Cryptoporticus, Pompeii (I.6.2): Pugliese

Fig. 7. Diagram showing perspective systems on the west wall of Room 14, Villa of Oplontis; nos. 1–3 represent three distinct convergence systems (courtesy Ministero per i Beni e le Attività Culturali, Soprintendenza Speciale per i Beni Archeologici di Napoli e Pompei).

The wall painting just around the corner on the east wall of Room 15 presents a contrast to that of Room 14 (see figs. 1, 8). The Room 15 wall painting employs just one system of convergence to regulate a vast composition covering three-quarters of the available wall surface. The base of the wall, although not fully preserved, uses parallel perspective. The striking juxtaposition of murals in adjacent Rooms 14 and 15 (the former employs multiple convergence systems, the latter a single convergence system) is echoed in Room 23, the north and south walls of which use one upper convergence system each, while the west wall of the same room uses two convergence systems.[35]

Room 23 at Oplontis, like Room 14, preserves nearly all its painted wall decorations (see fig. 1). The west and north walls provide interesting comparisons, with each other and with the murals already considered from Rooms 14 and 15. Beginning with the back (west) wall, the composition is similar in design to the paintings in Rooms 14 and 15 (fig. 9). Two layers of depth are depicted, the columnar screen in the foreground

and the enclosed precinct beyond. Where a central door is found in Rooms 14 and 15, a solid panel appears; two doors are at the right and left sides, with their inner leaves open to observers in the room (see fig. 9). This painting incorporates two convergence systems in the upper section, and the lines for both systems converge inside the central panel. An upper system regulates the lines of the projecting entablatures; some lines within the upper part of the aedicula; and the diving entablatures of the colonnades beyond, in the right and left corners of the mural. A second system below comprises less sharply receding lines located at middle height in the far right and left reaches of the wall painting. Parallel orthogonals are used for depictions of small modillions and brackets throughout the upper composition. The column bases along the bottom of the wall, depicted resting on top of a podium, are poorly preserved.

The right wall of Room 23 echoes the compositional theme of the back wall but with a less complex perspectival structure. The central bay of the colum-

Carratelli and Baldassarre 1990–2003, 1:231–35, figs. 65–74, esp. 65, 66; Ling 1991, fig. 31; see also table 1 herein.

[35] For photographs, see De Franciscis 1975b, figs. 9, 13; Ling 1991, fig. 25; Mazzoleni and Pappalardo 2004, 129.

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Fig. 8. Diagram showing perspective systems on the east wall, Room 15, Villa of Oplontis (courtesy Ministero per i Beni e le Attività Culturali, Soprintendenza Speciale per i Beni Archeologici di Napoli e Pompei).
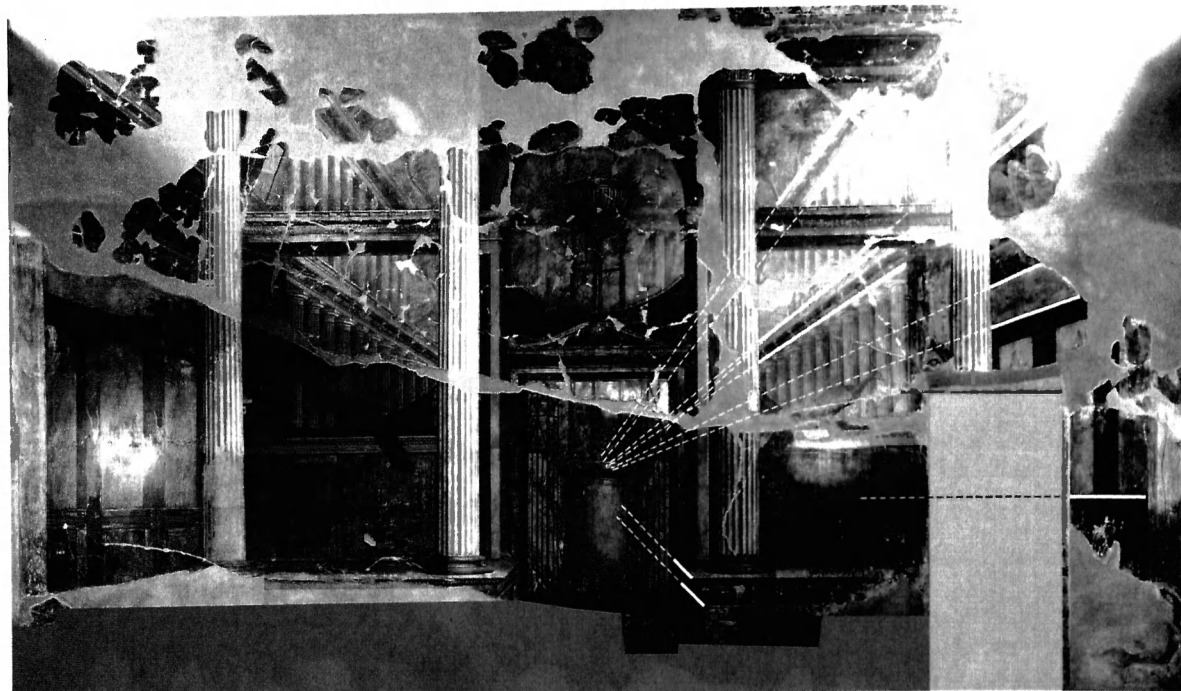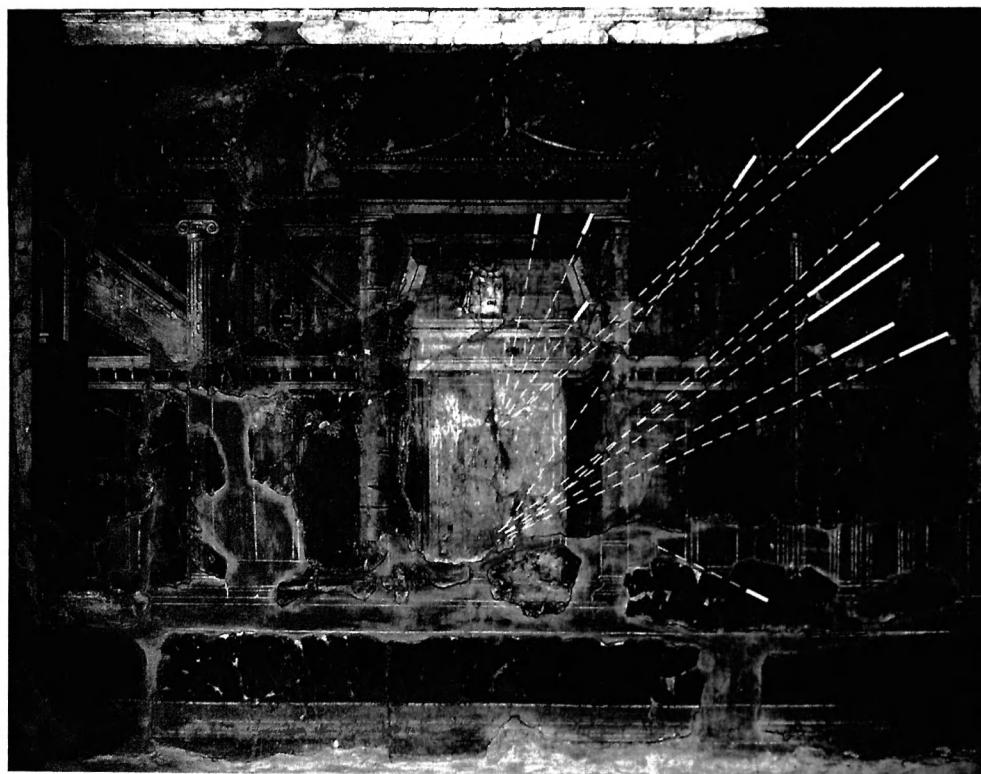

Fig. 9. Diagram showing perspective systems on the west wall, Room 23, Villa of Oplontis (courtesy Ministero per i Beni e le Attività Culturali, Soprintendenza Speciale per i Beni Archeologici di Napoli e Pompei).

nar screen on the right wall is recessed and flanked by projecting aediculae (fig. 10). The view into the realm of a colonnaded space beyond is restricted to three small central openings. Like the mural in Room 15, the entire upper half of the painting is regulated by a single zone of convergence, and the orthogonals appear to sweep across the surface in a balanced, fan-like pattern. Parallel perspective is again limited and found in small, paratactically arranged details and in three-dimensional features along the wall base (see fig. 10).

Room of the Masks, House of Augustus, Rome

The late Second Style wall paintings in the Room of the Masks in the House of Augustus on the Palatine Hill in Rome date to ca. 30 B.C.E. (see fig. 1).[36] Although these wall paintings are famous for their use of perspective, their perspectival characteristics are identical to those from Campania discussed above. All four walls of the Room of the Masks exhibit the same upper and lower perspective systems found in Campanian examples. The south and west walls are considered here (fig. 11). On the south wall (which has a near-identical design to the north wall) the orthogonals of the depicted light architectural framework, usually interpreted as resembling a stage set, all converge into one zone about the size of a basketball (fig. 12). Parallel orthogonals govern the lower projecting socles near the floor in the manner found in the Campanian examples. Extant portions of the east and west walls of the room indicate one upper convergence system each. On the west wall, a light structure, similar to but more horizontally compressed than that of the south wall, unfolds from a central aedicula (fig. 13). The many orthogonals converge in a single zone near the center of the entire composition. The podium is depicted in parallel perspective.

It is sometimes claimed that the perspectival recession of architectural elements depicted in the Room of the Masks is more consistent or constant than in other Second Style paintings, perhaps indicating a more sophisticated knowledge of perspective than found elsewhere. My examination of the material found no convincing evidence for this assertion.[37] The perspectival recession is not more constant, nor are the perspective systems more sophisticated, than in the Campanian examples.[38] It may also be noted that the wall paintings from the Room of the Masks do not depict as much spatial depth as those from Oplontis or the Villa of the Mysteries.

Summary and a Note About Boscoreale

In summary, analysis of Second Style wall paintings from Campania and Rome reveals two major types of perspective, convergence and parallel, which are organized together in compositions along a central vertical axis. Convergence perspective is typically found in the upper areas of wall paintings. Parallel perspective is found in the lower areas and is used for small details throughout. The conspicuous feature of multiple convergence systems can be observed mainly at Oplontis. Another important feature is the manner in which orthogonals appear to recede precisely to a point but actually fall within a small area.

Well-known are the Second Style wall paintings from the Roman villa of Publius Fannius Synistor at Boscoreale, well-published in 1953 by Lehmann and now displayed in the Metropolitan Museum of Art in New York. There was once a contentious debate about perspective in these paintings. Richter used the lateral tripartite designs from Cubiculum M to support a thesis that orthogonal convergence was completely unknown in Roman wall painting.[39] Lehmann later argued, however, that even though orthogonals of many structures and details depicted in a kind of aerial perspective diverge, the overall architectural frame of the compositions on the side walls of the room are in accordance with a general principle of orthogonal convergence. The groups of structures can be understood as left and right sides of one whole.[40]

I agree with Lehmann, although, as Richter noted, convergence perspective is limited in these particular wall paintings. There is, however, clearer evidence for convergence perspective in the same room: the lateral end panels that feature a tholos within a colonnaded court use a single upper convergence system each.[41] Moreover, perspective designs present in murals from Room G in the same villa (which are in two different

[36] Carettoni 1961, 1983a, 1983b; Beyen 1964; Ling 1991, 37–9; Jacopi 2008. On the dating, see Ling 1991, 37; Strocka 2007, 306. For architectural perspective in the Room of the Masks, see Gioseffi 1966, 198; Richter 1970, 52–3; Keuls 1978, 64–5; Mikocki 1990, 80–1; Ehrhardt 1991, 53–6.

[37] Gioseffi 1966, 198. Richter (1970, 53) disagrees. Keuls (1978, 65) observes "geometrically correct" perspective. Mazzoleni and Pappalardo (2004, 410 n. 4) observe a "rigorous perspectival system," although this statement is not clarified.

[38] Ling (2009, 603) states: "After all, the paintings preserved in the properties of Augustus on the Palatine are not significantly finer or more ambitious than those of Oplontis, Boscoreale, or the Villa of the Mysteries."

[39] Richter 1937, 382–83.

[40] Lehmann 1953, 148, 150; see also Gioseffi 1957, 44.

[41] Lehmann 1953, 149. See Anderson (1987, 23) or Bergmann (2010, figs. 55, 56) for illustrations.

Fig. 10. Diagram showing perspective systems on the east wall, Room 23, Villa of Oplontis (courtesy Ministero per i Beni e le Attività Culturali, Soprintendenza Speciale per i Beni Archeologici di Napoli e Pompei).

European museums today) appear to be consistent with the general findings of this study.[42]

WALL PAINTING IN PRACTICE

Consideration of the working processes of wall painters improves our understanding of the formal characteristics of perspective in Second Style wall painting. The initial stages of the wall painting process are usually not considered in studies of ancient perspective, but they are in fact critical.

From Cartoon to Underdrawing

It is generally agreed today that small drawn sketches, diagrams, or "cartoons" were part of the prelimi-

nary process of wall painting in first century B.C.E. Italy.[43] Cartoons could be transferred and enlarged to one or more walls using grids. Grids made it possible to enlarge cartoons accurately and efficiently and to replicate mirror-reversed designs if necessary.[44] The result was a full-sized cartoon drawn on the entire wall—usually called the underdrawing, or *sinopia*, after the reddish-brown pigment—which provided a guide for the actual painting.[45] As the underdrawing exposed in a Second Style wall painting from the House of the Labyrinth at Pompeii (VI.11.8–10) shows, painters could draw straight lines for major features while drawing details freehand. Even then, many other details would not have been drawn at

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[42] Engemann 1967, fig. 11, pl. 33. Room G wall paintings were recently reunited in a computer model (Bergmann 2010, fig. 50 [and bibliography]).

[43] For small cartoon sketches (drawn at eye level and divided into squares with red paint) made on the first layer of wall plaster on the east wall of the atrium at Oplontis, see De Franciscis 1975b, 13–14. One of these sketches is published in Fergola and Pagano 1998, fig. 36 (discussed in Clarke 1991, 45–6; 2009, 145). For a painter's sketch of a Corinthian capital in the House of Ceres at Pompeii (1.9.13), see de Vos 1976, 64;

Heinrich 1997, fig. 1. For a full-sized grid of yellow ochre (a Third Style wall painting) in Room 25 at Oplontis, see Clarke 1987, 274–76, fig. 4.

[44] Clarke 2009, 134–45, esp. 145.

[45] For grids and underdrawings, see *EAA* Suppl. 1, s.v. "Sinopia" (Vlad Borelli); Allag and Barbet 1972, 985–86, 1016–22, 1051–52; Vlad Borelli 1981, figs. 4, 6; Clarke 1991, 122, fig. 49; Ling 1991, 203, figs. 222, 223; Heinrich 1997; Wallert and Elston 1997, 97; Barbet 2000, figs. 28, 32, 38. For templates used for repetitive Second Style motifs, see Engemann 1967, 77–8.

Fig. 11. Computer model showing the actual state of wall paintings in Room 5 (Room of the Masks), House of Augustus, Rome (courtesy UCLA Cultural VR Lab).

Fig. 12. Diagram showing perspective systems on the south wall, Room 5 (Room of the Masks), House of Augustus, Rome (courtesy Ministero per i Beni e le Attività Culturali, Soprintendenza Speciale per i Beni Archeologici di Roma).
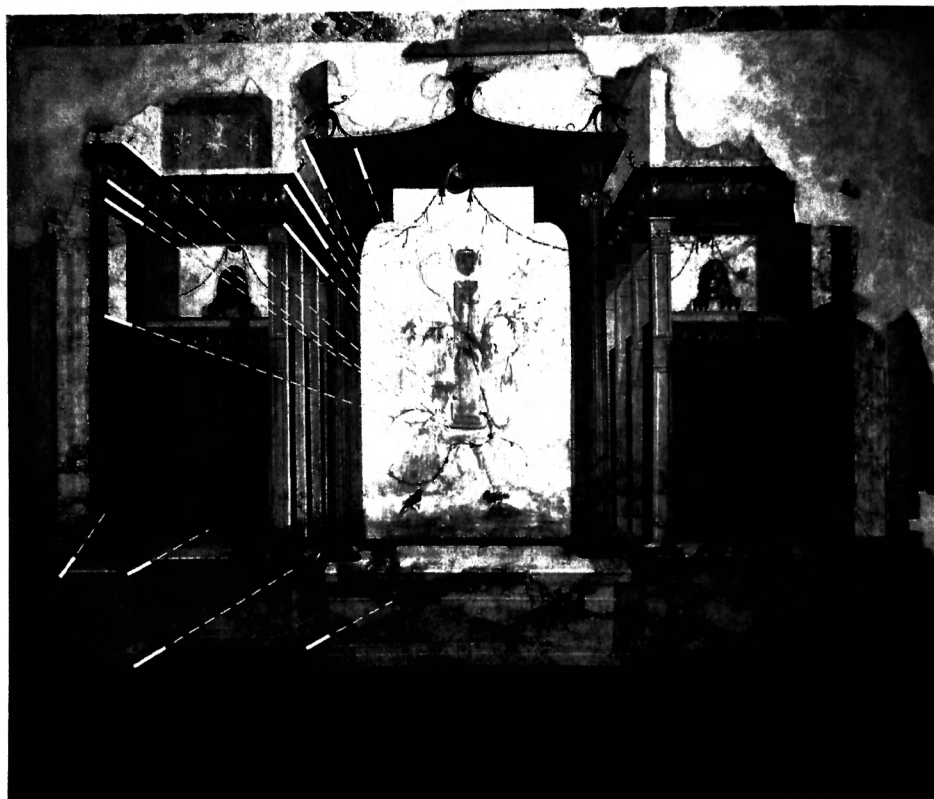
Fig. 13. Diagram showing perspective systems on the west wall, Room 5 (Room of the Masks), House of Augustus, Rome (courtesy Ministero per i Beni e le Attività Culturali, Soprintendenza Speciale per i Beni Archeologici di Roma).

all but painted freehand during the final stages of execution.[46]

Lines of Convergence

How lines in convergence perspective were constructed on the walls as they were being prepared for painting is not exactly clear, but it will be useful to engage in some speculation. At the outset, I assume that wall painters used a straightforwardly repeatable method.[47] What we do know from visual inspection of the few examples of underdrawings that are exposed and accessible is that converging lines were either drawn against a straightedge of some kind or snapped against the wet plaster using a cord. Ignoring for a moment the above observation that converging orthogonals do not precisely meet at points, we can draw on an interesting idea put forth by Tybout, who suggested that Roman architects made perspective

drawings (scaenographiae) on drawing boards using cords pulled away from pins.[48] The same technique or something like it could have been used by wall painters, too. Cords could have been pulled away from pins put temporarily into the wall—or simply held in place by assistants within the convergence zone(s)—and either snapped into the wet plaster or used as guides to draw the lines, in red or yellow, representing the major converging orthogonals.

Convergence of orthogonals into tightly packed small zones would seem to be inconsistent with this reconstruction of events, since in principle, a cord-and-pin technique should aim receding and projecting lines to precise points. This is typically not the case. But, rather than being mistakes, I suggest that convergence in this manner is an example of an adaptive practice that occurred naturally during execution. Indeed, we cannot be sure that a cord-and-pin method

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[46] Vlad Borelli 1981, fig. 4; Pugliese Carratelli et al. 1990–2003, 5:43, fig. 70; Ling 1991, fig. 222; Strocka 1991, 47 n. 37, figs. 290, 292, 307.

[47] Scholarship over the years has been largely silent regarding how this was done. Engemann (1967, 80) also thought

that converging orthogonals in Second Style wall paintings were produced without construction aids ("ohne konstruktive Hilfsmittel"), which I interpret to mean without geometrically based orthogonal projection methods.

[48] Tybout 1989b, 64.

would have always involved fixed points. As mentioned above, an assistant might have held a cord in place in the general area of a convergence center. Furthermore, the few preserved and exposed underdrawings we have suggest that painters only went to the trouble of drawing the major lines of a design, adding many more lines during the final painting stage.

Painting

Another factor to consider is the painting procedure itself. It is generally agreed today that Roman wall painters used a technique similar to fresco. Pigments were applied to damp or wet plaster surfaces, more or less as Vitruvius (*De arch.* 7.3–8) describes it. Painting was done as quickly as possible and in an organized fashion, moving from the top of the wall to the bottom. The size of most walls required division into horizontal sections, as rooms at Pompeii in the process of being redecorated at the time of the eruption of Vesuvius in 79 C.E. show; visible seams separating horizontal divisions represent working sessions.[49]

As underdrawings were being painted over, which was, at least in one instance, preceded by the application of a substantial new layer of wet plaster, reconstruction of the outlines of the designs would sometimes have been necessary.[50] It is conceivable that as work progressed down the wall, or across a horizontal section, the exact correspondence of all the projecting and receding lines would have been difficult to maintain. Even if painters made it their prerogative to do so, this was only one of several competing priorities. As a general rule of thumb, painters strove for "near convergence" to points on wall surfaces; I make no assumption that painters desired or were attempting to imitate a more "perfect" type of perspective. This characteristic indicates that wall painters had a solid grasp on the theory behind their methods and also understood the limits of the possible adjustments that could be made during execution.

Context

A number of other factors shaped the practice and appearance of perspective, especially physical constraints and the social function of Roman wall painting. Indeed, something as prosaic as wall proportion, or the relationship of wall height to wall width, played

a role in the planning stage and in the final product; Gioseffi and Engemann both theorized that Roman wall painters made adjustments to their designs according to varying wall heights and widths.[51] Among the paintings considered here, the back and side walls of Alcove A in the Villa of the Mysteries are especially relevant for this discussion. In them there is considerable vertical separation of upper convergence and lower parallel perspective constructions (see fig. 3). And while the columnar motif must have been a factor to some extent—renditions of column shafts in themselves offered few opportunities to wall painters in the way of perspectival embellishment—so, too, was the height of the wall. To appreciate this point, it is useful to consider the opposite case. Expansive wall surfaces could influence the use of multiple convergence systems (see below) and could result in less vertical separation, sometimes even causing the crisscrossing of upper convergences and lower parallelisms, as in Room 14 at Oplontis (see fig. 7).

It is also illuminating to consider briefly how architectural iconography interacted with the physical context of the wall. The back wall of Alcove A, for instance, accommodates the tripartite colonnade well, but the side walls of the same alcove are too narrow for the motif of the door with flanking columns (see fig. 3, right).[52] Less perceptible interplay with physical context is observable in the Room of the Masks. The architectural framework of the south wall fits its physical site well, but, nonetheless, the entire motif appears to have been horizontally stretched to fill the breadth of the room (see fig. 12). In contrast, the nearly identical designs on the east and west walls fit their available surfaces better (see fig. 13). It is worth stressing that Roman wall painters seem to have had no control over the sizes and shapes of the wall surfaces they were asked to decorate. Vitruvius (*De arch.* 7.5.2) himself comments that landscape paintings are appropriate for walls of great length.[53]

Social parameters can also be considered. It is generally accepted today that Roman domestic wall decoration was expected to relay certain social signs about the household. Scholars have noted the remarkable consistency with which wall decoration divided or demarcated walls according to functional or spatial divisions. For instance, in Room 16 of the Villa of the

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[49] For an overview of scholarship on the production and organization of Roman wall painting, see Bragantini 2004; see also de Mol 1991, esp. fig. 2; Ling 1991, 200–3, 215–16, figs. 220, 221; Béarat et al. 1997; Meyer 2010.

[50] Significant changes could also be made in the final painting, as the exposed underdrawing in Room 43 in the House of the Labyrinth at Pompeii indicates.

[51] Gioseffi 1957, 43–4; Engemann 1967, 73–80.

[52] Beyen 1938, 1:fig. 19; Engemann 1967, pl. 21.1; Tybout 1989a, pl. 16. For door motifs in Second Style wall painting, see Engemann 1967, 28–33; Tybout 1989a, 260–73.

[53] Ling (1991, 50–1) argues that very long walls, such as those along corridors, posed more problems to the Second Style architectural perspectivist than narrower walls that afforded centralized arrangements more adequately. See de Mol (1991) for wall proportions and Fourth Style wall paintings.

Mysteries, painted columns differentiate the alcoves from the antechamber, while the floor and ceiling designs also change at these transitional points (see figs. 2, 4, 6).[54] The organization of perspectives in rooms could accomplish a kind of functional division as well. Convergence perspective was reserved for visually prominent walls. To be more specific, convergence perspective was always employed for the greatest impact on observers (clients, diners, sleepers?) at the point of maximum effectiveness in the upper parts of walls.[55] Areas unseen from the entrances to rooms, such as the walls of antechambers (see fig. 6) or the lower parts of walls that would have been covered up by dining couches or other furniture (fig. 14) usually did not employ convergence perspective. Therefore, perspective contributed to the functional and social organization of domestic space.[56]

Multiple Convergence Systems and the Contexts for Wall Paintings

Let us reconsider the west wall of Room 14 at Oplontis (see fig. 7). Why do multiple convergence systems occur in this particular painting? To address this question, we will engage in some experimental archaeology.

Consider what the effect would have been if the orthogonals of the primary right and left columns in the middle of the composition (see fig. 7[2]) had converged instead above the shield or been coordinated with those of the convergence system in the upper part of the composition (see fig 7[1]). In those cases, the orthogonals would have been more horizontal. Since those choices were not made, we can assume that this effect was less desirable, perhaps because it was less dimensional.[57] The orthogonals of the two opposing colonnades depicted beyond the tholos (see fig. 7[1]) posed the opposite problem. Had these orthogonals converged lower on the wall surface, they would have been too inclined.[58] A similar exercise could be carried out for the orthogonal system in the lower part of the composition (see fig. 7[3]). Not every painter

would have gone through this thought process in every instance; the well-known visual principle for painters may have been to avoid exceedingly acute or obtuse angles, which caused elements to look too sharp or too flat. In contrast, most of the decoration in Room 15 is regulated by a single convergence system (see fig. 8). I posit that this is not because its creators were more skilled or more knowledgeable than those working in Room 14 (it may have been the same team) but rather because the physical context and goals—specifically, long wall proportions and a moderately complex composition in comparison with the painting from Room 14—did not necessitate additional convergence systems.[59] Similarly, horizontal proportions and a compositional motif encouraged the use of one primary convergence zone for the south wall in the Room of the Masks (see fig. 12).

This model for the orthogonal patterns found in Second Style wall paintings has the advantage over previous ones in how it interprets distinct but coordinated perspective systems. In addition to the two primary types of perspective—convergence and parallel perspective—painters had the option of using multiple convergence systems when required. From this analysis, we may conclude that the methodological apparatus underlying a composition incorporating one convergence system or multiple ones was essentially the same, being seemingly expandable or reducible on a sliding scale, literally along the vertical central axis of a given wall surface (fig. 15). Every characteristic of perspective found in Second Style wall painting served a purpose toward the whole.

WIDER SETTING

An additional yet crucial dimension of perspective in Second Style wall painting is the broader historical and cultural context. The historical context for perspective in Roman wall painting has always been rife with assumptions regarding the existence of an earlier, more sophisticated type of perspective practiced in Greece. First, there has never been scholarly consensus on the

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[54] For the classic study of functional division in wall painting, see Scagliarini Corlàita 1974–1976. Subsequently, see Clarke 1991, 105–11, 118–23, figs. 36, 46, 47; Wallace-Hadrill 1994, chs. 1–3.

[55] Wallace-Hadrill (1994, 27–8) equates greater perspectival depth in Second Style wall painting with higher prestige.

[56] See the above section "Previous Scholarship" and supra n. 25 for information on asymmetrical perspective.

[57] Similarly, Gioseffi (1957, figs. 15, 16) demonstrates how the angles of lower parallelisms in Alcove A (40–45° from horizontal) harmonize the depicted column pedestals with the real perimeter of the alcove from the point of view of an observer standing in the antechamber of the room. Any steep-

er angle would have created the illusion of a point of view that was too up-close. Scagliarini Corlàita (1974–1976, 8–9) agrees.

[58] Alternatively, Ehrhardt (1991, 48–9) emphasizes the spatial "discontinuities" of this wall painting in comparison with modern one-point perspective.

[59] Previous studies, even quite recent ones, often resort to accounting for seemingly discordant features as fortuitous errors with claims, in the case of the mural in Room 15 at Oplontis, such as "one wonders if the overall spatial plan was not somehow lost during execution" (Bucci de Santis 2004, 406–7); see also Mikocki 1990, 81.

Fig. 14. Computer reconstruction of Room 16, Villa of the Mysteries, Pompeii, showing actual state of wall paintings with restored ceiling, couches, and lighting conditions (courtesy UCLA Cultural VR Lab; © Regents of the University of California 1999; all rights reserved).

existence of a Greek system. Second, it is no longer reasonable today to assume or posit that knowledge of perspective as practiced in Greek scenery painting was somehow lost on Roman audiences. Instead, it is logical to imagine that the Middle to Late Republican period was a time of unfettered adaptation of Greek ideas about perspective to as many different Roman contexts as could make use of them, especially for the purpose of enthralling audiences and patrons of the arts and architecture. Contacts with Greece during the Republican period transformed Rome; indeed, according to Wallace-Hadrill, this was Rome's "cultural revolution." The process of Hellenization with respect to artistic and architectural practices was vibrant during this period.[60] Early Second Style wall paintings themselves

display schematic eastern connections.[61] Although historical references to specific scenery painters in Rome are rare, Pliny (*HN* 35.113) recounts that a certain painter called Serapion covered the whole Maenian Balconies[62] (perhaps the facades of shop balconies in the Republican Forum) with paintings; Serapion was apparently a most successful scenery painter, but he was unable to paint a human being. Greek painters such as Demetrius of Alexandria (known as a *topographos*, or landscape painter) and Metrodorus worked and lived in Rome; there were visits to Rome by envoys of Greek theatrical troupes, and Roman plays in Latin were staged on Delos.[63]

Perspectival architectural painting had likely been in practice in Rome before Second Style wall painting

[60] The definitive study on this process is now Wallace-Hadrill 2008.

[61] The best example is the Macedonian tomb of Lyson and Kallikles at Lefkadia, dated to before 168 B.C.E., which uses parallel perspective in the painted rendition of Ionic pilaster columns and Doric regulae/guttae; see Miller 1993.

[62] On the Maenian Balconies, see Welch 2007, 32–5.

[63] For Demetrius of Alexandria in Rome in the 160s B.C.E.,

see Diod. Sic. 31.18.2; Val. Max. 5.1.1; Garton 1972, 55–6; Pollitt 1974, 333. For Metrodorus, see Plin. *HN* 35.135. For Greek troupes of actors and artists who visited Rome in the 180s B.C.E. for 10-day periods, and again in 167 B.C.E., see Livy 39.22.1–3, 39.22.9–10; Polyb. 30.14. For Greek actors invited by Mummius, see Tac. *Ann.* 14.21. For Latin language entertainments on Delos, see Garton 1972, 65–6.
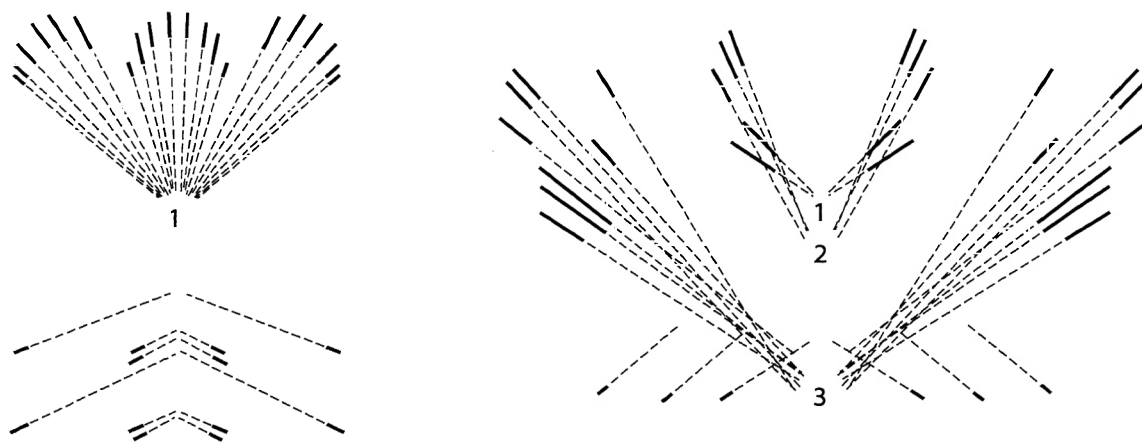
Fig. 15. Perspective systems: *left*, single convergence system, Alcove A, Room 16, Villa of the Mysteries, Pompeii; *right*, multiple convergence systems, west wall of Room 14, Villa of Oplontis.

became fashionable in the second or early first century B.C.E.[64] The temporary wooden theaters erected in Rome during the second century B.C.E., the sites of scenic *ludi* and displays of war booty,[65] would have used scenery paintings that probably contained perspectival images of an architectural nature—elaborate facades, temple fronts, and street scenes, the usual backdrops in plays.[66] Pliny (*HN* 35.23) mentions that crows were fooled into thinking a painted depiction of a roof was real on the elaborate temporary stage building erected in Rome by Clodius Pulcher in 99 B.C.E.

Although we do not know what kind of perspective was used to depict Clodius' rooftops, we do know that knowledge of different types of perspective existed in Rome by this time because of evidence from the House of the Griffins on the Palatine Hill in Rome; its early Second Style wall paintings are dated to 100–90 B.C.E.[67] Wall paintings there make use of all the fundamental features of perspective that later Second Style wall paintings have in more elaborate form. A carefully constructed convergence system regulates the

coffered ceiling depicted on the back wall of Room 2 (fig. 16).[68] The grander idea involved directing the views of observers toward the rear wall using a combination of convergence and parallel perspective on the side walls.[69] The extant paintings of the House of the Griffins do not use multiple convergence systems on one wall. Therefore, it is tempting to think that this feature, which is so common in Second Style wall painting, may not have been developed until later in the mid first century B.C.E. A developmental narrative such as this would be consistent with Beyen's model of the linear formalistic progression of the Second Style. It is perhaps wise at this time, however, not to be swayed too much by the evidence from Oplontis, where multiple convergence systems are best represented (see table 1), until we know how characteristic that decoration was.

The specific cultural context is also important to consider. The primary purpose of Second Style wall painting was to impress viewers. This desire drove painters to use perspective in domestic wall decoration

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[64] This suggestion is consistent with Welch (2006, 134–40), who argues that Second Style wall painting developed earlier than traditionally thought and proposes that the earliest Second Style wall paintings were created for only a few special rooms in the house, such as the atrium, where war booty and decorative imagery—painted as well as sculptural—associated with a general's victory and triumph might be displayed. This private spectacle of sorts acted as a pendant to the triumphal scenic shows in public space.

[65] Archaeological evidence is misleading, since it suggests theater construction was limited in the Republican period to southern and parts of central Italy. There was a ban, however,

on permanent theater construction in Republican Rome, and only literary evidence illuminates a tradition of theater architecture. For discussion, see Rawson 1991; Beacham 1992, 56–85; Klar 2006; Sear 2006, 54–7.

[66] Cf. Beacham 1992, 64.

[67] Ling 1991, 23–4; Strocka 2007, 308; see Welch's comments (2006, 135–36) for problems with dating the paintings from the House of the Griffins.

[68] Beyen 1939, col. 48, fig. 1; Engemann 1967, 66–8, pl. 6.

[69] It is important to note that some but not all orthogonals of the left and right side walls are directed to the rear wall; see Rizzo 1936, pls. 1–3; Engemann 1967, 66–8, pls. 4–6.
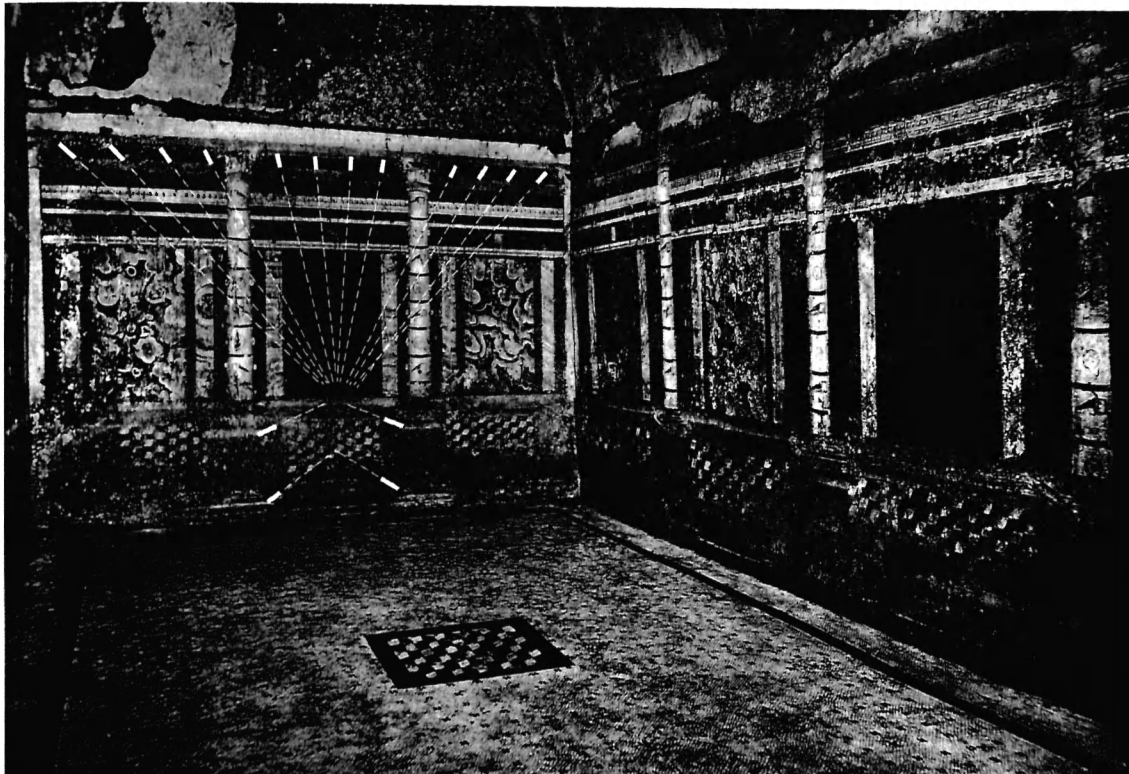
Fig. 16. Room 2, House of the Griffins, Rome (after Rizzo 1936, pl. 1).

in the first place and was the principal motivation for the formal development of the Second Style during the first century B.C.E. Perspective, with its immersive visual function, offered an enhancement in architectural representation over the First Style. Second Style wall painting speaks for itself in this regard, but it is also interesting that ancient references to perspectival architectural drawing or painting, *scaenographia* and *skenographia*, are often expressed in terms of visual experience. Most importantly, Vitruvius' (*De arch.* 1.2.2) general approach to writing about his subject matter is telling (see above). When Vitruvius writes about perspective architectural drawing, he shows little interest in describing how to construct perspective and more interest in the general effect it could create on the viewer. Vitruvius places the highest value on *scaenographia* as a visual effect of perspectival convergence. Perspectival drawing was a tool used by architects in conjunction with other kinds of architectural representation, mainly two-dimensional plan drawings and elevation drawings, *ichnographiae* and *orthographiae*. And although the specific roles that scenery painting and architectural drawing played in the theory and practice of Roman domestic wall decoration of the first century B.C.E. are difficult to

reconstruct in precise detail, the functional relationships of these applications of perspective to different media seem clear enough: muralists amazed domestic viewers with perspective, just as architects used perspective to impress patrons and scene painters used it to deceive audiences.

CONCLUSIONS

This article clarifies the coexistence of different perspective systems in Second Style wall paintings. New techniques and the remarkable evidence from Oplontis make possible a more precise definition of perspective. The combination of upper convergence perspective with lower parallel perspective and the use of both single and multiple convergence systems formed what may be called an underlying architecture, which could be easily adjusted to different locations and could respond to different variables.

Modern viewers have mined Roman wall painting for evidence of an ancient knowledge of perspective like their own. Ironically, convergence perspective, the type of perspective found in Roman wall painting that most closely resembles scientific one-point perspective, does not seem to have fully satisfied the desires of all those involved in the wall decorations

of Roman houses. Convergence perspective certainly answered the technical requirements of impressing viewers and buyers, and there must have been a body of theory behind it. However, the coordination of different perspective systems found in Second Style wall paintings does not reflect the needs of patrons but rather those of painters who made their livings from decorating Roman houses and villas.

Questions about the theory behind the perspective systems of Roman Second Style wall painting are left open in this article. I believe, however, that the presence of different perspective systems in the Second Style and the modes of adaptive practice identified in this article provide important clues to the presence of underlying visual principles. For instance, future research will consider why Second Style wall painters, while not theorists, understood that the multiple facets of perspective could come into harmony under the right viewing conditions.

Interestingly, convergence perspective all but disappears with the coming of Third and Fourth Style wall painting. The busy compositions of Fourth Style paintings demonstrate that convergence perspective was either no longer worth the trouble or no longer served any marketable visual function. The powerful agency of convergence perspective, displayed so vividly at Oplontis, may have became lost in the medium over time, or perhaps eventually parallel perspective was deemed simply "good enough." Vitruvius (*De arch.* 7.5) laments the loss of perspectival architectural imagery in Roman wall painting, as he was a witness himself to the coming of the new taste in domestic decor. After roughly half a millennium, during which time the Greek Masonry or Incrustation Style was followed by the First and Second Styles, wall decoration in the Mediterranean world finally broke free of its overt architectural associations.

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