

**Music from the Mosaics:  
*Diaeta* of Orpheus at Villa del Casale,  
Piazza Armerina, in the context of  
soundscape and musical performance**

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*Abstract*

The article investigates the *Diaeta of Orpheus* at the Villa del Casale through the study of function, musical performance and soundscape complemented by digital acoustic simulation executed in EASE 4.4 software. Interdisciplinary study consists as well of analysis of depicted instruments and explaining musical praxis in Late Antique context. The study situates the *Diaeta of Orpheus* within broader framework by examining its architecture, furnishing and placement within villa's microtopography. Results of acoustic experiment reveal long reverberation times and poor speech intelligibility, indicating that the room was not optimized for musical performance but rather for multifunctional convivial use enriched by ambient sound, water features, and low-resonance instruments such as the lyre.

*Keywords*

*Diaeta of Orpheus*; Piazza Armerina; archaeoacoustics; soundscape.

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## 1. INTRODUCTION<sup>1</sup>

Contemporary Swiss composer, Carlo Florindo Semini, author of the magnificent piece titled *I Mosaici di Piazza Armerina* composed in 1971<sup>2</sup>, inspired by various mosaics from the Villa del Casale brought to life harmony, character and expression of Late Antique depictions in his symphonic poem. As we could paraphrase iconic statement of Goethe<sup>3</sup>, Semini 'defrosted' music enchanted in the floors of the famous Villa del Casale. Semini's piece inspires to ask a question: can we 'defrost' the music and sounds from the architecture and mosaics of the Villa del Casale from a scientific point of view? There are three main spaces in which the musical mosaics of Piazza Armerina are found: the *Cubicolo dei Cori e Attori* (Room 45<sup>4</sup>), the *Diaeta of Arion* (Room 41) and the *Diaeta of Orpheus* (Room 35)<sup>5</sup>. This article is focused on the soundscape of the *Diaeta of Orpheus*, by setting it in the context of other Late Antique domestic spaces with mosaiced Orpheus depictions. In the Late Antique domestic context, rooms with Orpheus' mosaics are usually considered as spaces devoted to musical practice, either as a grand reception room or an *oecus*<sup>6</sup>. However, such statement is based mainly on the iconographical analysis, which does not exhaust the topic. Nowadays, we are enabled by the digital tools to deepen the knowledge on the subject beyond the iconographic study and ask and answer questions on volumetry, permeability of the sound and acoustics.

## 2. METHODOLOGY

Outlining the methodology of this article is challenging, as archeoacoustics and soundscape studies lack standardized procedures, even though related studies were conducted on ancient theatres and *odea*<sup>7</sup>. To address this, the methodology is approached from two angles: philosophical and technical, within a broader holistic framework that also includes traditional iconographic and literary analysis. The project draws on the archaeology of performance, cognitive archaeology, and the archaeology of music - all subfields of the broader Sensory Studies movement that emerged in the 1990s<sup>8</sup>. A phenomenological approach forms part of this study. Although not new to archaeology, phenomenology has historically centred on vision<sup>9</sup>. Thinkers such as Merleau-Ponty, and later Serres, challenged this sensory hierarchy, paving the way for scholars like Tilley and Hamilton to promote "thinking through the body." This approach does not attempt to recreate ancient experiences exactly but seeks to approximate them as closely as possible by considering the conditions that shaped them<sup>10</sup>. As McMahon notes, phenomenology has proven useful not only for landscapes but also for architectural studies<sup>11</sup>. The technical component of this methodology involves a digital experiment using EASE 4.4 software. Similar tools, such as ODEON, have been used in archeoacoustic research on Greek and Roman theatres<sup>12</sup> - for instance, Manzetti's study of the theatre near the sanctuary of Apollo Pizio in Gortina<sup>13</sup>. As Bellia has argued, such analyses

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<sup>2</sup> <http://www.carloflorindosemini.ch/opere.html>

<sup>3</sup> See full J.W. Goethe quote: «Music is liquid architecture; architecture is frozen music».

<sup>4</sup> Numbers of the rooms given in Carandini *et alii* 1982.

<sup>5</sup> The other two rooms with depictions of musicians are Room 3 and Room 6 where tuba players are depicted. For the reference see: Castaldo 2005, 414 and Sfameni 2023, 203-204.

<sup>6</sup> Jesnick 1997, 10.

<sup>7</sup> Bellia 2023, 329-330.

<sup>8</sup> Hamiliakis 2013a.

<sup>9</sup> Platts 2020, 4; Eve 2012.

<sup>10</sup> Platts 2020, 5.

<sup>11</sup> McMahon 2013, 117.

<sup>12</sup> Rindel Nielsen 2011.

<sup>13</sup> Manzetti 2019.

help determine whether ancient spaces were designed with acoustic properties in mind<sup>14</sup>. In this article, EASE 4.4 is used to evaluate speech and musical sound levels to assess whether the *Diaeta* of *Orpheus* in Piazza Armerina was acoustically suitable for musical performance.

### 3. RESEARCH LIMITATIONS

Before proceeding with the analysis, several limitations of studying past soundscapes, especially in domestic settings, must be acknowledged. As Mungari notes, many elements of material culture that affected acoustics, such as furniture, textiles, and windows, have not survived in the archaeological record<sup>15</sup>. It is important as well to note that the acoustical experiment is performed on partially reconstructed space which to some degree may weaken its reliability. Also, reconstructing the relationship between interior and exterior spaces, and especially the outdoor soundscape, is therefore nearly impossible. There are also conceptual challenges. Modern assumptions about music, sound, and acoustics can easily distort how we imagine ancient listeners experienced them<sup>16</sup>. Our “period ears” differ from those of the romans, whose perceptions, symbolism, and aesthetic expectations were shaped by a different cultural framework<sup>17</sup>. Literary sources rarely describe emotional or practical responses to sound, further limiting our understanding<sup>18</sup>. The phenomenological approach, although valuable, has been criticized, particularly by processual archaeologists, for its inherent subjectivity<sup>19</sup>. Additionally, the archaeology of music and sound is seldom integrated into Late Antique studies, which largely focus on literary figures such as Boethius or Aristides Quintilian rather than material culture (see: Faes de Mottoni<sup>20</sup>, Lacon<sup>21</sup> or Tsimbidaros<sup>22</sup>). The iconography of the mosaics with musical depictions coming from Late Antiquity were studied by Castaldo<sup>23</sup>, Malineau<sup>24</sup> and Sfameni<sup>25</sup>. The subject of the Late Antique performance and status of performance was tackled by Webb<sup>26</sup> and Tronca<sup>27</sup>. Existing scholarship on Late Antique musical artifacts is limited to a few works, such as Lawson’s studies of stringed instruments<sup>28</sup> and Dessi’s research on the hydraulic organ<sup>29</sup>. No musical notation from the period survives, posing further difficulties for accurate reconstruction. Comparative analysis of spaces decorated with Orpheus mosaics is also restricted. While the iconography has been widely studied, descriptions of the rooms themselves, and of the objects found within them, are often lacking, making functional comparisons uncertain. Despite these constraints, meaningful research is still possible.

### 4. FUNCTION OF ORPHEUS’ ROOMS

Determining the function of spaces with Orpheus mosaics is crucial to understand later what kind of sonic events might have taken place inside. Orpheus charming the animals’ depictions

<sup>14</sup> Bellia 2021, 2472.

<sup>15</sup> Mungari 2023, 113-114.

<sup>16</sup> Till 2014, 293.

<sup>17</sup> For the term ‘Period eye’ consult: Baxandall 1988.

<sup>18</sup> Tallon 2016, 263.

<sup>19</sup> Van Dyke *et alii* 2021, 193-195.

<sup>20</sup> Faes de Mottoni 2005.

<sup>21</sup> Lançon 2006.

<sup>22</sup> Tsimbidaros 2006.

<sup>23</sup> Castaldo 2005.

<sup>24</sup> Malineau 2007.

<sup>25</sup> Sfameni 2023.

<sup>26</sup> Webb 2013.

<sup>27</sup> Tronca 2021

<sup>28</sup> Lawso 2003; Lawson 2008.

<sup>29</sup> Dessi 2009.

are present in three Late Antique contexts: domestic, funerary and public. While speaking about the domestic context we must note that some of the rooms are placed in baths. The earliest example of Orpheus domestic mosaics is coming from the 2<sup>nd</sup> century A.D. and the latest one is the Jerusalem mosaic coming from 6<sup>th</sup> century A.D.<sup>30</sup>. Jesnick stated that mosaics with Orpheus were meant to decorate the *oecus*, (grand) reception halls or *triclinia*. Jesnick stated as well that the function of the room was fluid so what was a reception hall might have become a dining room. Similarly, ancient authors have suggested multifunctionality of the rooms: like Pliny the Younger who described his private room in the villa on the Laurentian hill as a place where he was also having dinner<sup>31</sup> or to descriptions of the home of *Aciatum* by Sidonius Apollinaris<sup>32</sup>. In the domestic context depictions of Orpheus appears in the villas near the peristyle and in the rooms connected to water<sup>33</sup>. Jesnick suggested that there is a dual interpretation of Orpheus: the one of him bringing the silence by restoring the harmony from chaos, thus she states that the rooms were meant for quiet relaxation or that of him, patron of music, suggesting musical soirees and concerts happening in the rooms<sup>34</sup>. To distinguish the function of the room the extent of the figured images as well as their location might be implicative<sup>35</sup>. As Witts has concluded in her paper on the Orpheus' mosaic rooms in Late Roman Britain the measurements of room do not implicate any clues about the function, thus is not mentioned<sup>36</sup>. In some cases, the comparison with other mosaics and spaces is not possible like in the case of Chahba-Philippopolis<sup>37</sup>. Some of the rooms were distinguished by the scholars as reception room/hall, *oecus*, *diaeta* or *triclinium*. Reception rooms are found in Carthage, Oudna, Volubilis, Arnal, Badayoz, Zaragoza, Littlecote and Woodchester. The room in Martim Gil was found in the southern wing of the peristyle and was probably an *oecus*<sup>38</sup>. The house where the Orpheus mosaic of El Djem was found has no traditional placement of the rooms around the peristyle conversely to Martim Gil. According to Slim the El Djem mosaic came from a more private small reception room for enjoyment of music and poetry<sup>39</sup>. Some of the rooms on the other hand were offered two hypotheses on their function. As far as we can judge the mosaic of Sakiet-es-Zit with the depiction of the Orpheus charming animals was part of the complex of a *villa*, which were popular in the Sfax region and in the Northern Africa. This mosaic is enclosed by two water basins and probably a cistern which means that it was placed over some hydrological complex, what is also proved by large, displaced blocks of shell limestone, that are visible in the *villa's* garden<sup>40</sup>. The Sakiet-es-Zit mosaic was probably coming from an apsidal room, since according to Thiron the western and northern angles of the room are softly rounded<sup>41</sup>. The function of the room is hard to determine, according to Thiron it was either a *frigidarium* or an *oecus*<sup>42</sup>. According to Del Chiaro, mosaic in Panik was found in a *fundus* and probably was an *oecus* or a chief reception room<sup>43</sup>. Scott says about the Littlecote that the room was probably reception hall, although some earlier scholars<sup>44</sup> suggested that this was a room for some kind of religious purposes due to its closeness to the river<sup>45</sup>.

<sup>30</sup> *Ibid.*, 985.

<sup>31</sup> Plin., *Ep.*, 2.17.20 (ed. Radice 1969).

<sup>32</sup> Sidon., *Ep.*, 2.211; Sidon., *Ep.*, 2.94 (ed. Anderson 1936).

<sup>33</sup> Alvarez-Martinez 2017, 2476.

<sup>34</sup> Jesnick 1997, 115.

<sup>35</sup> Witts 2000, 302.

<sup>36</sup> Witts 2000.

<sup>37</sup> Balty 1983.

<sup>38</sup> Alvarez-Martinez 1990, 49.

<sup>39</sup> Slim 1987, 210.

<sup>40</sup> Thiron 1955, 150.

<sup>41</sup> *Ibid.*, 152.

<sup>42</sup> *Ibid.*, 153.

<sup>43</sup> Del Chiaro 1972, 198.

<sup>44</sup> Ellis 1988.

<sup>45</sup> Scott 1995, 118.

Orpheus mosaic room in Newton St. Loe was entered from the corridor. It was placed in the southern part of the villa. The mosaic layout is in the outer (eastern) part of the room. The room is bipartite, and the second mosaic features the swastika-meander like geometric ornament<sup>46</sup>. Western corner could have held the couches. According to Witts, use as *triclinium* is suggested by the iconography of Orpheus, which as we see from reading this paragraph is not really a determinative feature<sup>47</sup>. Another example is Room 1 in the Villa of Woodchester with the Great Pavement depicting Orpheus. It lays in the center of the northern wing of the *villa* of the innermost of three courtyards. The main entrance was from the south, but probably there were other entrances from other sides. Orpheus is oriented to be seen from the entrance of the room. There is a suggestion of the fountain visible on the floor and decorations with water nymphs. Some scholars suggest that the room with Orpheus at Woodchester was lit by clerestories. Therefore, the room was suitable for many uses, thus the typology is not given<sup>48</sup>. The most problematic interpretation and yet the one studied most thoroughly in case of function are mosaics of Britain which were all considered as *triclinia* by Gazda<sup>49</sup>. Next, we can mention the mosaic of Cagliari, which according to Angiolillo, was executed in the way to be admired from different points of view<sup>50</sup>. Author suggests as well that from the composition of mosaic we can assume that it was either a *triclinium* or *apodyterium*<sup>51</sup>. Another problem that arises with describing some Orpheus rooms as *triclinia* is the fact that only one room in Miletus reflects the orthodox T + U shape of the Hellenistic *triclinium*. When speaking about describing rooms with Orpheus mosaics as *diaeta* there is an obvious example of Piazza Armerina. Alvarez Martinez also suggests that space with mosaic in San Marta is *diaeta* like in Piazza Armerina. It is so, because *diaeta* was supposed to be the prolongment of the idyllic gardens entered before<sup>52</sup>. Some of the spaces with Orpheus mosaics were described with more precision and we can learn about the walls and objects that were found in the compartments. Beczelly mentions that the walls of the Room S at Mytilene, where Orpheus mosaic was found, were solid, but he did not provide us with any more information<sup>53</sup>. On the other hand, we have information from excavations of Orpheus mosaic room in Sant'Anselmo all'Aventino: the notes from the excavations mention that the room had poorly preserved walls (and that now of finding were not of substantial height); however similarly to the Piazza Armerina the marbles decorating the walls were spotted<sup>54</sup>. One of the spaces that can serve for the comparison for better understanding the *Diaeta of Orpheus* in Piazza Armerina is a mosaic and space that was discovered in Trinquetaille<sup>55</sup>. The mosaic was placed in the in the northeastern compartment of the villa<sup>56</sup> and it was only found on the soil, reworked during the Middle Ages. Inside a fragment of a soapstone vase, a few shards of Graufesenque pottery, without decoration, and important fragments of moldings, coverings of marble and pilaster capitals forming wall lights, from a fairly early period were found. They seem to confirm the dating of the Trinquetaille *villa* to second half of the 3<sup>rd</sup> century<sup>57</sup>. Presence of the marble, which is discussed later, is a crucial indication to explore the sonic properties of the *Diaeta of Orpheus* in Piazza Armerina. It is worth adding that some of the rooms were place in the vicinity of water sources like

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<sup>46</sup> Witts 2000, 302.

<sup>47</sup> *Ibid.*, 303.

<sup>48</sup> *Ibid.*, 316-318.

<sup>49</sup> Gazda 1994, 127.

<sup>50</sup> Angiolillo 1974, 185.

<sup>51</sup> *Ibid.*, 186.

<sup>52</sup> Alvarez-Martinez 1994, 209.

<sup>53</sup> Beczelly 1988, 122.

<sup>54</sup> Gianfrotta 1976, 200.

<sup>55</sup> Benoit 1934, 343.

<sup>56</sup> *Ibid.*, 344.

<sup>57</sup> *Ibid.*, 347.



Piazza Armerina, but also in Cos II, Volubilis and Blanzky<sup>58</sup>, while other directly in baths: Perugia, Sakies-es-Zit, Saint Romain en Galle<sup>59</sup>. Some of the spaces with Orpheus mosaics were described as one having a religious context, like in case of Ellis' hypothesis on Littlecote. Foucher suggested that the Orpheus from El Djem was found in the Dionysiac ambience; this reasoning is based on the similarity of the ornaments that are also found in Thysdrus and are placed in the vicinity of the Satyres and Bacchants, however there was nothing of the objects that would fully confirm the Dionysiac character of the room at El Djem<sup>60</sup>. Jesnick stated that the rooms with Orpheus mosaics might have been place of the Bacchic cult because Orpheus was the poet of his rites<sup>61</sup>. Jesnick is suggesting here that some of the rooms with Orpheus might have served religious functions as the one in Sparta or Palermo I; she sees them as family shrines (?)<sup>62</sup>. Interestingly, Scott has suggested that a room with Orpheus would be appropriate for conducting business and to impress people of a lower social status, as well as for the entertainment and showoff<sup>63</sup>. She poses as an example the reception room at Woodchester. With four entrances reserved for the guests, Woodchester room was probably where the *dominus* met with his clients and a banquet room. Whether it had a barrel vault or was with colonies and the gallery it would have enhanced the visibility of Orpheus mosaic, thus the figure of the *dominus*<sup>64</sup>.

## 5. DECORATION AND FURNISHING IN LATE ANTIQUE VILLA

After presenting different proposed functions for the Orpheus rooms let us move to the objects that were or might have been found inside with a particular attention to the decorations and seating facilities. This enables a deeper understanding of what might have happened inside the rooms. There are various types of decoration and furnishing that were present in the Late Antique domestic context like mosaics, marbles or wall paintings. According to Baldini, the most important feature of the decorative mosaics was to glorify the *dominus* and express his cultural knowledge and education<sup>65</sup>. Other objects that could be mentioned are sculptures which were either taken and brought inside or executed *ex novo*<sup>66</sup>. Usually, the statues were employed to glorify the owner<sup>67</sup>. Displaying sculptures in connection to the other parts of the interior design as mosaics was popular in Imperial Roman times<sup>68</sup>, like in the case the *Diaeta of Orpheus* in Piazza Armerina, where copy of *Apollo Lyceus* of Praxiteles was displayed<sup>69</sup>. It is not known where the statue originally stood since *stibadium* might have been placed originally in the apse of the room<sup>70</sup>. It is also crucial to mention objects that did not survived to our times like rugs and curtains which are present on pictorial sources yet are almost impossible to reconstruct<sup>71</sup>. We also must take to account that if the Romans, at least the wealthy ones wanted to create some kind of division in the houses (with e.g. curtains) they could have achieved that, without it being reflected in the permanent structures of the buildings<sup>72</sup>. Also, what has

<sup>58</sup> Jesnick 1997, 104; Vieillefon 2004, 987.

<sup>59</sup> Vieillefon 2004, 987.

<sup>60</sup> Foucher 1962, 651-652.

<sup>61</sup> Jesnick 1997, 104.

<sup>62</sup> *Ibid.*, 105.

<sup>63</sup> Scott 1995, 117.

<sup>64</sup> *Ibid.*, 116.

<sup>65</sup> Baldini 2001, 76.

<sup>66</sup> *Ibid.*, 86-88.

<sup>67</sup> Scott 1995, 116.

<sup>68</sup> Gazda 1994, 79.

<sup>69</sup> Gentili 1999, 15.

<sup>70</sup> Carandini, Ricci, De Vos 1982, 138.

<sup>71</sup> Baldini, 2001, 76.

<sup>72</sup> Dunbabin 1993, 171.

been already mentioned in some of the Orpheus rooms the water fountains were present. The main importance of the fountains inside the rooms was to evoke the feeling of nature<sup>73</sup>. We must acknowledge that fountains were not only visually pleasing but filled the room with pleasant and delicate sound of the murmuring water. Aside from already mentioned cases of Orpheus rooms we can also mention here the case of the El Ruedo Villa in *Baetica* where there was *nymphaeum* displayed on the back of the *triclinium*. It was made to make it more comparable to the outdoor dining experience<sup>74</sup>. Yet what seems most important in presented study is the question of seating. In Late Antique domestic context, substantial change occurred in furniture for seating. From various sources we are informed that tables, beds, and other furniture were used in the Late Antique domestic spaces<sup>75</sup>. The 3<sup>rd</sup> and 4<sup>th</sup> century A.D. have seen the growth of the popularity of *stibadium* or *sigma* couches which had the semi-circular shape. Apart from the *stibadium* couches we can also mention *sedie* and *sgabelli* that were used as chairs<sup>76</sup>. Some of the scholars suggest that apses present in many spaces in Late Antique *villas*, grew in popularity due to commonness of *stibadium* couches; thus, apses might have served for *stibadium* placement. Witts however disagrees pointing out that the niches were sometimes too small for the placement of *stibadium* (like in the case of the Littlecotte tri-apse room<sup>77</sup>)<sup>78</sup>. This kind of couches were also used in the outdoors dining, which can be seen on the mosaics of Piazza Armerina in the Room 30<sup>79</sup> or on the mosaic of Villa of Tellaro<sup>80</sup>. Witts suggested that the couches, by comparison with the Pompeian evidence, measured around 1,5-2,0 m and the rooms were of usual width of 5,5 to 6,0 m. Conversely, there are cases of Orpheus compartments where the apses were suitable places for *stibadium*. If we consider such placement, we must also consider the fact that it was then the focal point of the audience/reception hall, and it might have been place where *dominus* was seated<sup>81</sup>. According to Bek the popularity of *stibadium* in the Late Antiquity changed the 'approximate' number of guests from 9 ('maximum' of people seated on the 3 *kline*) to 6/7 people<sup>82</sup>. Sometimes *stibadium* was included in the masonry of the villa, like in case of the El Ruedo Villa in *Baetica* (end of 3<sup>rd</sup>/early 4<sup>th</sup> century A.D.)<sup>83</sup>. All the above-mentioned evidence, from literary sources to material culture prove useful in the analysis of the soundscape of the *Diaeta of Orpheus* in Piazza Armerina.

## 6. MUSIC AND ACOUSTICS IN (LATE) ROMAN CONTEXT

In the following part we encounter different views that were stated by architects and musicians on acoustic and musical matters. Their thoughts allow us to understand the meaning of the acoustics in architectural spaces, harmony and experience of musicians themselves as well as the power of music described by its original encounters. In the context of music, we must firstly note that some of the earlier Greek works, like Plato's *Timaeus*, still play crucial role in the 4<sup>th</sup> century A.D. world, which is proven by Plato's work's translation by Calcidius, concentrated on musical fragments and enriched with illustrations and diagrams. Important author that tackled the question of acoustics was Vitruvius. He described acoustic objects that according to him helped to enhance the resonance of the sounds in the theaters: *echea*, which were bronze vases<sup>84</sup>.

<sup>73</sup> Dunbabin 1996, 77.

<sup>74</sup> Dunbabin 2003, 169.

<sup>75</sup> Baldini 2001, 79.

<sup>76</sup> Baldini 2001, 83.

<sup>77</sup> Witts 2000, 296.

<sup>78</sup> Witts 2000, 292.

<sup>79</sup> Baldini 2001, 83.

<sup>80</sup> Dunbabin 1996, 76; Dunbabin 2003, 146.

<sup>81</sup> Witts 2000, 296.

<sup>82</sup> Bek 1983, 84.

<sup>83</sup> Dunbabin 2003, 169.

Vitruvius bases his knowledge of the acoustics on musical theory and suggests that every vase should be tuned to a certain height of a musical note<sup>85</sup>. Later similar acoustic systems were used in medieval churches<sup>86</sup>. This fragment of Vitruvius informs us on few important things. Firstly, Vitruvius noted the fact that singers preferred spaces with good reverberation to hear what they were producing<sup>87</sup>. Secondly, although the fragment is devoted to describing acoustics of the theaters we learn from it about Vitruvius' observations of acoustic properties: he states that for musician wood had more resonance than marble or stone. This statement is particularly important for the later analysis of the acoustics of the *Diaeta of Orfeo* in Piazza Armerina. Next thing we must give a closer look to is the harmony, which was in fact already mentioned as one of the properties of Orpheus music. In general, the theory of harmonics is ascribed to Pythagoras, as he was the one to explain the concept of the intervals<sup>88</sup>. The harmony that Vitruvius refers is the one of Aristoxenus which is a bit different from the Pythagorean one. Aristoxenus ideas on the harmonics are mostly focused on the pleasure of the musicians and experience, not stressing out the harmony of the sphere theory so much<sup>89</sup>. If we are to speak about later authors there are three names that cannot be omitted: Aristides Quintilian, Martianus and Boethius. One of the most important music treatises comes from Late antiquity being the Quintilian's *De musica*. Work has its reception in the Bryennius in the Byzantine times and then in Poliziano treaties in the Renaissance<sup>90</sup>. According to Aristides, music has a special potential<sup>91</sup>; some part of Quintilian's work is devoted to the description of the lyre as an instrument of a great (healing) power or comparison of the human voice to the flute<sup>92</sup>. He also mentions the fact that music is important at different stages of life and states that music is important for mature people due to its epistemological content<sup>93</sup>. Martianus addressed music as well as his later intellectual heritage bearer Boethius. In *De nuptiis* Martianus sees music primarily through the lenses of mundane harmony, but not only<sup>94</sup>. Boethius was the one who was responsible for the division of the three types of music: *musica mundana*, *musica humana* and *musica instrumentalis*. The first one is the music that is produced by the universe, the second is the harmony of the soul and the third one is produced by humans with the use of their voices and instruments. *Musica instrumentalis* is an emanation of the *musica mundana* and *musica humana* and has a power to change the state of the soul. In the Boethius' understanding there are also three types of musicians: instrumentalists (performers) poets (composers) and the judges of the performance (according to the author true musicians)<sup>95</sup>. Boethius believed that music, was not constructed by the rational decision or sensual experience, but as a revealed truth. Especially considering the intervals and proportions<sup>96</sup>.

## 7. WHO PRODUCED MUSIC?

To fully grasp the subject of people producing music in the domestic context let us take a closer look at history and literary source on musical practice in the households. Firstly, we can refer to words of Aristides Quintilian, who observed that there was no human activity

<sup>84</sup> Vit. 4.4 (ed. Granger 1931).

<sup>85</sup> Arns Crawford, 1995, 106.

<sup>86</sup> Tallon 2016, 265-267.

<sup>87</sup> *Ibid.*, 269.

<sup>88</sup> *Ibid.*, 268.

<sup>89</sup> Arns, Crawford 1995, 112.

<sup>90</sup> Brancacci 2013, 13.

<sup>91</sup> *Ibid.*, 17.

<sup>92</sup> Ardelean 2022, 9.

<sup>93</sup> Brancacci 2013, 19.

<sup>94</sup> Mart.Cap., 339, 3-10 (ed. Willis 1983); Bower 2006, 139.

<sup>95</sup> *Ibid.*, 146.

<sup>96</sup> *Ibid.*, 142.



without music<sup>97</sup>. In the Republican Age the performance of music and going to acting/music schools were considered rather inappropriate in the eyes of conservative elites as is attested by Macrobius<sup>98</sup>. We also know from Seneca that there were sounds coming from the private houses where wives and husbands engaged in the pantomime and dancing, and even in small private competitions<sup>99</sup>. Moreover, Cicero criticized such things as performing a dance and even uses the word dancer as invective<sup>100</sup>. In broadly understood Roman times musicians were rather seen as craftsman not artists, if they were freemen, however this job was usually executed by slaves<sup>101</sup>. Generally, in Roman culture at *symposia* the aristocrats and well-educated man were supposed to be skillful to recite or improvise poetry however were not supposed to sing<sup>102</sup>. In the Augustan age singing and playing music became popular among the higher-class of course the most famous aristocrat entertainer is *Trimalchio* from Petronius' *Satyricon*, however he is not an aristocrat from the education pedigree<sup>103</sup>. It was emperor Nero who had fully changed the opinion on the entertainment like doing music and dancing among the Roman aristocracy<sup>104</sup>. Musical characteristics of Imperial Age were rather like Republican times mentioned above, however performing in the private sphere executed by the aristocrats was seen more appropriate, while in the theatre not. It was Plutarch who described the practice of singing and performing together at the *symposia*<sup>105</sup>. We are informed from literary sources that women also could have taken music lessons<sup>106</sup>; however, it is not described that they are performing at the supper parties<sup>107</sup>. Yet we see in Pompeian paintings women singing. As usual the context is what matters the most: painted female, contrarily to Leucippus, is an adult woman and is probably engaging in the singing as spontaneous activity. Woman of Ancient Rome, meaning the aristocrats, if described as too skillful in musical capabilities were poorly considered (especially in the context of performing at not all-female parties)<sup>108</sup>. But what about children? Music was thought to children and adolescents to provide them with moral and cultural education. It might be stated that music is the synonym of education, culture and refinement<sup>109</sup>. We learn from Pseud-Lucian's *Amores*<sup>110</sup> that young boys were being educated in the art of playing the lyre. Importance of the instruments for young musical adepts is visible in the *Papyrus Oxyrhynchus* 119<sup>111</sup>. We see there a request of a son Theon to his travelling father to send him a lyre from Alexandria. This interesting document coming from 2<sup>nd</sup>/3<sup>rd</sup> century A.D., informs us on the importance of the lyre to the young Theon. Young boy begging his father for the instrument threatens not to drink nor to eat. Apart from well-born youngsters the child slaves, both boys and girls, were brought to banquets as a form of entertainment<sup>112</sup>. From the testimonies of music in ancient world we can mention also *Deinosphistae* of Athenaeus of Naucratis. Athenaeus writes there: *My fellow-citizen Alexander (he died not long ago) gave a public concert on the instrument called the trigonometry and made all the Romans so mad about music that many of them have even memorized his tunes*<sup>113</sup>. Thus, although we are talking here about

<sup>97</sup> Aristid., *Quint.*, 2.4, 57.23-24 (ed. Mathiesen 1983).

<sup>98</sup> Macr., *Sat.*, 3.14.7. (ed. Kaster 2011).

<sup>99</sup> Sen., *Nat.*, 7.32.3. (ed. Corcoran 1972).

<sup>100</sup> Cic., *Pis.*, 10.22 (ed. Watts 1931); Cic., *Cato*, 2.10.22-23 (ed. Falconer 1923); Cosgroove 2023, 175.

<sup>101</sup> Cosgroove 2023, 176.

<sup>102</sup> *Ibid.*, 178.

<sup>103</sup> Petron., 35; 52; 55; Cosgroove, 2023, 180.

<sup>104</sup> Cosgroove, 2023, 179.

<sup>105</sup> Plut., *Mor.*, 743c (ed. Babbitt 1927).

<sup>106</sup> Ach. Tat., 2.1.1-3 (ed. Gaselee 1969).

<sup>107</sup> Cosgroove 2023, 181.

<sup>108</sup> *Ibid.*, 180.

<sup>109</sup> Vieillefon 2003, 111.

<sup>110</sup> Luc., *Am.*, 44 (ed. MacLeod 1967).

<sup>111</sup> P. Oxy. 119. (ed. Grenfell 1898).

<sup>112</sup> Cosgroove 2023, 193.

<sup>113</sup> Anth. 184e. (ed. Olson 2007).

some customs, the spontaneous humming, singing, memorizing melodies, is something that is lost from the contemporary record and obviously not possible to reconstruct.

## 8. SOUNDS OF VILLA AND CONVIVIUM

To begin with there is a diverse hierarchy of the sounds that are the components of the soundscape: the keynotes- basically the background sounds, the foreground sounds- the ones that are intended to attract the attention of the listener and the sound marks, which are the sounds that are particularly important for the community of listeners<sup>114</sup>. Soundscape can be understood as a sonic environment in which sounds have a particular meaning to the listener<sup>115</sup>. To discuss how insides of houses were perceived by the romans we can refer to Pliny's Letters where he described his multi-sensory experience of the house<sup>116</sup>. He mentioned the murmuring sounds of the ornamental pool which for him was pleasurable to see and hear or that in the bedroom no sound could have been heard<sup>117</sup>. We must also note that listener can experience sounds in different ways while shifting positions and self's placement in the *villa* or even in the room<sup>118</sup>. Of course, fully describing the soundscape of the house it is rather a dead's man wish, thus we should focus our attention on the spaces with Orpheus mosaics. Whether the function was *triclinium*, *diaeta* or grand reception hall, they all have in common that convivial/ dining activities could have taken place there. The event of dining can be described as a mirror of the social functions and dynamics<sup>119</sup>. What was desired at the *cena/convivium* was on the one hand a refined conversation executed by the participants, while musicians were supposed to provide the entertainment by playing various instruments like horns and pipe. Music at the banquet was an expression of the luxury, also the above-mentioned aerophones were the symbol of luxury themselves<sup>120</sup>. Entertainment of the eating and dinning in the theatrical way was considered desirable from the Late Republican Period to the 5<sup>th</sup> century A.D.<sup>121</sup>. Now let us take a closer look at some Roman banquets that are described in the written sources. In one of the chapters of *cena Trimalchionis*<sup>122</sup>, there are two major musical events that are described: there is continuous singing of the servants and then the *symphonia* intermezzos which mark important points during the event<sup>123</sup>. In Chapter 31 it is described that clumsy and annoying singing of servants is always present and results in a rather annoying background noise Petronius also mention the fact that *symphonia* playing is too loud and exaggerated. Thus, we can observe that the musicians are playing in a rather too loud and obscene way. The parodic dinner party of Trimalchio teaches us, by being a bad example of what kind of music was desirable during the dinner party: subtle and if not being a performance of renowned musician rather a background for conversation. The other sonic events that we can mention during this dinner party are the table tales of participants and then arrival of the actors specialized in Enactment of Homer<sup>124</sup>. There are other sonic events present as well, the acrobats showing of their repertoire, dogs barking, Trimalchio trying to perform solo singing, cook singing his song while carving meat or celling rumbling<sup>125</sup>. Platts has also examined various descriptions of the convivial activities and

<sup>114</sup> Murray Shafer 1979.

<sup>115</sup> Mleukuz 2014.

<sup>116</sup> Platts, 2020, 28.

<sup>117</sup> Plin., *Ep.*, V.6.23 (ed. Radice 1969).

<sup>118</sup> Mungari 2023, 114.

<sup>119</sup> *Ibid.*, 117.

<sup>120</sup> *Ibid.*, 117.

<sup>121</sup> Dunbabin 1996, 67.

<sup>122</sup> Petron., 18 (ed. Warmington 1913).

<sup>123</sup> Mungari 2023, 118.

<sup>124</sup> *Ibid.*, 118.

<sup>125</sup> Petron., 35; 60; 68; 70; 72 (ed. Warmington 1913).

accurately has pointed out that other sounds happening at dinner like clicking of the finger to the servants<sup>126</sup>. Musical entertainment was considered secondary to proper conversation of elite men<sup>127</sup>. Music is described by Plutarch<sup>128</sup> as a rather a background thing, and it is not always listened as the main part of banquet<sup>129</sup>. Some of the elite members were praising the fact that they do not need a musical entertainment for the *symposium* or a banquet to go well and to be refined and speak highly of them<sup>130</sup>. Other auditory experiences that might happened during Roman dinning practices are hearing of music and poetry produced by musicians and actors, clinking of the goblets and sounds of the wine being poured<sup>131</sup>. The objects that are part of the domestic soundscape might be considered bone fleets, musical instruments or knucklebones which enhanced the auditory experience of the life in the house. Among those not mentioned by Platts we can mention *oscilla*, ceramic rattles or other objects that contributed with their secondary sonic function like bracelets<sup>132</sup>. Dunbabin also suggested that the dinners in the late antiquity were sort of a merge of both inside and outside activities<sup>133</sup>. The other thing that we can say about summer *triclinia* were in fact the vicinity of bird's singing and chirping and fountains producing soft murmur of the water. Platts saw these kinds of sonic solutions as the distraction from the noises going inside of the house<sup>134</sup>. The views and then probably also the sonic effects of the water either inside of the rooms for dining or in the peristyles were a sought-after effect in the Late Antiquity, which is also attested by the poem of Sidonius Apollinaris<sup>135</sup>. While speaking about the sources that attested musical practice in the domestic spaces of Late Antiquity, we cannot omit description that can be found in *Res Gestae* of Ammianus Marcellinus. As we see here and as it has already been observed by Sfameni this passage cannot be a proof of omnipresent music the 4<sup>th</sup> century domestic context, and it is rather a commentary on the corruption of the upper classes<sup>136</sup>. Other sources that describe in rather negative way the domestic musical practices are the complaints of Church fathers as Gregory of Nyssa who lists mimes, *kitharodes*, female singers and other musicians as parts of luxurious banquets or John Chrysostom, who criticizes higher classes for bringing 'the filth of the theatre' inside their houses<sup>137</sup>. Also, another proof that can be used to attest music in the Late Antique domestic context are three mosaics coming from different parts of Empire: one of *triclinium* of villa Noheda (Cuenca) in Spain (**Fig. 1**), the banqueting scene from villa kept today at Bardo Museum in Carthage and last one from 4<sup>th</sup> century villa of Mariamin in Syria, present in the Museum Hama (**Fig. 2**). On the mosaic of Bardo Museum we can see an old musician playing flute and dancers<sup>138</sup>. Mosaic of Mariamin exhibits use of hydraulic organ, women playing *crotola* and there is also instrument called oxybaphon/*acetabulae*<sup>139</sup>. On the Syrian mosaic we can also spot women playing *tibiae* and there is a grand *kithara* present. Kiilerich even suggest that the mosaic is depicting an event that could have taken place in this room<sup>140</sup>, while Sfameni believes it has been an event for a wider public<sup>141</sup>.

<sup>126</sup> Platts 2020, 168.

<sup>127</sup> Cosgroove 2023, 196.

<sup>128</sup> Plut. *Mor.*, 7.8.2 (ed. Babbitt 1927).

<sup>129</sup> Cosgroove 2023, 197.

<sup>130</sup> *Ibid.*, 206.

<sup>131</sup> Platts 2020, 174.

<sup>132</sup> *Ibid.*, 175.

<sup>133</sup> Dunbabin 1996, 76.

<sup>134</sup> Platts 2020, 179-180.

<sup>135</sup> Dunbabin 2003, 172.

<sup>136</sup> Sfameni 2023, 203.

<sup>137</sup> Webb 2013, 285.

<sup>138</sup> *Ibid.*, 209.

<sup>139</sup> *Acetabulae* are mentioned by Cassiodorus and Isidore of Sevilla yet in the textuary description exhibit a bit different organology. Consultation with Doctor of Percussion instruments Antonina Kadura exhibits that probably instrument in the modern term should be called a 'proto-vibraphone'; Böhm 1998.

<sup>140</sup> Kiilerich 2011, 92, 105.

<sup>141</sup> Sfameni 2023, 210.





Fig. 1. Panel B of mosaic of triapsidal hall of the villa. Noheda (Cuenca), Spain (Photo: J. Latova; figure produced after Sfameni 2023).

Above-mentioned mosaics especially once depicting musical scenes are an important source of the musical practice in Late Antiquity yet cannot be taken as a proof of music performance happening in the very spaces with them. In the following chapter the detailed study on sound and space is provided for the *Diaeta of Orpheus* in Piazza Armerina, which enables us to conduct the acoustic experiment and understand more thoroughly the soundscape.

#### 9. VILLA DEL CASALE, PIAZZA ARMERINA - MOSAICS AND SPACE

From the technical perspective the Villa after being constructed underwent only minor architectural adjustments; the main building materials that have been used are mortar rubble and brown, local stone<sup>142</sup>. The entrance of the Villa leads through the courtyard with a central basin, and a portico, shaped in irregular D shape<sup>143</sup>. Going through the peristyle leads the Room 35 called the *Diaeta of Orpheus*, described in detail in next paragraph. While thinking of the movement in the Villa we must acknowledge that the space of the Late Roman houses was explored by the guests of different status in different ways and by taking different routes<sup>144</sup>. Thus, our later considerations on the soundscape of the *Diaeta of Orpheus*, are seen from perspective of the *dominus* himself or the guest that were joining him for banquets/ conducting affairs in the

<sup>142</sup> Wilson 1983, 15.

<sup>143</sup> *Ibid.*, 16.

<sup>144</sup> Gazda 1994, 123.



Fig. 2. Mosaic with female musicians, Mariamin, Syria, Museo di Hama, 4<sup>th</sup> century A.D. (after Sfameni 2023).

room. Crucial part of that experience was undoubtedly admiration of mosaics and decorations, which wide iconographic apparatus lead along with the study of the shapes of the rooms to the recognition of the function of the rooms of the Villa. For example, as Baldini stated apsidal and tri-apsidal room (among them the *Diaeta of Orpheus*) are the most representative spaces present in the villa; corridors and peristyle serve as a connective space which leads to the representative areas<sup>145</sup>. Let us take a closer look at the general notions on the mosaics of Piazza Armerina, which enables understanding of the *Diaeta of Orpheus* function in the Villa's microtopography. In the roman context we can see how the decor of the houses focused on the taming of nature by humans<sup>146</sup>. Mosaics in Piazza Armerina were studied by many distinguished scholars. Stratigraphy and composition of stratigraphic units have been only fully published in Gentili's work<sup>147</sup>. In the mosaics of 4<sup>th</sup> century A.D. in Sicily a strong North African influence can be spotted, especially in Piazza Armerina<sup>148</sup>. Similarly to Piazza Armerina the direct influence is visible in the mosaic of Orpheus in Palermo, especially due to the still pose and decorations on the borders of the mosaic<sup>149</sup>. As Baldini observed the inspirations for the subject of the mosaics in the 4<sup>th</sup> century A.D. come from the IV style of Pompeian paintings and the garden landscape painting of Republican age<sup>150</sup>. From the perspective of the iconography the overall interpretation of the mosaic complex focuses on the concept of man's victory over passions and brute forces thanks to music (Orpheus over the terrestrial beasts, Arion over the marine ones, cunning (Ulysses and Polyphemus, Eros and Pan) and the strength (the hunters of wild animals, Jupiter and the other gods of the giants, Bacchus on Lycurgus)<sup>151</sup>. It must be remembered that the full

<sup>145</sup> Baldini, 2016, 155.

<sup>146</sup> Gazda 1994, 10.

<sup>147</sup> Baldini 2008, 380.

<sup>148</sup> Wilson 1982, 414-415.

<sup>149</sup> *Ibid.*, 420.

<sup>150</sup> Baldini 2022, 40.



iconographical study of the rooms might have been only fully understood if we take to the account e.g. the fresco decorations as well. In presented study, the wall decorations, marbles, which are present in the *Diaeta of Orpheus* help to understand not only the 'visual landscape' but also the soundscape. In the Villa there are other spaces that either have musical mosaics or relate to convivial activities and entertainment. Here are to mention: the *Diaeta of Arion*, *Tri-apsidal Chamber*, the *Basilica* or *Room of Child Actors and Choirs*. Study of these spaces will also enable us to understand better the meaning of the sound in the *Diaeta of Orpheus*.

#### 10. DIAETA OF ORPHEUS

The *Diaeta of Orpheus* (Room 35) is a room placed in the northern part of the peristyle of the Villa del Casale. It is a large room opened to the peristyle, like no other room in the Villa. Main part of the room is rectangular (m 10,10 x 6,10) and crowned with the apse (Figs. 3-4). The apse might have been covered with a dome (*casino apsidale*), while the rest of the room probably had pitched slope roofing<sup>152</sup>. The side walls of the *Diaeta of Orpheus* are no wider than short once so there was no barrel vault. What is more it is probable that the walls of the room supported a non-wood construction of the roof. The proposed roofing hypothesis is based on several elements: the relationship between the floor plan and the elevation, combined with the presence of adjacent rooms and the lack of vertical connections, suggests that this section of the villa lacked an upper floor. Furthermore, the discovery of Laconian-style tiles during excavation is consistent with the reconstruction of a pitched roof. Given the decorative apparatus of the room and the entire building, it seems unlikely that the roof beams were left exposed. The roof itself was probably composed of wooden rafters, and it was covered with clay tiles on the outside; inside the room the ceiling was probably covered with painted plaster. Today, inside the apse, there is a statue of Apollo *musagetes* (original position of the sculpture not known). The mosaic of Orpheus, discovered in 1946, is unfortunately damaged. Jesnick mentioned following sites as parallels to Piazza Armerina's apse: Sakiet-es-Zit, La Alberca, Arnal, Martim Gil<sup>153</sup>, Orbe, Whatley<sup>154</sup>. Room 35 has been recognized as *diaeta* or *centiuncula* based on notions of Sidonius Apollinaris<sup>155</sup>. Near the entrance there are bases of two columns visible; room is also adorned with a rectangular fountain. Similar fountains are found in Blanzky-les-Fismes and Woodchester. On the mosaic we see Orpheus representation (Type IIa) depicted in the long Thracian robes, cloak, red shoes and a Phrygian bonnet. Musician is depicted semi-frontally and is holding probably a lyre (depiction of the instrument damaged). Orpheus is seated on a rock and on his left side there is a leafy tree with birds seating on the branches. There are various types of animals both real and mythical that are surrounding Musician: *mammals*: bison, camel, fox, hedgehog, hippopotamus, mongoose monkey, mouse, pangolin, rhinoceros; *reptiles and amphibians*: tortoise; *birds*: cockerel, crane, goose, hoopoe, ostrich, peacock, pheasant, roller, robin, shelduck, stork, swallow, thrush, wheatear; *gastropods*: snail; *mythical*: griffin, phoenix. Generally, there are 60 creatures present on the mosaic, while 56 of them can be counted. Among the remarkable finds we have the marble pilaster capital and the blue glass plates that might have adorned the walls or the fountain<sup>156</sup>. Some of the small finds that were present in the room are lamps and coins (found near the *Diaeta of Orpheus*) mentioned by Gentili<sup>157</sup>.

<sup>151</sup> Sfameni 2006, 38.

<sup>152</sup> Reconstruction of the roofing of the *Diaeta of Orpheus* is based on suggestions of Dottoressa Claudia Lamanna and modern wooden reconstruction present in the villa.

<sup>153</sup> Also observed by Alvarez- Martinez in Alvarez-Martinez 1990 39.

<sup>154</sup> Jesnick 1997, 129.

<sup>155</sup> Sidon., Ep., II, 2 (ed. Anderson 1936).

<sup>156</sup> Carandini *et alii* 1982, 139.

<sup>157</sup> Gentili 1999, 102, 106.



Fig. 3. *Diaeta of Orpheus*, Villa del Casale, Piazza Armerina, 4<sup>th</sup> century A.D. (<https://sketchfab.com/GlobalDigitalHeritage>).

## 11. FUNCTION OF THE *DIAETA OF ORPHEUS* AT PIAZZA ARMERINA

The Villa del Casale with the apsidal or even three apsidal rooms, and apsidal ended corridors attest the fact it was a representative and visited place<sup>158</sup>. In the vast literature that is present the *Diaeta of Orpheus* is described differently while authors are concerned with the function. Usually at the back of the peristyle there was a room described as *oecus* or *triclinium* that was supposed to be a representational room for the guests (in which often mosaics suggested the placement of three *kline*)<sup>159</sup>. The northern placement of the *Diaeta of Orpheus* and the fact that it's opened to the peristyle suggests it was at least a semi-public space where guests visited or banqueted with the *dominus*. Let us deepen the theories that have been expressed so far by scholars on function of the room. In the latter part of this paragraph the function of the *Diaeta of Orpheus* is considered by

<sup>158</sup> Baldini 2007, 347.

<sup>159</sup> Gazda 1994, 119.

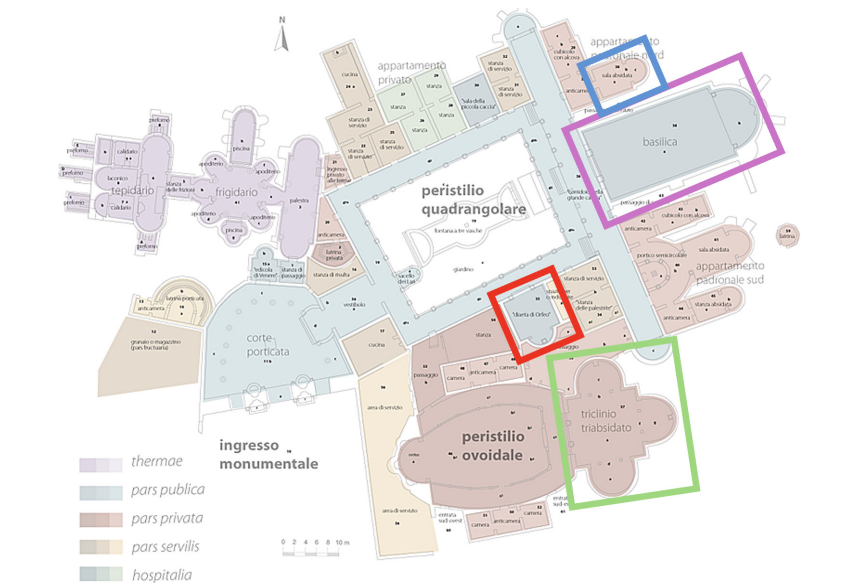


Fig. 4. Plan of the Villa del Casale, Piazza Armerina, 4<sup>th</sup> century A.D. *Diaeta of Orpheus* is highlighted in red (<https://www.vivigreen.eu/blog/villa-romana-del-casale-in-sicilia-centro-della-grande-tenuta-su-cui-si-basava-leconomia-rurale-dell'impero-occidente/>).

comparison to the similar compartments present in the Villa. Firstly, Jesnick believes that *Diaeta of Orpheus* in Piazza Armerina was serving as a small reception room and was a principal *exedra* of the peristyle<sup>160</sup>. According to Dunbabin Room 35 might be considered *diversiorum aestivum* giving its opening to the north. Dunbabin went one step further and suggested that *Diaeta of Orpheus* was the room sole for the performance of the music<sup>161</sup>, yet it seems rather unconvincing and is examined the digital experiment. On the other hand, Caradini suggested that the *Diaeta of Orpheus* was used for small gatherings maybe for lunch when the people were not eating in the private spaces (Rooms 30, 38, 41) or the *dominus* did not wanted to open the triapsal chamber<sup>162</sup>. Pensabene suggested that the *Diaeta of Orpheus* was in fact a *diaeta* for summer, while the one with Arion's depiction was the winter one<sup>163</sup>. Pensabene also stated that the Small Hunt room and the one with Orpheus were used for the same purpose but in the different seasons of the year<sup>164</sup>. The peristyle in the Villa del Casale had to have a semi-public function according to Pensabene (all the spaces with the geometric mosaics near the peristyle are considered as utility spaces, while the once with figurative mosaics, were dedicated to *dominus* and his guests)<sup>165</sup>. What is more, according to Pensabene, the *Diaeta of Orpheus* also due to the presence of the statue of Apollo, who is associated with the 9 Muses, might have been a room for the music and spectacles, the usage in the summer is suggested by the placement of the room in the northern part<sup>166</sup>. Thus, the question arises: how to consider the room among other similar spaces in the Villa? Firstly, we will tackle the subject of triconch apsidal room. Bek suggested that if the triconch apsidal room at Piazza Armerina was used for convivial activities it had much more representational and staged character than normal *triclinium/diaeta*<sup>167</sup>. The Tri-apsidal room is probably *triclinium* and is not connected to the main peristyle, similarly to the one present in

<sup>160</sup> Jesnick 1997, 104.

<sup>161</sup> Dunbabin 1978.

<sup>162</sup> Caradini *et alii* 1982, 138.

<sup>163</sup> Pensabene 2009, 81.

<sup>164</sup> *Ibid.*, 85.

<sup>165</sup> *Ibid.*, 84.

<sup>166</sup> *Ibid.*, 90.

<sup>167</sup> Gazda 1994, 95.

the Palace of Theodoric in Ravenna. Thus, if we consider Tri-apsidal chamber a *triclinium* and it's bigger than the *Diaeta of Orpheus* it is probable that the Room 35 was in fact a more private *triclinium* for smaller gatherings. It may be also supported by the fact that to reach the Tri-apsidal chamber there was no necessity to enter the Villa, thus there was no chance for the guests to give even a glance into the private sphere of them complex. Similarly to what have been suggested on the triconch room at Woodchester the apses might have been constructed to accommodate *stibadi*<sup>168</sup>. However, Ellis has suggested that the room that should be considered a *triclinium* is the Basilica while Tri-apsidal chamber was to be seen as grand dining hall. This poses some difficulties. The *Diaeta of Orpheus* seems alike to the *Diaeta of Arion* (Room 41) which is situated in the part of the complex with private compartments of the *dominus*. Carandini suggested that Room 41 was place dedicated to rather private gathering<sup>169</sup>. Also, the composition of the mosaic of Arion is not surprisingly similar the one of Orpheus. Arion is playing the lyre surrounded by the tritons and nereids, and many marine creatures. Similarly to the *Diaeta of Orpheus* walls of the *Diaeta of Arion* were decorated with the marbles<sup>170</sup>. There are other examples of the Late Antique of the vicinity of those two subjects, like in case of La Chebba<sup>171</sup>. Settis suggested the Dionysian reading off the Mosaic of Arion due to the presence of the marine panthers<sup>172</sup>. Settis' idea could lead us to conclusion that while we consider the *Diaeta of Arion* as a Dionysian space we can consider the *Diaeta of Orpheus* as Apollonian space. However, it seems more convincing not to ascribe such godly reading of the mosaics and spaces, since the iconography of the Arion's mosaic is much wider: there is a lyre, the instrument of Apollo and animals like deer ascribe to the very same god. But this iconographic hypothesis leads us to the conclusion that rather a placement of both rooms in the microtopography of the Villa's complex is more substantial. Not to add the fact, that all the iconography of the Arion, Orpheus and Small Hunt might be read as the subjects of philosophical meaning that the power of human mind can capture the forces of nature<sup>173</sup>. So finally come to the question: how in fact we should call the *Diaeta of Orpheus*? The *triclinium* or reception room theories seem most convincing due to the reasons of the placement inside the Villa's complex. Terms like *diaeta* or *oecus* seem too general. The above-mentioned theory of Dunbabin contradicts with what Vitruvius stated about the marbles: they have poor acoustic properties according to the musical performers, thus in theory the room reserved only to musical entertainment should be rather adorned with wood. Those facts implicate two things: firstly, musical performance was probably happening in the room but was not in fact the major event and secondly, the *Diaeta of Orpheus* should be seen as a multifunctional space.

## 12. MUSICAL OBJECTS OF PIAZZA ARMERINA

To fully study the soundscape of the *Diaeta of Orpheus* we also should investigate the musical objects present in Piazza Armerina. This part of the study is divided the three sections of the sonic objects themselves, instruments represented and then to investigating the *Diaeta of Orpheus* as an instrument itself. It is worth mentioning that the only object from Piazza Armerina (understood as a city) that has musical iconography and was described in the scientific literature in detail was *lastra plumbea* with depiction of the Dionysiac celebrations, however coming from the 4th century B.C. is not relevant to the following study<sup>174</sup>. The objects

<sup>168</sup> Carandini *et alii* 1982, 331.

<sup>169</sup> *Ibid.*, 258.

<sup>170</sup> *Ibid.*, 268.

<sup>171</sup> Vieillfon 2003, 113.

<sup>172</sup> Settis 1975, 978.

<sup>173</sup> Pensabene 2009, 91.

<sup>174</sup> Bellia 2011, 1-2.



of sonic properties found in the Villa del Casale are not numerous and unfortunately none of them is coming directly from the *Diaeta of Orpheus*. Sonic objects described in literature are three small bells: no.19 that comes from the north *portico* of the peristyle, no.20 that was found in *atrium* of porticoed entrance and no.27 from the north-east courtyard of the *triclinium*<sup>175</sup>. For the study the most interesting of them seems no.19 since it was found in the vicinity of the *Diaeta of Orpheus*. Of course, it is not possible to determine if the sound of the bell was hearable from inside of the Room 35 yet, we can investigate what kind of association it may have evoked. First, bells are usually connected to Dionysiac context and have an apotropaic function<sup>176</sup>. We can also refer here to Aymard who suggested that bells were used in Roman times during the fights to scare wild beasts away<sup>177</sup>. It is also attested in the pictorial sources that both wild and domestic animals were usually provided with bells around their necks. We see it on the painting of giraffe from *columbarium* of Villa Pamphili in Rome (circa 20-10 B.C.). Taking this to account we can assume that the presence of the sounds of small bells was enhancing the experience of the individual watching the mosaics with the animal depictions. And even if the sound of a small bell was not hearable in the *Diaeta of Orpheus* itself, the walk through the peristyle mosaiced with the medallions of animal heads seems to have been enough of suggestion. Next step of discussing the musical objects is to refer to the depictions of instruments present in the Villa. Room of the mosaic of the Children's Musical Competition (Room 45) is the one that presents the widest variety of the musical instruments depicted in the Villa (not to mention the lyres of Orpheus and Arion). Room 45 was probably a room dedicated as *cubiculum* to the children of the *dominus*, and in the pavement mosaic we see the musical concours depicted in the three registers. The players of the musical instruments are playing the *syrinx*, *tuba* and a *tibia*, there are also female representations in the poor state of preservation that were probably part of the choir; another female figure is also depicted playing an instrument but due to the poor state of the preservation is not recognizable<sup>178</sup>. Dunbabin is suggesting that the depictions of Room 45 are the part of the typical education for the young musical students; on the representation there is a *kithara*-player as well<sup>179</sup>. One of the instruments that gained the popularity during the Late Antiquity was *hydraulis* (water organ), however it is not depicted in the Villa<sup>180</sup>. The most interesting musical objects coming from the Room 45 is the devices with musical notes written in Greek from A to E. There are few theories in interpretation of that object: according to Duval it was a slot-machines used during the competition<sup>181</sup>, Dunbabin on the other hand suggested it was a machine to mark the parts of the play to make it more understandable for the audience in the theatre, while Gentili suggested they were *timpani*<sup>182</sup>. The wide musical iconography of Room 45 provides us with information on Late Antique *instrumentarium*, yet unfortunately, does not give us any direct clue on what kind of instruments might have been used in the Villa. Usually, it is believed that the instruments that were used in domestic space were those of the lower resonance power not suitable for the performances in *odea* or theatres. Now let us consider the *Diaeta of Orpheus* as an instrument itself by referring to the acoustic theories of Vitruvius. As it was already stated on walls of the Room 35 rests of the marbles were spotted. Of course, it is not possible to reconstruct all the height of the marble decorations yet as we learned from Vitruvius marble was not a preferable material for the musicians. It is also not optimal from acoustical perspective due to its hardness and flatness, especially in such a small space. But what about the apse and its' domed roofing? As Baldini stated the

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<sup>175</sup> Gentili 1999, 144.

<sup>176</sup> Perrot 2013, 27.

<sup>177</sup> Aymard 1937, 52.

<sup>178</sup> Carandini *et alii* 1982, 290.

<sup>179</sup> Dunbabin 2016, 36.

<sup>180</sup> Cosgroove 2023, 214-215.

<sup>181</sup> Duval 1984, 166.

<sup>182</sup> Dunbabin 2006, 205-209.



rooms for banquets and receptions have been adapted in the Late Antiquity to the apsidal shape<sup>183</sup>. Such adaptation is visible in various spaces across the Eastern and Western parts of the Empire. The schematic architectural motives helped the beholder to understand its more symbolic context. Pediment fronts, arches or especially domes were connected to somehow universally understood features<sup>184</sup>. Dome from ancient times relates to cosmic symbolism and harmony and expresses one of the Platonic cubicles<sup>185</sup>. The domed structures symbolize the power of the either imperial or Christian aptness for the cosmic rule<sup>186</sup>. Thus, seeing a domed structure might have also evoked connotations of *musica mundana*. And moreover, the space of the apse itself might have served in a room as a resonant cavity mentioned by Vitruvius. And if the *stibadium* was placed there it may have been a special place for *dominus* to have best sonic experience of the banquet/reception participants, which is also in accordance with notion of hierarchy expressed by Late Antique architecture.

### 13. LYRE OR *KITHARA*?

From Greek times, in the private space instruments like lyre, *barbitos* (bass version of *kithara*) and popular in Roman times *kithara* are used since their resonant potential is limited<sup>187</sup>. The mosaics of Orpheus all depict instruments coming from yoke lutes family: lyre and *kithara* (in classification of Hornbostel-Sachs no.321.2). According to Jesnick the musical instrument shown on the Orpheus mosaics is their most difficult to study feature<sup>188</sup>. Good representations of *kithara* are the ones from Chabba and Polajnice<sup>189</sup>. The mosaics demonstrating playing of the lyre in correct form are Tarsus, La Chebba, Cagliari and Sparta. Depictions of instruments are different on each mosaic; they might have been the image of contemporary local instruments or the imaginary ones. There are approximately two types of the instruments that may be distinguished on the Orpheus mosaics: *kithara* and lyre. Lyre is constructed with a tortoise shell sounding box and two horns either of a goat or antelope, and various number of strings. Strings were connected to the box with a bar. The animal horns arms are in later times made of wood. The ideal mythical lyre had seven strings. The other similar ancient instrument is *kithara* made usually with seven strings, which is depicted sometimes with higher number of strings (the higher number of the strings might have been applied by more skillful musician). The strings might have been plucked or strucked with *pectin* or *plectrum*. What is more Jesnick suggests that the instruments such as lyre were not so popular in the Late Antiquity and might have been known to the mosaicists from legends and stories. Vieillefon have posed the hypothesis that the mosaic artists maybe did not intend to create an accurate instrument on the mosaics, or they simply did not care<sup>190</sup>. While reading the hypothesis of Jesnick and Vieillefon it is hard not to question them, since undoubtedly musical performance of Orpheus was the whole reason of animals coming to listen, thus how possibly his instrument could not have been relevant? Here I would like to refer to archeological finds and organology of yoke lutes to question statements of Jesnick and Vieillefon. Before focusing on represented and found yoke lutes let us see what ancient writers stated about the instruments like lyre to prove their vital importance. According to Aristides Quintilian a lyre was a manly and serious instrument devoted to being played to accompany love songs<sup>191</sup>. Lyre was considered to have

<sup>183</sup> Baldini 2016, 147.

<sup>184</sup> Olovsson 2019, 138.

<sup>185</sup> *Ibid.*, 147.

<sup>186</sup> *Ibid.*, 148.

<sup>187</sup> Restani 2013.

<sup>188</sup> Jesnick 1997, 74.

<sup>189</sup> *Ibid.*, 75.

<sup>190</sup> Vieillefon 2003, 58.

<sup>191</sup> Aristid., *Quint.*, II (ed. Mathiesen 1983).

a power over the rational part of the soul of a man<sup>192</sup> while wind instruments were arousing the feral and wild part of human nature<sup>193</sup>. Friedman suggests that lyre is an instrument made according to the harmony of the universe and reflects it due to its creation and the fact that it travelled all over different planets (after Theon of Smyrna<sup>194</sup>)<sup>195</sup>. Thus, the depiction of lyre and Orpheus has been deeply rooted in the Neoplatonic concept of the soul and its connection with the harmony of universe<sup>196</sup>. Music spectacles are of Late Period are described also in the Claudian's<sup>197</sup>*Panegyric on the Consulship of Manlius* where he also described use of the lyre<sup>198</sup>. Lucianus stated that the lyre of Orpheus which had seven strings even represented the harmony of the planets<sup>199</sup>. As we have also seen above use of lyre is also described by Ammianus Marcellinus, who also attested the production of *hydraulis* and grand lyres in his *Res Gestae*<sup>200</sup>. Not to mention the description of the competitions of *kitharodes* by John Chrysostom<sup>201</sup>. First question that we could tackle to see if they represented lyres were not accurate is question of stringing. There was a huge variety in stringing: usually number of strings of the lyre varied from 3, 4, 6, 7, 8 and even 10. For *kithara* on the other hand 7 strings are conventional number. As it is shown (see **Table 1**), the variety of the strings showed on the Orpheus mosaic representations proves to limited extent the traditional number associated with lyre and *kithara*. Lawson stated it is sometimes hard or even not possible to assign ancient names to represented instruments<sup>202</sup>. Thus, if we treat all the instruments of Orpheus mosaics as a yoke lutes, we see that most of the numbers of the strings are in fact correct. Yet we seen those mosaics of Barton Far, El Djem, El Pesquero, Lepcis Magna, Littlecote, Mytilene and Ptolemais represent 5 stringed instruments. This number of strings is contrary to ergonomics of the playing and musical tuning logic (which will be explained in detail later) yet is not surprising and visible in later representations of lyres for example from the 8<sup>th</sup> century Cassiodorus manuscript of Durham where king David is carrying a 5-stringed lyre<sup>203</sup>. Similarly, not traditional numbers are 8 and 16 that are present on the mosaics of Sparta, Trinquetaille and Chahba, we can consider here a probable will of wanting to represent a very skillful musician. Of course, this does not prove that mosaicists were highly aware of the organology of the real instruments, yet it's hard to believe that they did not care or not seen any yoke lute.

So, the question comes, is there any real Late Antique finds of the yoke lutes? Undoubtedly, especially if we think of strict Late Antique period the 'real finds' of yoke lutes, especially in the domestic context are rather an exception yet they can be used to confirm or deny the accuracy of other sources (literary and pictorial documents)<sup>204</sup>. As Lawson stated, which in fact is with agreement of the Jesnick and Vieillefon hypothesis we cannot account pictures of instruments as complete and valid depictions of real objects<sup>205</sup>. Lyres dominate the represented instruments; for example, in Britain we see only lyres in mosaics, metalwork and sculpture. From finds of the string instruments there are two collections of *kithara* pegs coming from Vatican Museums and Museum of Piazza Santa Croce however both provenance and date

<sup>192</sup> Aristid., *Quint.*, II.18 (ed. Mathiesen 1983).

<sup>193</sup> Mucznik 2011, 284.

<sup>194</sup> Theon. Sm., *Philo Plat.*, 12 (ed. Hiller 1878).

<sup>195</sup> Friedman 1967, 9.

<sup>196</sup> Jesnick 1997, 76.

<sup>197</sup> Clavd., *Pan. dicto Manlio Teodoro, carm.*, 311-319 (ed. Platnauer 1922).

<sup>198</sup> Sfameni 2023, 205.

<sup>199</sup> Luc., *Astr.*, 10 (ed. Haramon 1936).

<sup>200</sup> Amm., 14.18; 28.12 (ed. Rolfe 1950).

<sup>201</sup> Webb 2013, 280-281.

<sup>202</sup> Lawson 2003, 97.

<sup>203</sup> *Ibid.*, 104.

<sup>204</sup> *Ibid.*, 94.

<sup>205</sup> Lawson 2008, 180.

Place	Dating	Instrument	Number of Strings	<i>Plectrum</i>
Brading	4 <sup>th</sup> century AC	lyre	3	n/a
Martim Gil	circa 4 <sup>th</sup> century AC	lyre	4	n/a
Palermo I	late 3 <sup>rd</sup> century AC	lyre	4	yes
Rome	after 300 AC	<i>kithara</i>	4	yes
Barton Farm	293-300 AC	<i>kithara</i>	4	n/a
El Djem	late 2 <sup>nd</sup> century AC	lyre	5	yes
El Pesquero	circa 350 AC	<i>kithara</i>	5	n/a
Lepcis Magna	3 <sup>rd</sup> century AC	lyre	5	n/a
Littlecote	circa 360 AC	<i>kithara</i>	5	n/a
Mytilene	after 250 AC	lyre	5	yes
Ptolemais	late 4 <sup>th</sup> – 5 <sup>th</sup> century AC	lyre	5	n/a
Neo Paphos	220-230 AC	<i>kithara</i>	6	yes
Trento	250 AC	lyre	6	n/a
Voluboulis	circa 250 AC	lyre	6	yes
Cagliari	250-275 AC	lyre	7	yes
Rougga	circa 250 AC	<i>kithara</i>	7	yes
Vienne I	circa 250 AC	lyre	7	yes
Sparta	250-300 AC	lyre	8	yes
Trinquetaille	240 AC	<i>kithara</i>	8	yes
Chahba	244-249 AC	<i>kithara</i>	16	yes

Table. 1. Selection of instruments (based on the criteria of best-preserved images) depicted on Late Antique mosaics of Orpheus with the number of strings and method of plucking the strings showed on the image.

is not known for these collections<sup>206</sup>. There are two sides published: Kerch (*Panticapaeum*) in Crimea and Intercisa (*Dunapentele*) on the banks of river Danube below Budapest where finds were ascribed and understood as lyres (the actual objects were for Kerch the metal bowl shaped and decorated as tortoiseshell and pegs, for Intercisa only the tuning pegs). The understanding of the parts of instruments coming from Late Antiquity is difficult because not rarely, especially if they are already placed in museums, they lack ‘musical interpretation’. Pegs from Intercisa were firstly dubbed small pillars, later chess pons before gaining the musical interpretations. *Panticapaeum* pegs were spotted in the context of the female grave and accompanied by the bronze box in shape of tortoise shell. Those objects were coming from the 4<sup>th</sup> century A.D. However, there is another collection of pegs published before as pendants that is dated to 1<sup>st</sup> and 2<sup>nd</sup> century A.D. and were found sealed beneath the mosaic floor and are

<sup>206</sup> *Ibid.*, 182.

coming from excavations of the Villa Comunale at St. Maria, Capua Vetere around 25 km from Naples; it is hard to determine from what kind of yoke lute they are coming from<sup>207</sup>. Thus, what these finds prove? Firstly, they debunk the theory of not existing lyres (or yoke lutes) in the Late Antiquity of Jesnick. Finds from Capua Vetere prove the use of string instruments in the domestic context (although being of an earlier age than most of the studied mosaics). Also, the organology of later instruments reconstructed by Lawson proves continuity in the use of yoke lutes in early medieval contexts. Lawson by reconstructing one of the instruments of 6 strings proved it to be the most ergonomic for musician and logical from musical perspective (it was tuned with a heptatonic major scale from F above middle C and enabled musicians both to use it for accompaniment and playing melodies)<sup>208</sup>. Such standardization of instrument proves continuous will to improve the practical experience of playing, thus makes hard to believe the disappearance of lyres and *kitharas* in Late Antiquity.

#### 14. DESCRIPTION OF EXPERIMENT

As it has already been stated the digital experiment is aimed at distinguishing whether the *Diaeta of Orpheus* was better for speech intelligibility or for musical performance or none. This experiment is also aimed at checking Dunbabin's hypothesis on devoting spaces with Orpheus mosaics for musical performance<sup>209</sup>. We also must keep in mind few facts stated before: the spaces of domestic context should be regarded as multifunctional, the character of performance in antiquity differed from our vision of silent audience and finally it is believed that in the domestic spaces instruments of the lower resonance were used. The experiment itself was executed in the software called EASE 4.4 and consisted of two methods: statistic and geometric. It is assumed that all partitions of the room are covered with a highly reflective material, which can be marble, stone slabs or other hard materials or plaster as in the case of roofing. Of course, giving our state of knowledge it is not possible to state the height of the marble decorations. Yet we know that aside from thermal spaces and basilica, walls in almost all the rooms in the Villa del Casale were covered with painted plaster. It is taken to account that there is a stone fountain in the center of the room. In the acoustic simulations performed, the background sound level was increased to 40dB as a mean of imitating the sound of overflowing water. The level of the acoustic background noise affects the acoustic simulation results for speech intelligibility. The lower the background sound level, the better the speech intelligibility results. Question of the closing of the room is also considered: the simulation assumes that no permanent dooring was present. The entrance to the room is covered with a thin cloth (curtain) following the indications also mentioned by Baldini<sup>210</sup>. In the simulations, it was assumed that the entrance opening covered with a thin fabric would have a very high sound absorption coefficient (the sound would not be reflected but would travel out of the room). The presence of the people in the room is from 6-10 as it could have been counted from the equations mentioned in the previous chapters; however, people as 3D objects are not substantially changing the question of the reverberation. A listening plane was placed at a height of 1.5 meters to present the results of acoustic simulations of speech intelligibility. For the simulation of the reverberation of the sound in the *Diaeta of Orpheus* the omnidirectional sound source was used. The signal that is sent from the source is voice of the woman and man of the normal volume (not whispering not shouting). Examined room has cubic capacity of approximately 445 m<sup>3</sup> (see Fig. 5). The total active area in the simulations performed is 350 m<sup>2</sup>.

<sup>207</sup> *Ibid.*, 182.

<sup>208</sup> Lawson 2003, 104, 109.

<sup>209</sup> Dunbabin 1978.

<sup>210</sup> Baldini 2001, 73.



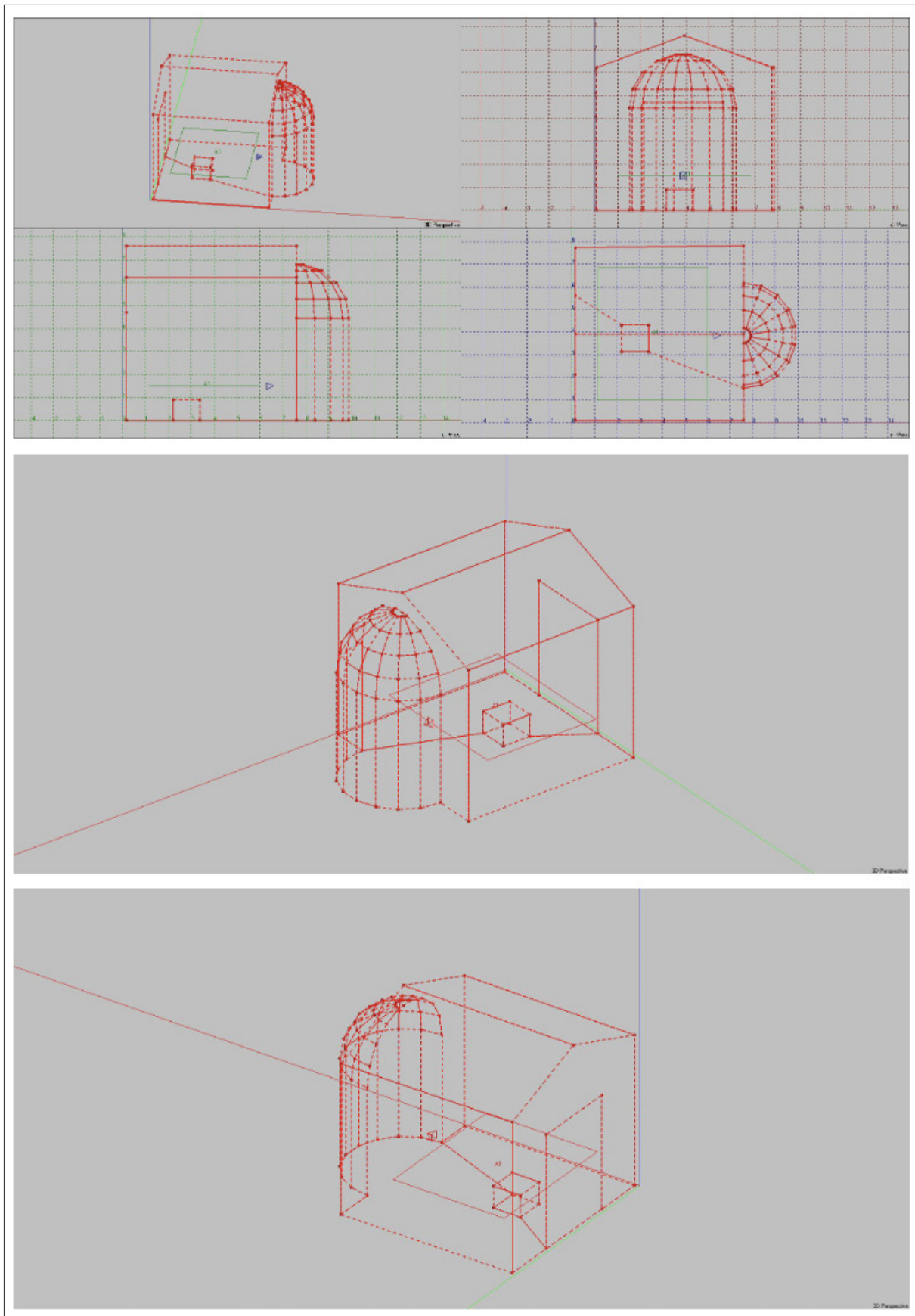


Fig. 5. Geometry of the *Diaeta of Orpheus* with 3D perspectives performed in EASE 4.4



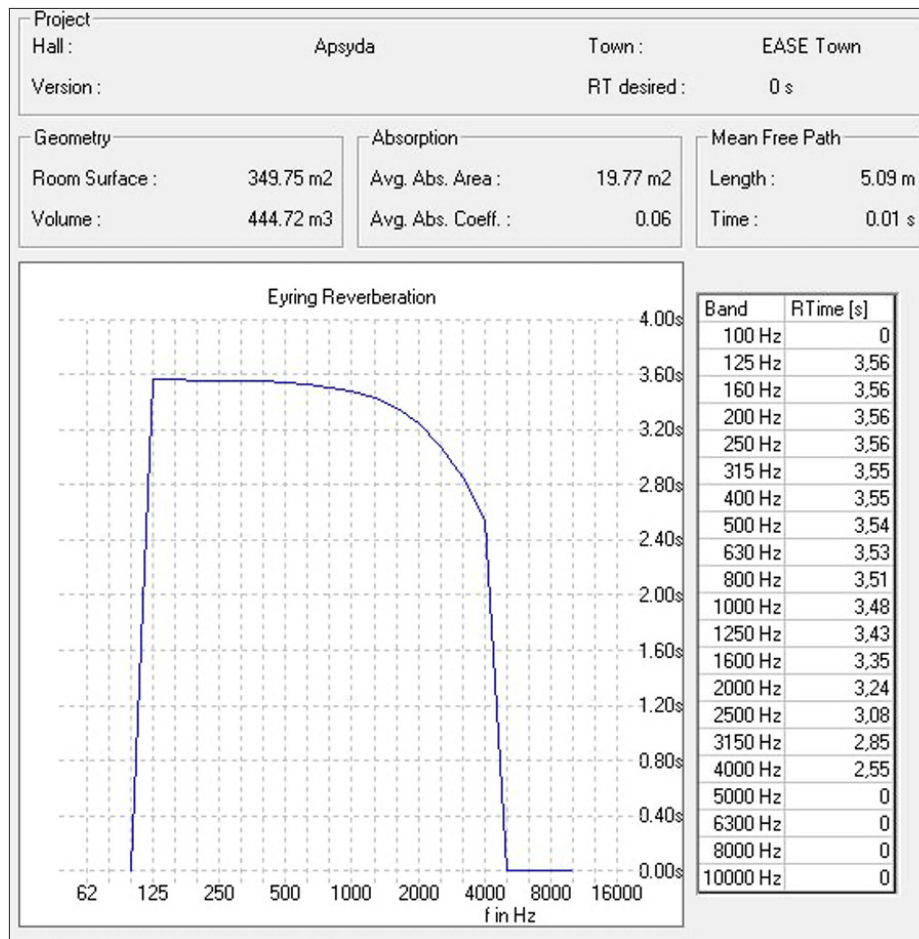


Fig. 6. The measurement of the reverberation of the *Diaeta of Orpheus*, executed in EASE 4.4.

## 15. RESULTS OF EXPERIMENT

The primary view on the acoustics of the space of the *Diaeta of Orpheus* seems to show that the room from modern perspective would be more suitable for the musical performance. In the modern view it would be either for organ music or classical voice. Primary reverberation was: 3,5 seconds and the higher reverberation of the sound is the lower understandability of the voice is. Primary view is followed by the detailed explanation of the results of the experiment.

### 15.1 Acoustic simulation of reverberation conditions

A simulation of the reverberation time - the time during which the sound level drops by 60dB when the sound source is switched off - was performed statistically using the Eyring formula<sup>211</sup>. This simulation is performed without a sound source such as human speech or a loudspeaker. The result of the computer simulation - a graph of the reverberation time as a function of frequency and its values are shown in the figure below (**Fig. 6**). The obtained result of the reverberation time simulation shows that the reverberation conditions in the room are very poor both for listening to music and singing and for listening to speeches. Similar values for the reverberation time are obtained for church interiors for listening to organ music, where quite a long time is needed for the sounds to reverberate. Of course, the simulation was carried

<sup>211</sup> To read more about Eyring formula see: Lawrence 1970, 148.

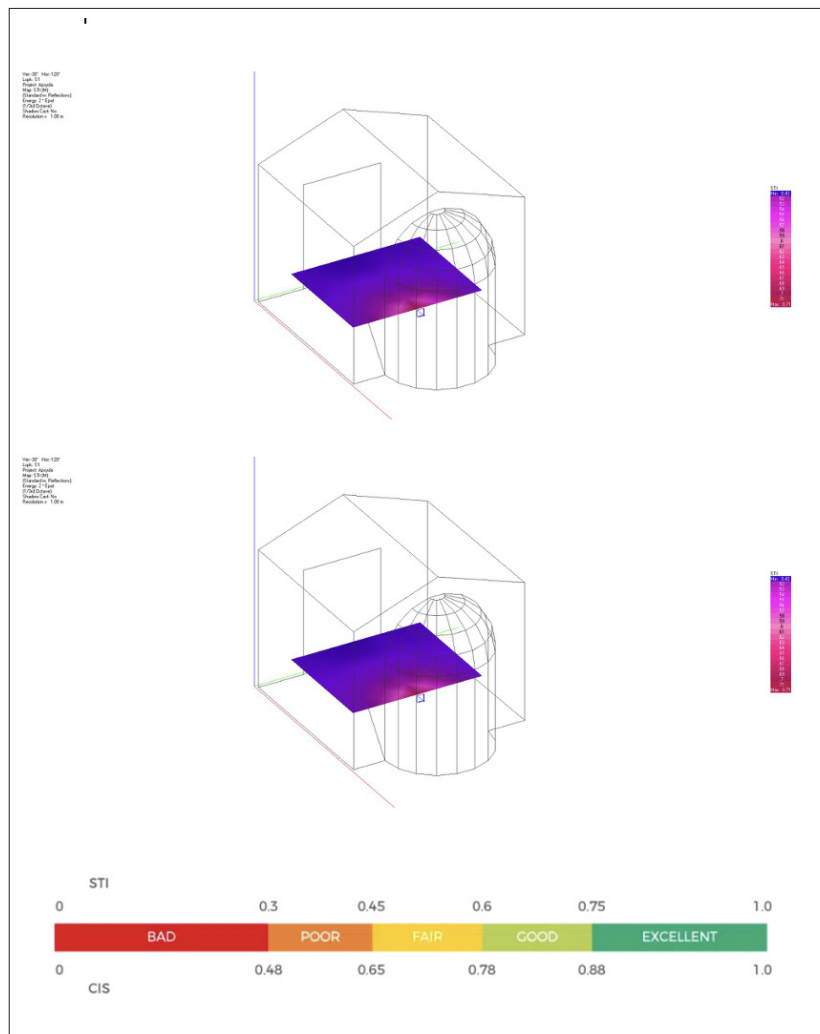


Fig. 7. Results of computer simulation of acoustics of the *Diaeta of Orpheus* examining the STI factor. In the lowest part of the figure the STI scale is shown.

out for an empty room; the presence of people would reduce the reverberation time a little (people as a 3D object have average sound absorption properties) but it would not result in such a big change of reverberation time.

### 15.2 Acoustic simulation of speech intelligibility conditions

Speech intelligibility simulations are performed by using a sound source. Two types of acoustic signals were used - a male voice and a female voice of a normal intensity. A sound source directed towards the exit was placed just in front of the apse at a height of 1.8 meters. In the middle of the room around the fountain, a listening plane was located at a height of 1.5 meters to mimic a gathering of people. Speech intelligibility is assessed with the STI speech intelligibility index, which is directly and linearly dependent on the reverberation time. The acoustic simulation results obtained - the STI intelligibility values are the same for both acoustic signals (male and female voice). The average STI value is 0.47, indicating poor speech intelligibility. The evaluation scheme for the speech intelligibility index is shown in **Fig. 7**. The room in question did not meet the acoustic standards currently in force or recommended at the time it was used. The entire interior of the room was covered with hard, reflective materials, which resulted in significant reverberation. In the simulation, it was assumed that the entrance to the room was open, covered only with a thin material so that some of the sound emitted inside could 'leave' the room, and this improved the simulation result. If it had been assumed that the room was

closed with, for example, a wooden door, the reverberation time values obtained would have been even higher. Reverberation time values are very much related to speech intelligibility, as well as other parameters for evaluating music in interiors. The lower (better) the reverberation time values, the better the speech intelligibility (higher STI). The acoustic conditions in the auditorium can be described as very poor both for the verbal function - speeches - and for the musical function - all forms of music. Only organ music or opera singing could be perceived positively by the users. Thus, the *Diaeta of Orpheus* was in the result not made neither for music or nor for orations at least in the modern understanding of the acoustic suitability.

## 16. INTERPRETATION OF EXPERIMENT

While interpreting the results of experiment we must take to account that the contemporary knowledge on acoustics is far beyond the perception of ancient people. We can also take to account the fact that the criteria of suitability of a given space for music or for speech can be subjective. As Anita Lawrence has stated in theory the best room for speech intelligibility would be an anechoic room with reverberation time equaling zero. However, in practice reverberation is needed to adjust the speech level and energy<sup>212</sup>. On the other hand, she has stated that the subjective criteria of suitability of the space for music are even harder to distinguish, since emotional and aesthetic response are not possible to be measured<sup>213</sup>. Yet important thing to note is the fact that musician playing in each space should hear his/her musical instrument respond thus some reverberation is required<sup>214</sup>. The criteria of subjectivity are at least partially omitted thanks to the experimental approach which operates on the objective data: roofing shape, materials of the walls or presence of the water fountain. The results obtained from the experiment, by eliminating question of the subjectivity, show that acoustic and architectural properties of the *Diaeta of Orpheus* made it not suitable for acoustic performance of any kind. However, there are some hypotheses that can be made thanks to that experiment. Firstly, understanding of the acoustics of the room can help assuming that probably the *Diaeta of Orpheus* was space not permanently enclosed. If so, the reverberation time would be too long and would create sonically unusable space. Secondly, the answer to the main question after seeing results of the experiment leads us to conclusion that maybe space was multifunctional- maybe music was happening during dining activities were all people seated would hear each other well because of the closeness. However, it should not be understood as a space dedicated specifically to the musical performance or poetry declamation, thus Dunbabin's hypothesis has been disproven. Thirdly, if indeed the instruments of the lower resonance (like lyre/*kithara*) were used in domestic spaces (and in the *Diaeta of Orpheus*) long reverberation time could have enhanced the experience of being surrounded by the harmony and tune which could have created a pleasurable experience. Such conclusion also agrees with the fact that dining was indeed a theatrical experience and mixing sounds of speech, overflowing water and music could have given this effect. If given results were to be understood this way it could have reflected the surround effect present on the mosaic and literary descriptions of Orpheus music - all the world creatures from animals to plants gathered around Thracian musician enchanted by the sound. Of course, in modern standards as already stated the room was not suitable for music nor speech, however we must keep in mind that there is an important category of artefacts that did not survive until our times. Any cloths that could have been placed on the walls or even floor might have affected the acoustics of the room and result in lower reverberation time and higher STI factor<sup>215</sup>.

<sup>212</sup> Lawrence 1970, 126.

<sup>213</sup> *Ibid.*, 127.

<sup>214</sup> *Ibid.*, 128.

<sup>215</sup> Similar practice of covering walls is described in the work of Pon (2015), who is studying the Sistine's Chapel Tapestries; of course, this cannot be used as a comparative proof yet reflects the idea of acoustics before understanding sound as a wave.

## 17. FURTHER RESEARCH

The results of experiment performed are in fact a good starting point for asking more questions about the problems of sound and space in Late Antique domestic context especially with Orpheus; depictions (or with other ‘musical’ iconography). Firstly, comparative study on acoustic properties of the *Diaeta of Orpheus* and the *Diaeta of Arion* could help testing hypothesis of Torelli who ascribed different type of repertoire to both rooms. Torelli suggests that the music of Orpheus was the one that was to accompany recitation and the one of Arion was meant for choral music<sup>216</sup>. Scholar goes even further and suggests that in the *Diaeta of Orpheus* hexameter and elegiacal poetry was performed<sup>217</sup>. Secondly, not only the hypothesis of Torelli can be examined – by expanding the amount of studied spaced (Tri-apsidal room, Basilica) in the Villa del Casale itself could help creating ‘ancient scale’ of poor/good acoustic features of spaced, leading by expanding the research further and latter to establishment of the methodology of studying Late Antique domestic soundscapes. Thirdly, this kind of analysis may be conducted on higher number of Orpheus spaces from different parts of Empire and it could result in the answer if all the spaces had modernly understood poor acoustic features and if we should consider them spaces for music at all. Fourthly, what could be done as well is switching the EASE 4.4 program to ODEON, which allows to study spaces’ acoustics and listen to outsource tracks in the space. It could allow to play the reconstructed ancient music in the spaces and give it a broader understanding.

## 18. FINAL CONCLUSIONS

Presented study allows understanding that holistic approach to Late Antique domestic spaces and specifically the *Diaeta of Orpheus* at the Villa del Casale results in complex mosaic of information based not only on the visual but also sonoric aspects. Rooms with Orpheus mosaics across the Late Roman world were multifunctional spaces, variously interpreted as *triclinia*, *oeci*, reception halls or *diaetae*. It has been confirmed that iconography alone does not determine function but rather: room placement, decoration, furnishing and architectural layout. The acoustic analysis demonstrates that the room was not optimized for musical performance nor declamation in the modern sense. The highly reflective surfaces and domed apse produce long reverberation times and low STI values, unsuitable for intelligible speech or musical clarity by contemporary standards. Nevertheless, the poor “modern” acoustic conditions do not exclude meaningful ancient auditory experience: long reverberation could have enhanced the immersive, enveloping quality of soft-resonance instruments such as lyre or *kithara* aligning with ancient aesthetic expectations and Neoplatonic notions of cosmic harmony. The room’s soundscape would have been shaped by more than performance alone: murmuring water from the central fountain, the open access to the peristyle, possible textile hangings, and the presence of small bells around the villa contributed to a layered, atmospheric sonic environment. The *Diaeta of Orpheus* should therefore be interpreted as a multifunctional dining and reception room, where music could occur but was not the primary architectural determinant. Dunbabin’s hypothesis that Orpheus rooms were dedicated musical chambers is not supported by the acoustic data. The *Diaeta of Orpheus* emerges as a space where elite identity, cultural literacy, philosophical symbolism, and sensorial experience intersected: a stage for orchestrating harmony between visual art, architecture, sound, and social performance.

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<sup>216</sup> Torelli 1988, 146.

<sup>217</sup> Sfameni 2023, 203.

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