

# The Pisa Griffin and the Mari-Cha Lion

## Metalwork, Art, and Technology in the Medieval Islamicate Mediterranean

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ISBN 978-88-6995-306-4

*Publisher*



Via A. Gherardesca  
56121 Ospedaletto (Pisa)  
[www.pacineditore.it](http://www.pacineditore.it)

*Publishing Manager*

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*Printing*

**IGP** Industrie Grafiche Pacini

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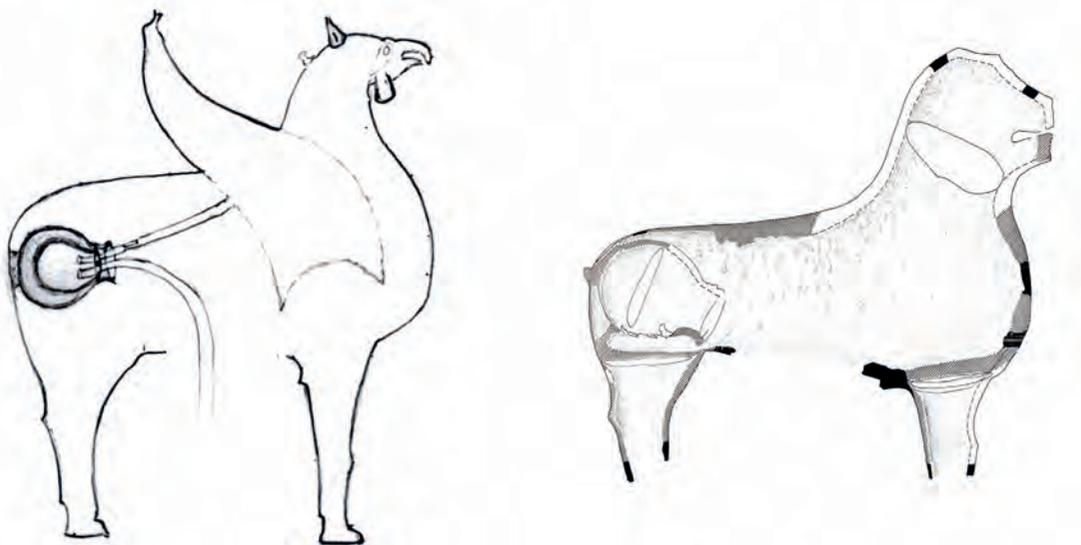
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## 1.5 - Acoustic Automata

*Richard Camber and Anna Contadini*

Among the most vital questions that surround the Griffin and the Lion is that of their function. Both, intriguingly, contain a cast vessel that must have fulfilled a specific purpose, but one that is not immediately obvious. One attractive hypothesis is that the Griffin and Lion were associated with water:<sup>1</sup> the round lips of the latter certainly look as if they could have had a pipe inserted between them, and both beasts have an aperture in the belly. Around that on the Lion there is also a square recess into which a plate must have been inserted, presumably in order to seal it, and it could well have had a pipe passing through it. But if this went straight to the mouth there would be no need for the internal vessel, and if not the vessel would have to be understood as part of a hydraulic mechanism, for which purpose, though, it is clearly unfit: because of imperfections of casting as well as its angle it could not have served as a reservoir. No trace remains of any substance that could have suggested a use as a container for incense to be burned, to which may be added that there are no piercings in the external body to allow smoke to escape – and the many surviving incense burners in the form of animals are in any case much smaller.<sup>2</sup>

This leaves as the most plausible interpretation of the internal structure with its cast vessel the suggestion, made in 2002, that both Griffin and Lion were intended as acoustic automata.<sup>3</sup> The function of the vessel would, accordingly, be to act as a rigid container holding in place an air bag. Air would be pumped through a pipe passing through the aperture in the belly, and once the bag was fully inflated further pressure would force it out through a second pipe leading to the mouth, one which would have a reed inserted to cause the air to vibrate. The placing of the vessel at the rear of the animal would be explained by the need for the reed-pipe to be long enough to produce a low-pitched tone; and the fact that the vessel in the Grif-



1. Drawings showing the internal vessels of: a) Pisa Griffin; b) Mari-Cha Lion (Drawings by: a) Owen Wright; b) Kikar Singh, Museum of London)

2. a) The Pope seated on a Lion Throne, from an Exultet Roll produced ca. 1087 in Monte Cassino, Rome, Biblioteca Apostolica Vaticana, MS Barb.Lat.592, 5r; b) Detail (Photo: By permission of Biblioteca Apostolica Vaticana, all rights reserved)



fin is cracked is consonant with it being used to contain an air bag, as a perfect seal would not be required. (Figs. 1a and b) This hypothesis has been confirmed by Maurice Merrell (see the interview with him in this book, Chapter 1.4), who has recreated the mechanism in his workshop and confirmed that the Griffin and Lion could have been set on plinths containing bellows, the air being pumped through the belly and channelled through pipes.<sup>4</sup> Also to be kept in mind is the resonance of the metal of both Griffin and Lion.

In addition, the outlet pipe that would readily be accommodated by the circular opening in the mouth of the Lion could have had inserted into it a blade, perhaps of leather, that would then have vibrated to give the effect of a “quivering tongue” of the type that Liutprand claims to have seen in Constantinople.<sup>5</sup> The opening of the beak of the Griffin, in contrast, is covered by the upper part of the beak itself, which would conceal any pipe behind and would also make the insertion of a tongue unrealistic, but in either case the sound properties would not change.

The history of automata in the ancient world has been described by Kalligeropoulos as “the history of the ideas of Heron [of Alexandria]”.<sup>6</sup> Although Heron’s *Pneumatica* was probably written sometime around 60 AD, the technology that he described was still familiar in Late Antiquity. In Book III of the *Dionysiaca* of Nonnus, which is believed to have been written in the early fifth century AD, there occurs a description of the visit that Cadmus made to the palace of Emathion in Samothrace: on either side of the gates were standing figures of dogs in gold and silver, “silent works of art, snarling with gaping throats [which] wagged the friendly shape of an artificial tail”.<sup>7</sup> Perhaps more pertinent is a letter Theodoric the Great sent to Boethius in around 507-508<sup>8</sup> in which he refers to five different types of acoustic automata, including bronze oxen that low and a tree with birds

that twitter. As will be noted below, this may be a reference to the “singing trees” that became a familiar feature of princely courts in both the Byzantine and Islamic worlds. Opinion is still divided as to whether or not Theodoric’s descriptions should be considered merely as literary tropes or as reflecting accurately the type of automata with which the Ostrogothic court was familiar.<sup>9</sup>

There is, though, no doubt about the existence of the automata seen by Bishop Liutprand of Cremona during the audience that he was granted in Constantinople in 949. They belonged to what contemporary Byzantine texts described as the Throne of Solomon,<sup>10</sup> the biblical descriptions of which occur in 1 Kings 10, 18-20 (“The throne had six steps and the top of the throne was round behind: and there were stays on either side on the place of the seat and two lions stood beside the stays. And twelve lions stood there on the one side and on the other upon the six steps”) and 2 Chronicles 9, 17-19 (“And there were six steps to the throne, with a footstool of gold, which were fastened to the throne and stays on each side of the sitting place, and two lions standing by the stays. And twelve lions stood there on the one side and on the other upon the six steps”) (Fig. 3).

Evidence that Byzantine craftsmen possessed the technology to create figures that appeared alive already in the eighth century is contained in a report from Abu ‘Umara ibn Hamza, an Abbasid ambassador sent to Constantinople sometime between 754 and 775. He relates that he had been unable to approach the throne of the Emperor, probably Constantine V Copronymus, because of the presence in front of it of mechanical lions that seemed to be alive.<sup>11</sup> Another throne, of particular relevance in the present context, devised for the Byzantine Emperor Theophilus in the Magnaura Palace in Constantinople before 842,<sup>12</sup> was a version of the Throne of Solomon, but apparently without the smaller lions on the steps, and according to various closely contemporary accounts what particularly distinguished it was that it was flanked by acoustic automata. The reasons behind this development are unclear: appeal has been made to a Sassanian origin<sup>13</sup> and to the possible model of the throne room of the Abbasid caliphs in Baghdad,<sup>14</sup> but neither specifically involves the presence of acoustic automata as guardians of the throne, although without excluding them. Another hypothesis is the circulation of a number of narratives on the appearance of the biblical throne and its fate subsequent to its capture by Nebuchadnezzar.<sup>15</sup> Incorporated into a post-biblical midrashic commentary known as *Targum Sheni* or the *Second Targum on the Book of Esther*, which was complete by the seventh century AD, these narratives developed the notion that the animals on the throne were of many different types, not merely lions, but also griffins, eagles and so on, each of which emitted a sound appropriate to its species.<sup>16</sup> Their role was to protect the throne by preventing illegitimate claimants from ascending the steps leading up to it, so that only worthy successors to Solomon such as Cyrus the Great and Alexander the Great were granted access; others, such as the Seleucid ruler Antiochus IV Epiphanes, were refused: such animals were clearly thought of as being acoustic automata.

It may have been this throne that Bishop Liutprand of Cremona saw in the Magnaura Palace, although it is generally believed to have been destroyed by Theophilus’ son, the Emperor Michael III (842-867), its subsequent reconstruction being attributed to the Emperor Leo the Wise (886-912), who was also fascinated by acoustic automata.<sup>17</sup> Because of its importance, it is worth quoting an extensive extract from Liutprand’s description:

3. The Emperor Henry VI sitting upon a throne identified as the "Sedes Sapientiae". Pietro da Eboli, *Liber ad honorem Augusti*, south Italy, between 1195-97. Berne, Municipal Library, MS 120 II, fol. 147r  
(Photo: Bürgerbibliothek Bern)



In front of the Emperor's throne was set up a tree of gilded bronze, its branches filled with birds, likewise made of bronze gilded over, and these emitted cries to their different species. Now the Emperor's throne was made in such a cunning manner that at one moment it was down on the ground, while at another it rose higher and was seen to be up in the air. This throne was of immense size and was, as it were, guarded by lions, made either of bronze or wood covered with gold, which struck the ground with their tails and roared with open mouth and quivering tongue. ... As I came up, the lions began to roar and the birds to twitter, each according to its kind, but I was moved neither by fear nor by astonishment .... After I had done obeisance to the Emperor by prostrating myself three times, I lifted up my head, and behold! the man whom I had just seen sitting at a moderate height from the ground had now changed his vestments and was sitting as high as the ceiling of the hall. I could not think how this was done, unless perhaps he was lifted up by some such machine as is used for raising the timbers of a wine press.<sup>18</sup>

A frequently overlooked description of the throne that substantially confirms Liutprand's remarks concerning the pair of roaring lions occurs in the *Book of Ceremonies*, in an account of a visit by envoys from the emir of Tarsus in 946.<sup>19</sup> One important detail Liutprand omitted is that, as a succession of Byzantine chroniclers from the late tenth century onwards confirm, there were, in addition to the pair of lions flanking the throne, two griffins<sup>20</sup> – the one feature that betrays a possible Sassanian influence, since griffins as supporters of the royal throne do appear frequently in Sassanian art.<sup>21</sup>

The political and religious assumptions behind these narratives, with their post-biblical accretions, are self-evident.<sup>22</sup> It is not known how they came to the attention of the Byzantine court but it may be assumed that they were in general circulation as they were also known to Arab writers of the tenth to twelfth centuries such as al-Tabari (225-311/839-923), al-Tha'labi (d. 427/1035) and al-Kisa'i (sixth/twelfth century).<sup>23</sup> In the Latin West, interest in the iconography of the Throne of Solomon surfaces in the late eleventh century in the papal domains.<sup>24</sup> Gandolfo has argued, in relation to the Investiture Contest, that papal ambitions led to a conscious revival of Late Antique imagery, and the incorporation of ancient *spolia* in the thrones that it commissioned.<sup>25</sup> Those constructed in Salerno (1084-85) and at S. Gregorio Magno, S. Stefano Rotondo, SS. Quattro Coronati (1116) and S. Maria in Cosmedin in Rome (1123) represent a curious amalgam of iconographical features drawn not only from Late Antiquity but also from the biblical description of the Throne of Solomon.<sup>26</sup> The re-assertion of papal authority implied by such symbolism is also reflected in a remarkable miniature in a Cassinese Exultet Roll of the late eleventh century (Ms. Barb. Lat. 592) showing the pope clothed in imperial garments and seated on a throne that is supported on the backs on two lions that look remarkably like the Mari-Cha Lion would if it had preserved its legs (Fig. 2).<sup>27</sup>

There is, then, a continuing employment of the symbolic potential of thrones in the West, but it is not always the Throne of Solomon that is invoked. In the final decade of the twelfth century, a celebrated miniature in a south Italian manuscript of Pietro da Eboli's epic poem *Liber ad honorem Augusti* (Berne, Municipal Library, MS 120 II) shows the Emperor Henry VI, heir to the last Norman king of Sicily, William II, sitting upon a throne clearly modelled upon the biblical description of the Throne of Solomon,<sup>28</sup> yet now identified as the "*Sedes Sapientiae*", the throne of the Virgin (Fig. 3).<sup>29</sup>

In the Islamic world the biblical theme of the Throne of Solomon appears prominently in the *Qiṣaṣ al-anbiyā'* literature (Stories of the Prophets), but seen now through the prism of Qur'anic references. Particularly well developed is the account by al-Tha'labi with its



references to golden peacocks, golden vultures and even a golden pigeon, the role of which was to open the Torah for Solomon to read from. Such golden menageries were not, though, confined to the Solomon narrative: the *Shāhnāma*, for example, has a whole treasure chamber of golden animals, among which the lions also had their bellies stuffed with jewels (Fig. 4).<sup>30</sup>

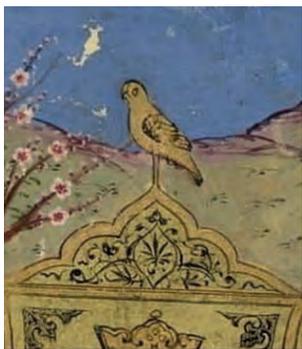
Of particular interest in the present context, however, is that the golden lions that appear in al-Tha‘labi’s account flanked the throne, thrust out their paws and struck the ground with their tails.<sup>31</sup> As with Liutprand’s account, the movement of the throne is stressed,<sup>32</sup> but this time it is circular, for as soon as Solomon stood on the lowest step the throne would revolve swiftly like a quern,<sup>33</sup> a feature also said to have been a characteristic of the audience chamber in which the throne of Khusrau II stood before it was allegedly captured by the Byzantine Emperor Heraclius in the seventh century.<sup>34</sup> The theme of mobility is a constant in these accounts, whether of the throne itself, the platform on which it stood, or of the paws and tails of the flanking lions, but sound does not always receive the same attention: the birds in Tha‘labi’s complex scenario are not mentioned as emitting sounds; there is no mention of lions or griffins roaring. In contrast, sound pervades Kisa’i’s otherwise quite similar version. On the gold palm trees on either side of the seat were hollow birds encrusted with jewels that would whistle when the wind blew through them, and as he ascended the steps the lions would roar. Voices would also be heard, and when litigants came before him the lions would look at them as if speaking, the birds would flap their wings and the jinn would mutter.<sup>35</sup> In neither account is there any reference to contraptions such as lifts propelling the whole throne upwards, which seem to have been a Byzantine speciality, but the singing birds (Fig. 5) both echo Liutprand’s twittering ones and recall Abbasid automata.

Not unexpectedly, certain of these features recur in descriptions of Islamic throne rooms and court ceremonial.<sup>36</sup> An explicit comparison with the throne of Solomon, for example, occurs al-Shabushti’s (d. 399/1008) description of al-Mutawakkil’s throne at Samarra in 239/853-854, with its images of two huge lions.<sup>37</sup> As frequent exchanges of gifts and ambassadors between Cordoba and Constantinople took place in the middle of the tenth century (indeed, envoys from al-Andalus were present in the Great Palace at Constantinople at the time of Liutprand’s visit), novel features of Byzantine technology would doubtless have been reported by ambassadors. But they do not seem to have prompted emulation. Rather, we encounter in the Arab world a different form of theatricality surrounding the ruler, one that had no need to copy Byzantine practice by adding automata around the throne. For the Abbasids in Baghdad and their Fatimid counterparts in Cairo a standard feature of court etiquette, and one which characterizes the depictions of rulers, whether seated on thrones or not, was the practice of *sitr*, the concealment of the ruler behind a curtain and a less flamboyant but still dramatic lifting of the curtain to reveal him in all its splendour on ceremonial occasions. Such is reported by Hilal al-Sabi’ in tenth-century Baghdad, who emphasizes not the throne but the carefully orchestrated appearance of the caliph with his imperial insignia,<sup>38</sup> and it may well be supposed that a similar staging occurred in Samarra in the middle of the ninth century as well. A protocol of concealment might also be extended to less formal situations: in the more relaxed context of musical entertainment, for example, as recorded by al-Isfahani (284-c.363/897-c.972) in the *Kitāb al-aghānī*, attitudes of the Abbasid caliphs varied: some wished to be curtained off from the singer, others not.<sup>39</sup>

Accommodating the need for concealment in the construction of the throne appears clear-

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4. Bahram Gur finds Jamshid’s treasure. Firdawsi, *Shāhnāma*. Tabriz, Iran, Ilkhanid period, c. 1330. Washington DC, Freer Gallery of Art, F1935.24 (Courtesy of the Freer Gallery of Art)



5. a) Bird finial on a golden throne (possibly singing). Rashid al-Din, *Jāmi' al-tawārīkh*. Herat, Afghanistan, 1430. Paris, Bibliothèque nationale de France, MSS Supplément Persan 1113, fol. 204v; b) Detail (Courtesy of the Bibliothèque nationale de France)



ly in the eyewitness account of the Fatimid throne in the Golden Pavilion of the Caliph al-Mustansir (427-87/1036-94) given by the Persian traveller Nasir-i Khusraw (394-between 465 and 471/1004-between 1072 and 1078). As he describes it, the throne platform, which had a canopy over it, was approximately 2.5m high and 2.5m deep, occupied the full width of the reception hall, and was accessed only via a flight of steps at the rear,<sup>40</sup> a feature consistent with the Fatimid practice of *sitr*.<sup>41</sup>

With the Umayyad caliphs of Cordoba, on the other hand, *sitr* is not noted as playing a part in court ceremonial. As both al-Maqqari (c. 986-1041/c. 1577-1632) and al-Razi (d. 379/989) make clear, the caliph was not only visible to all those who were present in the throne rooms at Madinat al-Zahra' and Cordoba, he also played an active role in all the various ceremonies that were held there, even to the point of extending his hand so that it could be kissed by all those present in the audience chamber.<sup>42</sup> During 'Abd al-Rahman III's reception of a Greek embassy at his palace in Cordoba in around 339-340/950-951 he sat on his throne in the middle of the audience hall,<sup>43</sup> but the narrative does not remark upon it: what particularly impressed the visitors was not the throne itself but the whole *mise-en-scène*, with the luxurious furnishings of the hall and the serried ranks of courtiers, and neither here nor in al-Razi's many entries that begin by describing the caliph as being seated on his throne is there any reference to automata. However, from this may be deduced no more than their absence from one highly specialized and ritualized social context. But if the historiographical literature remains in consequence silent, confirmation of the continuing availability of the necessary technology to produce automata is provided by works concerned with mechanical devices, which demonstrate that rulers were certainly able to call upon the engineering skills required. The treatises of the Banu Musa and al-Jazari, which contain detailed accounts of the construction of several noise-making devices, including musical automata,<sup>44</sup> demonstrate the levels of sophistication that could be reached, but although the record for al-Andalus is, unfortunately, sparser than that for the East, there is enough to confirm the presence there too of comparable expertise. Among his various other accomplishments the polymath Ibn Firnas (194-263/810-87) was noted for his scientific discoveries and technical innovations,<sup>45</sup> while the eleventh-century treatise by al-Muradi demonstrates a mastery of mechanical technology, above all in water clocks.<sup>46</sup>

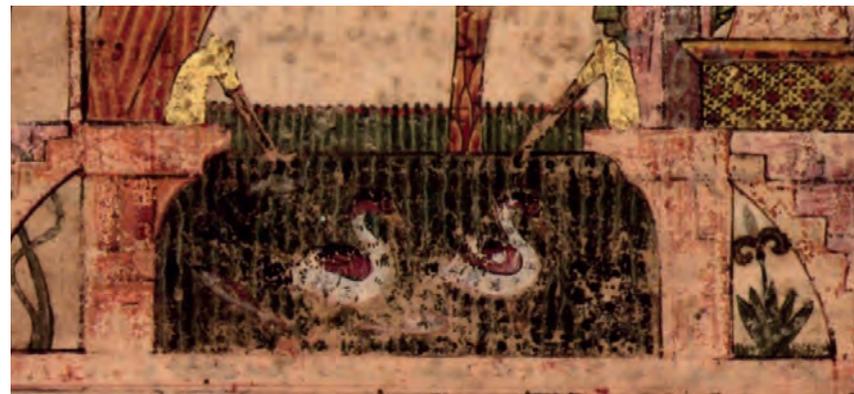
There is thus evidence for continuing expertise sufficient for the manufacture of sound producing automata, but not for a specific association with regal pomp. It is true that our knowledge of court receptions relates primarily to the caliphal period, with less being known about the *Taifa* rulers, but it is unlikely that their practice was significantly different, so that in the absence of any indication that these large bronzes were meant to be frightening presences surrounding the ruler other possible contexts should be taken into consideration; indeed, it may well be that they were not expressly designed for one specific environment. It has been suggested that the Byzantine Emperor Leo the Wise may have had bronze acoustic figures of a lion and a griffin installed in the baths that he commissioned for himself in the Great Palace,<sup>47</sup> thus providing a precedent for the freeing of such automata from an exclusive relationship with the throne and their symbolic function as its guardians, and it is quite probable that the Pisa Griffin and the Mari-Cha Lion were likewise installed

in a different environment. It would thus be reasonable to think beyond the specific need to impress and intimidate subjects and emissaries and embrace wider notions of display and magnificence: there would, surely, be nothing unusual about the presence, whether within a palace or in its gardens, of imposing sculptures that were at the same time sound-producing automata. Al-Maqqari describes<sup>48</sup> how ‘Abd al-Rahman III commissioned a cunningly engineered water supply to feed a large pool

above which was set an imposing, expertly crafted and magnificent lion, than which nothing more splendid has been witnessed among the images created by the kings of past ages. It was painted with pure gold, and its eyes were brightly flashing jewels. The water entered the lion from behind, for it then to discharge it into the pool through its mouth. The viewer is dazzled by its beauty and awe-struck by the sight of it and by the force of the gushing flow, which waters the gardens of the whole palace.

He talks about the cynosure that were the gardens in Madinat al-Zahra’, “with large expertly constructed pools, basins, and statues of wonderful figures that one cannot even imagine how to describe adequately”, and gives a detailed account of an imported green basin

carved (*manqūsh*) with human figures, on which the caliph placed twelve statues of red gold studded with precious pearls. Made in the *dār al-ṣinā’a* in Cordova, they consisted of the image of a lion, at its side a gazelle and then a crocodile, with opposite them a fox, an eagle and an elephant, and on the flanks a dove, an Indian falcon, a peacock, a hen, a cock, a kite and a vulture [thus making thirteen in all] – all made of gold studded with precious stones, and discharging water through their mouths.



6. a) Riyad by the pool with blood running over her face. *Hadith Bayād wa Riyād*. Al-Andalus, thirteenth century (?). Rome, Biblioteca Apostolica Vaticana, Vat. Ar. 368; b) Detail (Courtesy of the Biblioteca Apostolica Vaticana, all rights reserved)

These examples of artistic craft are part of the display of conspicuous consumption that was central to the whole Madinat al-Zahra' project and for which the Caliph, as al-Maqqari reports, having become obsessed by it to the extent of missing three Friday prayers in a row, was roundly rebuked by the *qāḍī* Mundhir b. Sa'id in a sermon.<sup>49</sup>

The tradition continues in the Alhambra gardens, as testified by sources such as Ibn Zamrak (d. after 795/1393), and a garden scene showing such metal spouts in animal form is represented in the *Ḥadīth Bayāḍ wa Riyāḍ* (Fig. 6).

To have imposing acoustic automata placed near or among the animal fountain pieces in a palace garden would dramatically expand the soundscape, mixing the noises made by the animals with the wind and the plashing of the water, and possibly producing sound effects akin to those made by the lions at the corners of the Ghumdan palace in San'a' when the wind blew through them<sup>50</sup> – even, indeed, possibly presaging the uncanny sounds that the wind would make in the hollow body of the Griffin once it was installed on the roof of Pisa Cathedral.

## Notes

- 1 For the Griffin see, for example, Umberto Scerrato, *Metalli islamici* (Milan: Fabbri, 1966), 78-80, and 83, fig. 33; and Cynthia Robinson, "Pisa Griffin," in *Al-Andalus: The Art of Islamic Spain*, exh. cat., ed. Jerrilynn D. Dodds (New York: Metropolitan Museum of Art; Madrid: Viso, 1992), 216-218, cat. 15; and for the same suggestion for the Lion see Christie's, London, *Islamic Art and Indian Miniatures*, October 19, 1993 (London: Christie's, 1993), lot 293.
- 2 See examples in the form of small birds in Géza Fehérvári, *Islamic Metalwork of the Eighth to the Fifteenth Century in the Keir Collection* (London: Faber and Faber, 1976), pl. 37, nos. 109-111; and one in the form of a lion in Rachel Ward, *Islamic Metalwork* (London: British Museum Press, 1993), col. pl. 3 (Hermitage Museum, St. Petersburg, IR-1565).
- 3 Anna Contadini in "Beasts That Roared: The Pisa Griffin and the New York Lion," in *Cairo to Kabul: Afghan and Islamic Studies Presented to Ralph Pinder-Wilson*, ed. Warwick Bell and Leonard Harrow (London: Melisende, 2002), 65-83, at 69-70.
- 4 However, according to the various descriptions in both Western and Arab sources the driving mechanism could have been either pneumatic or hydraulic: see Gerard Brett, "The Automata in the Byzantine 'Throne of Solomon,'" *Speculum* 29, no. 3, July (1954): 477-487 for Byzantine sources. For both Byzantine and Arabic sources, see Reinhold Hammerstein, *Macht und Klang: Tönende Automaten als Realität und Fiktion in der alten und mittelalterlichen Welt* (Bern: Franke, 1986), chapters 3 and 4 respectively. For the Arabic sources, which go back to the eighth century, see Henry George Farmer, *The Sources of Arabian Music*, 2nd ed. (Leiden: Brill, 1965).
- 5 Liutprand of Cremona, *The Works of Liutprand of Cremona*, translated by F. A. Wright (London: Routledge, 1930).
- 6 Dimitri Kalligeropoulos, "Metahellenistische und byzantinische Automaten," *Automatisierungstechnik* 7 (1998): 233-238. The legacy of ancient automata and their persistence in the medieval world has recently been examined in Elly R. Truitt, *Medieval Robots: Mechanism, Magic, Nature and Art* (Philadelphia: University of Pennsylvania Press, 2015).
- 7 W. H. D. Rouse, *Nonnos: Dionysiaca*, III, Loeb Classical Library (London: Heinemann and Cambridge, Mass.: Harvard University Press, 1940), 170-173.
- 8 S. J. B. Barnish, ed., *Cassiodorus, Selected Variae* (Liverpool: Liverpool University Press, 1992), Book I, Letter 45. See Ubaldo Pizzani, "Le lettere di Teodorico a Boezio e la mediazione culturale di Cassiodoro," *Cassiodorus* 4 (1998): 141-161.
- 9 Danuta Shanzer, "Two Clocks and a Wedding. Theodoric's Diplomatic Relations with the Burgundians," *Romano-barbarica* 14 (1996-97): 225-254.
- 10 The literature on the Solomonic Throne in Constantinople is extensive, but see most recently Truitt, *Medieval Robots*, 22-24; Allegra Iafraite, *The Wandering Throne of Solomon: Objects and Tales of Kingship in the Medieval Mediterranean* (Leiden: Brill, 2016), particularly 55-105.
- 11 Gustav E. von Grunebaum, *Der Islam im Mittelalter* (Zurich: Artemis Verlag, 1963), 453, no. 76, also Henri Massé, *Abrégé du livre des pays* (Damascus: Institut Français de Damas, 1973), 164-166 and Gerhard Strohmeier, "Umara ibn Hamza, Constantine V and the Invention of the Elixir," *Graeco-Arabica* IV (1991): 21-24.

- 12 Brett, *Automata*, 477-487; Constantin Canavas, "Automaten in Byzanz. Der Thron von Magnaura," in *Automaten in Kunst und Literatur des Mittelalters und der Frühen Neuzeit*, ed. Klaus Grubmüller and Markus Stock (Wiesbaden: Harrassowitz, 2003), 49-73.
- 13 Both Andreas Alföldi, "Die Geschichte des Throntabernakels," *La Nouvelle Clío* II (1950): 537-566 and H. P. L'Orange, *Studies on the Iconography of Cosmic Kingship in the Ancient World* (Oslo: H. Aschehoug and Cambridge, Mass.: Harvard University Press, 1953), 134-136 suggested that the model may perhaps have been the throne of Khusrau II (610-641), allegedly captured and taken to Jerusalem by the Emperor Heraclius in 628, but this seems improbable since Byzantine sources of the eighth to the eleventh centuries seem to agree in describing Khusrau's throne and throne room in cosmological terms totally absent from the allusions to the biblical throne in the Byzantine example.
- 14 Otto Treitinger, *Die oströmische Kaiser- und Reichsidee* (Darmstadt: H. Gentner, 1956), 134-135.
- 15 André Grabar, "Trônes épiscopaux di XIème et XIIème siècle. Italie Méridionale," *Wallraf-Richartz-Jahrbuch* XVI (1954): 17-52, particularly 37-42; and Hammerstein, *Macht und Klang*, 33-58, 60-83 and 109; also mentioned in passing by Treitinger.
- 16 The possible relationship between the biblical Throne of Solomon, *Targum Sheni* and the throne in the Magnaura was first explored by Paulus Stephanus (Selig) Cassel, "Der goldene Thron Salomo's," *Wissenschaftliche Berichte der Erfurter Akademie* (1853): 35-133. See also Joseph Perles, "Thron und Circus des Königs Salomo," *Monatschrift für Geschichte und Wissenschaft des Judentums* 21 (1872): 122-139; Eveline Ville-Patlagean, "Une image de Salomon en Basileus Byzantin," *Revue des Etudes Juives* 121 (1962): 9-33; Bernard Grossfeld, *The Two Targums of Esther* (Edinburgh: T. & T. Clark, 1991): 107-113; Beate Ego, "Gottes Thron in Talmud und Midrasch," in *Le Trône de Dieu*, ed. Marc Philonenko (Tübingen: Mohr, 1993), 318-333; Beate Ego, "All Kingdoms and Kings Trembled Before Him. The Image of King Solomon in Targum Sheni on Megillat Esther," *Journal for the Aramaic Bible* 3 (2001): 57-73; Steven Fine, *Art and Judaism in the Greco-Roman World: Towards a New Jewish Archaeology* (Cambridge: Cambridge University Press, 2005), 105-110.
- 17 Titos Papamastorakis, "Tampering with History: From Michael III to Michael VIII," *Byzantinische Zeitschrift* (2003): 193-209; Nikos Maliaras, *Die Orgel im byzantinischen Hofzeremoniell des 9. und 10. Jahrhunderts* (Munich: Institut für Byzantinistik und Neugriechische Philologie der Universität, 1991), 160-169.
- 18 Cyril Mango, *The Art of the Byzantine Empire 312-1453: Sources and Documents* (Englewood Cliffs, N.J.: Prentice-Hall, 1972), 209-210; also P. Chiesa, *Liudprandi Cremonensis Opera Omnia VI (Corpus Christianorum CLVI)* (Turnhout: Brepols 1998), 5, 147; and François Bougard, *Liudprand de Crémone Oeuvres VI (Sources d'histoire médiévale 41)* (Paris: CNRS editions, 2015), 5, 238.
- 19 Ann Moffatt and Maxeme Tall, eds., *The Book of Ceremonies II* (Canberra: Australian Association for Byzantine Studies, 2012), 15.
- 20 For the complete list of these chroniclers, see Jean Psichari, "L'arbre chantant," *Mélanges offerts à M. Emile Châtelain* (Paris: Librairie Ancienne Honoré Champion, 1910), 628-633; Brett, *Automata*, 477-487; and Papamastorakis, "Tampering with History," 197.
- 21 See the examples illustrated in Annette Hagedorn, "Die Rezeption des vorislamischen Thronbildes in der Darstellungen auf tauschierten Metallarbeiten des 13. und 14. Jahrhunderts," *Beiruter Texte und Studien* 61 (1999): figs. XIX/6 and XX/27. In the tenth-century Byzantine chronicle known as the *Theophanes Continuatus*, the griffins are dated to the period of Theophilus. *Theophanes Continuatus*, *Corpus Scriptorum Historiae Byzantinae* 43, ed. Barthold Georg Niebuhr (Bonn: Weber, 1838): 21, 173 ("...famosam illam auream platanum duosque aureos leones ac totidem gryphes, ipsos quoque ex auro solido ductiles.....").
- 22 On the revival of interest in Old Testament prototypes, particularly during the period of the Iconoclastic and Macedonian dynasties, see the essays in Paul Magdalino and Robert Nelson, eds., *The Old Testament in Byzantium*, *Dumbarton Oaks Byzantine Symposia and Colloquia* (Washington, D.C.: Dumbarton Oaks Research Library and Collection, 2010), especially 12, 74-75 and 243-247. On the eschatological, particularly Jewish, elements, see also Gilbert Dagron, "Trônes pour un empereur," in *Byzantium: State and Society: In Memory of Nikos Oikonomides*, ed. Anna Avramea, Angeliki Laiou and Euangelos Chrysos (Athens: Kentron Byzantinon Ereynton, 2003), particularly 185-191; and Alexei M. Sivertsev, *Judaism and Imperial Ideology in Late Antiquity* (Cambridge: Cambridge University Press, 2011), 22-30, 185-188 and 212.
- 23 Al-Tabari, *De Salomon à la chute des Sassanides*, trans. Hermann Zotenberg (Paris: Sindbad, 1989), 23; al-Tha'labi, *Qiṣaṣ al-anbiyā' al-musammā 'arā'is al-majālis* (Beirut: Maktabat al-thaqafiyya, n.d.), 272, and 'Arā'is al-majālis fī qiṣaṣ al-anbiyā', trans. William M. Brinner (Leiden: Brill, 2002), 512; al-Kisa'i, *Vita prophetarum*, ed. Isaac Eisenberg (Leiden: Brill, 1922), 283; and *The Tales of the Prophets of al-Kisa'i*, trans. Wheeler M. Thackston (Boston: Twayne, 1978), 306.
- 24 Although the so-called Throne of Charlemagne in Aachen is built on a podium with six steps, and the throne of the Emperor Conrad II in Aquileia, oddly positioned on top of an altar, also has a flight of six steps leading up to it, Horst Appuhn ("Zum Thron Karls des Grossen," *Aachener Kunstblätter* (1986/87): Abb. 30 and 85-86) has argued that neither of them should be thought of as anything more than a distant echo of the biblical Throne of Solomon. See also Percy Ernst Schramm, *Herrschaftszeichen und Staatssymbolik I* (Stuttgart: A. Hiersemann, 1954), 341 and Taf. 36.
- 25 Francesco Gandolfo, "Reimpiego di sculture antiche nei troni papali del XII secolo," *Atti della Pontificia Accademia Romana di Archaeologia. Rendiconti* 47 (1974-75): esp. 19; and "Simbolismo antiquario e potere papale," *Studi Romani* 29 (1981): 9-28.
- 26 The ideological implications of such

- thrones have also been the subject of detailed analyses by Mary Stroll, *Symbols as Power: The Papacy Following the Investiture Contest* (Leiden: Brill, 1991); and Lawrence Nees, "Forging Monumental Memories in the Early Twelfth Century," in *Memory & Oblivion: Proceedings of the XXIXth International Congress of the History of Art held in Amsterdam, 1-7 September 1996*, ed. Wessel Reinink and Jeroen Stumpel (Dordrecht, Norwell: Kluwer Academic Publishers, 1999), 772-78.
- 27 Iafate, *The Wandering Throne*, 221, fig. 31. Iafate also remarks upon this striking resemblance.
- 28 Alfried Wiczorek, Bernd Schneidmüller, and Stefan Weinfurter, eds., *Die Staufer und Italien*, exh. cat. (Mannheim: Reiss-Engelhorn-Museen, 2010), II, 253, fig. 4.
- 29 Francis Wormald, "The Throne of Solomon and Saint Edward's Chair," in *De artibus opuscula XL: Essays in Honor of Erwin Panofsky*, ed. Millard Meiss (New York: New York University Press, 1961), 532-591; and Isa Ragusa, "Terror Demonym and Terror Inimicorum: The Two Lions of the Throne of Solomon and the Open Door of Paradise," *Zeitschrift für Kunstgeschichte* (1977): 93-114.
- 30 Firdawsi, *Shahnameh: The Persian Book of Kings*, trans. Dick Davis, (London: Penguin Classics, 2006), 632.
- 31 Al-Tha'labi, *'Arā'is al-majālis*, 272.
- 32 Albrecht Berger regards Liutprand's description of the throne rising up to the roof of the audience chamber while he was performing the *proskynesis* ritual as pure fantasy, but even if the degree of elevation was exaggerated there would appear to be no reason to dismiss it out of hand.
- 33 Al-Tha'labi, *'Arā'is al-majālis*, 272.
- 34 Finbarr Barry Flood, "From the Golden House to A'isha's House," *Beiruter Texte und Studien* 61 (1999): 97-128. Priscilla Soucek, "Solomon's Throne/Solomon's Bath: Model or Metaphor," *Ars Orientalis* (1993): 109-134, notes (at 113) the frequency with which this theme appears in Islamic sources.
- 35 Al-Kisa'i, *Vita prophetarum*, 283.
- 36 The court ceremonial of the Umayyad, Abbasid and Fatimid dynasties has been extensively studied by Oleg Grabar, "Notes sur les cérémonies umayyades," in *Studies in Memory of Gaston Wiet*, ed. Myriam Rosen-Ayalon (Jerusalem: Institute of Asian and African Studies, Hebrew University of Jerusalem, 1977): 51-60; Dominique Sourdel, "Questions de cérémonial abbaside," *Revue des études islamiques* (1960): 121-148; and Marcel Canard, "Le cérémonial fatimide et le cérémonial byzantin," *Byzantion* (1955): 355-420.
- 37 T. M. P. Duggan, "Diplomatic Shock and Awe: Moving, Sometimes Speaking, Islamic Sculptures," *Al-Masāq* 3 (2009): 246-248; also Alistair Northedge, *Historical Topography of Samarra* (London: British School of Archaeology in Iraq, 2006), Appendix C, 127 and 239.
- 38 Hilal b. al-Muhassin al-Sabi', *Rusūm dār al-khilāfa*, ed. Mikha'il 'Awwad (Baghdad: Matba'at al-'Ani, 1964), 90-91. See also Gülru Necipoğlu, "Shifting Paradigms in the Palatial Architecture of the Pre-Modern Islamic World," *Ars Orientalis* (1993): 3-24, at 6.
- 39 Eckhard Neubauer, "Musiker am Hof der frühen 'Abbāsiden," (Diss., Frankfurt am Main: Goethe-Universität, 1965), 81-7, 91; George Dimitri Sawa, *Music Performance Practice in the Early 'Abbāsīd Era* (Toronto: Pontifical Institute of Medieval Studies, 1989), 122-3.
- 40 Nasir-i Khusraw, *Sefer Nameh*, trans. Charles Schefer (Paris: E. Leroux, 1881, repr. Amsterdam: Philo P. Holland, 1970), 157-158.
- 41 Lisa Golombek, "The Draped Universe of Islam," in *Content and Context of Visual Arts in the Islamic World*, ed. Priscilla Soucek (University Park and London: Pennsylvania State University Press for the College Art Association of America, 1988), 32.
- 42 Ibn Hayyan: *Anales palatinos del Califato de Córdoba al-Hakam II, por 'Isā ibn Ahmad al-Rāzī (360-364 H. = 971-975 J. C.)*, trans. Emilio García Gómez (Madrid: Sociedad de Estudios y Publicaciones, 1967), 183 et seq.
- 43 Al-Maqqari, *Nafh al-tīb*, ed. Ihsan 'Abbas, I (Beirut: Dar Sadir, 1968), 527.
- 44 For the Banu Musa see Eilhard Wiedemann, "Über Musikautomaten bei den Arabern," in *Centenario della nascita di Michele Amari* 2 (Palermo: Stabilimento tipografico Virzi, 1910), 164-185; and for al-Jazari see Donald R. Hill, ed. and trans., *The Book of Ingenious Devices (Kitāb al-hiyal)* (Dordrecht: D. Reidel, 1979). Farmer, *Sources*, includes Yuhanna ibn al-Bitriq (d. c. /200/815), no. 7, who briefly mentions a hydraulic organ used in warfare; Banu Musa ibn Shakir (d. 259/873/), no. 43, who wrote a treatise on an automatic hydraulic organ; and Muristus (Moristos or Myrtos), translated in the ninth century, no. 113, who wrote a treatise on the construction of the reed-pipe pneumatic organ "the sound of which may be heard sixty miles." See also Henry George Farmer, *The Organ of the Ancients from Eastern Sources (Hebrew, Syriac and Arabic)* (London: William Reeves, 1931), 60-73 and fig. 1, which is a diagram of the Muristus pneumatic organ.
- 45 Elías Terés, "'Abbās ibn Firmās," *Al-Andalus* 25 (1960): 239-49.
- 46 Donald R. Hill, "Andalusian Technology," in *Studies in Medieval Islamic Technology*, ed. David A. King (Aldershot: Ashgate (Variorum), 1998).
- 47 On the question whether they were really of bronze or merely images in mosaic, see Paul Magdalino, "The Bath of Leo the Wise and the 'Macedonian Renaissance' Revisited," *Dumbarton Oaks Papers* 42 (1988): 97-118; Maliaras, *Die Orgel*, 160-169 [see footnote 16]; Cyril Mango, "The Palace of Marina, the Poet Pallades and the Bath of Leo the Wise," in *Eufrosunon: afiēroma ston Manóle Hatzedáke* (Athens: Tameio Archaio-logikon Poron kai Apallotrioseon, 1991), 321-330; Paul Magdalino, "The Bath of Leo the Wise," *Maistor: Byzantina Australiensia* 5 (1994): 225-240; and Albrecht Berger, "Die akustische Dimension (Gesang, Orgelspiel und Automaten)," in *Visualisierungen von Herrschaft: frühmittelalterlichen Residenzen: Gestalt und Zeremonien*, ed. Franz Alto Bauer (Istanbul: Ege Yayınları, 2006), 68.
- 48 Al-Maqqari, *Nafh al-tīb*, 564-5. (Translation by Anna Contadini).
- 49 Al-Maqqari, *Nafh al-tīb*, 570-1. (Translation by Anna Contadini).
- 50 Yaqut ibn 'Abd Allah al-Hamawi, *Jacut's Geographisches Wörterbuch*, ed. Ferdinand Wüstenfeld (Leipzig: Brockhaus, 1866-73), vol. 3, 811.