

6 BEASTS THAT ROARED: THE PISA GRIFFIN AND THE NEW YORK LION

*Anna Contadini, Richard Camber
and Peter Northover*

The Pisa Griffin

Anna Contadini

My interest in the Pisa Griffin (pl. 6.1) goes back to my childhood, when my parents took me to visit Pisa for the first time. I am still as impressed by the beast as I was then, but I am now equally intrigued by the mystery that surrounds it. As will be clear from this paper, although our knowledge of the Griffin has advanced somewhat, especially regarding the hypothesis of its function, there are still many questions that remain unanswered. Further, the discovery of a rather similar lion, sold at Christie's in 1993¹ and now on loan to the Metropolitan Museum of Art in New York, has opened up new avenues for research, especially technical, but also regarding style and provenance.

My research on the Griffin began ten years ago,² the findings being published in part in 1993, in the entry of the catalogue of the Venice exhibition *Eredità dell' Islam*,³ where I was also able to publish the New York Lion (pl. 6.2) and to note, albeit briefly, its relationship to the Griffin. During a trip to Pisa in 1992 I had discovered something both puzzling and interesting. It was clear that the presumed function of the Griffin as a piece for a fountain needed

¹ Christie's 1993, 124-127, Lot 293.

² Many people and institutions have helped over the many years of my research: I should like to thank first of all the President, Prof Ranieri Favilli and the Director of the Opera del Duomo di Pisa, Dr Antonio Lazzarini, for allowing me to study the Griffin and permission to take samples for analyses; Mr Andrea Cinacchi, of the Archivio dell'Opera del Duomo, who assisted in the study of the documents and facilitated the photography; Mons. Mario Beconcini of the Archivio Capitolare; and the staff of the Pisa National Archive. The owner of the New York Lion generously sponsored my second research trip to Pisa in 1994. Dr Brian Gilmour of the Royal Armouries of the Tower of London did much work on the technical construction of the Lion and spent time in discussion. My father, Attilio Contadini, has been of great assistance in translating the Latin passages in various documents. I should also like to thank Richard Camber, Peter Northover, and Ralph Pinder-Wilson for time for discussion, useful suggestions and for their generosity in sharing their superior knowledge with me.

³ Contadini 1993, 126-131, col. pls. 43 and 43b, and black and white fig. 43a.

further substantiation, and consequently that more needed to be learnt about its construction, so I conducted what one might call a gynæcological examination of the Griffin through the opening in the belly, and to my astonishment discovered that it had a womb! In other words, inside the Griffin and attached to the rear is a bowl-shaped vessel with slightly everted rims opening towards the front of the animal (pl. 6.3). It is fixed to the wall of the body by means of a short solid metal stem, and there is no opening to the outside. Further, it was possible to ascertain that the body is hollow, but that there is no trace of a hydraulic system. A year later, in 1993, I was able to establish that the New York Lion has the same internal characteristics: a bowl-shaped vessel with everted rim, opened towards the front (pl. 6.4) and attached to the rear of the body by a small piece of solid metal, a hollow body containing no trace of a hydraulic system, and hollowed legs, unfortunately damaged. We now can advance new arguments to support the likely hypothesis that these vessels were part of a noise-making mechanism (see *Function*).

After the Lion was sold at Christie's it remained in London for a long time, as its owner was keen to have it examined in order to discover more about its construction, metal composition and, ultimately, provenance and date. But it was evident that any study on the Lion had to go in tandem with that of the Griffin, and it was as a result of Ralph Pinder-Wilson's initial suggestion of a joint study that there emerged the collaboration between Richard Camber, Peter Northover and myself the provisional results of which are presented here. Even though Ralph has not contributed to this study in writing he has followed our research very closely, spending time discussing various aspects and providing useful suggestions. It is therefore only proper that this paper should be dedicated to him.

Description

The Griffin is 107cm high (to the top of the ear); 90cm long and a maximum of 46cm wide (measured at the base of the wings). It has a head slightly resembling that of a

cockered, with two wattles and a slightly open beak. It has four legs with feline feet, and the wings are attached by rivets around the shoulders of the forelegs. There is an aperture in the beak and another at the rear within a rectangular block which measures H 8cm x W. 9.7cm. It was here, probably, that the base of the missing tail was inserted. There is a big, irregular aperture on the belly, inside which is the vessel described above (pl. 6.3). It occupies a considerable part of the belly, measuring c. 24cm in length, and has a rather uneven opening measuring c. 9.5cm in diameter.

The decoration of the Griffin is incised and organized in panels: there are semicircular plumes on the breast with, beneath, part of the inscription, and plumes with curls on the head, neck and wings. On the back there are scattered concentric circles with, between them, a decoration of crossed lines, and at the bottom of each flank are further parts of the inscription. At the shoulder joints between body and legs there are shield-like panels containing, on the forelegs, the figure of a rampant lion and, on the hindlegs, what appears to be a dove.

The Griffin was taken down from the Cathedral in 1828. It was placed first in the Camposanto and later in the Museum. The Griffin presently found on top of the Cathedral is a modern copy.

The Griffin in the early literature

During a second research visit to Pisa in 1994 I found iconographical evidence for the Griffin being placed on top of the Cathedral that dates back to the late 1400s. This is a representation of the leaning tower and part of the nave of the Cathedral towards the apse on top of which is a black bird with two legs and outspread wings. It appears in a marquetry panel on the underside of a chorus seat of the cathedral (pl. 6.5) which may be dated to the end of the fifteenth century.⁴ It is interesting that at this early stage the animal is 'seen' as a bird and not as a Griffin.

⁴ For a discussion of the marquetry panels see Novello and Tongiorgi Tomasi 1986, especially 144, where the panels by Guido da Seravallino are discussed. Although the present panel is not mentioned, it seems that those of views of the town (possibly therefore including also ours) are to be attributed to Seravallino, who operated between 1488 and 1490. Also, for a brief discussion of those now in the Museum see Lucchesi 1993, 84-88. The panels that are still in the chorus can be dated to various periods of the late 15th century. A black and white representation of the panel under discussion is to be found in Burgalassi 1993, Fig. 9, where, however, the Griffin is not discussed.

In the literature we begin with an indirect mention of the Griffin (but with no illustration) from the early 1540s, when it was reported that a new column had been made to support it on top of the roof of the Cathedral.⁵

The Griffin is subsequently mentioned, but again not illustrated, by Raffaello Roncioni in his *Istorie Pisane*, a work datable to between the end of the sixteenth and beginning of the seventeenth century. It is there described as a hippogryph standing on top of the cathedral, and as a very beautiful bronze object with Egyptian characters inscribed on it.⁶

In c. 1643 Paolo Tronci made a watercolour of the cathedral with, on top,⁷ the Griffin which is, however, still represented as a large, two-legged bird with spread wings resting on a column (pl. 6.6). He reports a rather fanciful account of the Griffin, saying that it was a very large and ferocious animal that lived in a wood (the 'Bosco detto Migliarino'), but that it was eventually captured and a bronze statue was made of it.⁸ This account, together with Tronci's watercolour as it appears in the manuscript of c. 1643, was then published by Peleo Bacci in 1922.⁹

A further description was given in 1705 by Giuseppe Martini, accompanied by three engravings showing the Griffin, this time a clear four-legged griffin, on a short column on top of the roof of the Cathedral at the end of the nave, above the apse.¹⁰ In these engravings it has outspread wings and no tail, and Martini is inclined to identify it as an eagle, one of the four symbols of the Apocalypse, on the grounds that the other three images are also found in the proximity of the apse.

The first representation from an examination at close quarters, even if a rather rapid one, is found in a work by Da Morrone dated 1787-93. He tells us that, pushed by an extreme curiosity to inspect the 'hippogryph', he went up the roof of the Cathedral, usually only accessible to builders, and saw with his own eyes that what Roncioni had thought to be characters engraved on the Griffin were instead decorative motifs. He took an impression of them and reproduced the Griffin in his work, with outspread wings but no tail. Like Roncioni, Da Morrone thinks that it is a work of antiquity, either Egyptian or Etruscan, as it was, so he relates, found during

⁵ Tanfani Centofanti 1897, 469.

⁶ The *Istorie Pisane* were compiled between the end of the 16th and the beginning of the 17th century: Roncioni 1844, vol. V, part I, 114.

⁷ Tronci c. 1643, fol. III.

⁸ Tronci c. 1643, fols. 6v-7r.

⁹ Tronci 1922.

¹⁰ Martini 1705, n. 10, 13, figs. 4, 5 and 7.

the excavations of the foundations of the Cathedral among the remains of Hadrian's palace.¹¹

The Griffin continued to be mentioned and discussed throughout the 19th century, beginning in 1823 with Cicognara, the first to suggest that the object could be medieval rather than a work of antiquity, and possibly contemporary with the erection of the Cathedral itself.¹² But we have to wait for the well-known Arabist Michelangelo Lanci to have a correct interpretation of the inscription, which he read and translated in 1829, and in his *Trattato delle simboliche rappresentanze Arabe* of 1846 where he also gives an engraving of the Griffin.¹³

Date and provenance

In 1839 Marcel, who published the inscription, if with some mistakes, and also an engraving of the Griffin, put forward the hypothesis of a southern Italian provenance, considering it an object produced by Muslims under the Normans.¹⁴ For Rohault de Fleury, on the other hand, writing in 1866, it is the type of sculpture that Muslim merchants would order for a Christian or Jewish market, and is to be dated, according to the character of the letters of the inscription, to between the end of the 11th and the beginning of the 12th century.¹⁵

The hypothesis that starts to emerge in the second half of the 19th century is that the Griffin was booty captured during one of the battles won by the Pisans against the Muslims throughout the 11th and 12th centuries in Sicily, North Africa and Balearic Islands. However, even though the sources talk about fabulous booty, they are never specific about the objects captured. More recently, in 1978, Jenkins drew attention to an inscription on the façade of the cathedral dated 1063, which she considers to be its foundation date.¹⁶ She associated the inscription, which is a report of the main victories of the Pisans in the 11th century, with a Pisan chronicle by Marangone, who, under the year 1088, gives an account of a naval expedition by the Pisans and Genoese against the African coast during the course of which they conquered Mahdiyya and Zawila in Tunisia, taking back rich booty including, according to Jenkins' translation, big bronze objects which were then used to enrich the Cathedral. Jenkins therefore suggests that the Griffin could have been among those objects,

and that it was put on top of the cathedral, the construction of which had already started in 1063, as an ornament, and that, consequently, it is a Fatimid work of the 11th century, produced either in Egypt or Tunisia. But the source cited by Jenkins does not specify that the objects were large, and in any case *aeramentorum*, 'bronze objects', is just one of three possible readings, for other compilations of Marangone's text have *ornamentorum*, which can be translated as 'pieces of jewellery', and *ferramentorum*, which can be translated as 'arms'.¹⁷ Further, as far as the inscription dated 1063 is concerned, it may be pointed out that on the façade of the Cathedral there are six such inscriptions giving the *gesta* of the Pisans in the Mediterranean, with dates ranging from 1006 to 1114, and that they have been the cause of endless discussions among scholars as to which one is to be associated with the foundation of the church.¹⁸ However, the date of the foundation is now accepted to be early in 1064 (and that of the consecration 1118).¹⁹

If one wants to associate the Griffin with Pisan booty, the sources report at much greater length the magnificence of the booty brought back from the Balearic conquest of 1114, which is also referred to on the façade of the Cathedral,²⁰ and in 1946 Monneret de Villard advanced the hypothesis that the Griffin, together with a 10th century marble capital from Spain set on the roof of the northern transept of the Cathedral, was Pisan booty either from the conquest of Almeria in 1089 or from that of the Balearic islands in 1114.²¹ Monneret associated the Griffin with the deer found in Madinat al-Zahra' and the Monzón lion found in the ruins of an Islamic fortress near Palencia, emphasizing the similarity of decoration, especially

¹⁷ The passage is found in Marangone 1845, vol. VI, part 2, 5-6. The whole Latin passage with an Italian translation is found in Contadini 1993, 130, note 8.

¹⁸ Cicognara 1823, vol. II, 79-89, where the differences of opinions on the matter are discussed.

¹⁹ Scalia 1993.

²⁰ For the passage in Marangone 1936, 94 on the 1114 Balearic conquest see Contadini 1993, 131, note 10.

²¹ Monneret de Villard 1946, 21-3. The capital was subsequently moved to the Battistero, where, in the middle of the baptismal font, it functioned as a support for the bronze statue of St. John. It is now in the Museum of the Opera del Duomo, sala 1, no. 30. For a discussion and a translation of the Arabic inscription see Contadini 1993, 122-3, no. 39. In this context it is interesting to point to the fact that there is another notable Islamic object in the Museo dell'Opera del Duomo in Pisa: a large brass tray, with a kufic inscription and various decorative motifs which has been preliminary dated to the 12th century. This, now in the Museum, was used in the Sacristy. See Baracchini 1986, where black and white reproductions of the tray, capital and griffin are found (figs. 71-73); also Lucchesi 1993, 20, nos. 29-31 and Fig. 15 (black and white detail of the inscription of the Griffin) and Pl. VI, colour reproduction of the Griffin.

¹¹ Da Morrona 1787-93, I, 190-195.

¹² Cicognara 1823, 108-9.

¹³ Lanci 1845-46, 54-58, fig. XXVII. For Lanci's translation of the inscription see Valeriani 1829.

¹⁴ Marcel 1839.

¹⁵ Rohault de Fleury 1866, 42 and 122-124, fig. XLVI.

¹⁶ Jenkins 1978.

that of the back, which is like a textile.²² Arguing against Migeon who, in 1907, had classified the Griffin as a Fatimid work of the 11th century on the basis of generic stylistic affiliations,²³ Monneret considered it a Spanish piece of the late 11th–early 12th century. His hypothesis was to be followed in 1966 by Scerrato who, however, suggested an early 11th-century date, that is, during the caliphal period, and considered it a fountain piece.²⁴

An 11th-century date was also preferred by Melikian-Chirvani. However, on the basis of the characteristics of static monumentality, the use of inscriptions in kufic script as if surrounding a textile, and the type of script, he argued in 1968 for an attribution to Iran (Khurasan),²⁵ although subsequently, in 1973, he proposed a Spanish attribution (but probably still at the hands of Iranian craftsmen),²⁶ thereby taking account of the observation by Fernández Puertas that the style of script in the Griffin is practically identical to that on a metal lamp now in the Archaeological Museum in Madrid.²⁷

More recent scholarship has been marked by continuing hesitation over the date. The slightly earlier caliphal period of the late 10th–early 11th century is proposed by Almut von Gladis,²⁸ Cynthia Robinson, followed by Antonio Milone, opts for the Taifa period of the 11th century,²⁹ and the present writer cautiously prefers the 11th–12th century.³⁰ But there has been general agreement on provenance: earlier arguments for southern Italy or the Fatimid territories have been largely discounted, and the predominant view is that the Griffin is to be attributed to Spain. The Fatimid case, like the Spanish one, relies primarily on stylistic association, and given the paucity of comparative material is undeniably much weaker. If we move to Spain, however, there are stylistic affinities with pieces attributable to Spain with a good margin of security.

²² For the Monzón lion (Paris, Musée du Louvre, no. 7883) see Granada and New York 1992, 270, no. 54. Monneret also notes the similarity with the quadruped in the Bargello National Museum in Florence (inv. n. 63c), for which see Contadini 1993, 124–125, no. 41 and col. Pl., and with a lion in the Victoria and Albert Museum (M. 708–1910), which, however, is a modern, 19th century copy.

²³ Migeon 1907, vol. I, 375, fig. 182.

²⁴ Scerrato 1966, 78–80, and 83, fig. 33; also Gabrieli and Scerrato 1985, col. pls. on the flyleaf and on 489.

²⁵ Melikian-Chirvani 1968.

²⁶ Melikian-Chirvani 1973.

²⁷ Published by Fernández Puertas in 1975.

²⁸ Berlin 1989, n. 4/83, 592–3, fig. 15.

²⁹ Granada and New York 1992, n. 15, 216–18. Milone 1993 provides a review of the literature on the Griffin within a book dedicated to the medieval and modern sculptures of the Pisa's Camposanto.

³⁰ Contadini 1993. The above overview of the literature incorporates part of the Venice catalogue entry.

The most striking similarities are those exhibited by the Monzón lion. Found by Fortuny in an Islamic fortress near Palencia which fell in Christian hands in the 11th century,³¹ it has much in common with the Griffin and the New York Lion: the organization of the decoration in sectors; the manner of representing hair/plumes on the chest; the way in which the joints of the legs are highlighted with a shield-like decoration; and the decoration of the back that is reminiscent of a textile edged with an inscription. Other animals attributed to Spain, such as the deer of Cordoba and Madinat al-Zahra', also have a decoration with circles that reminds us of a textile, but freely scattered over their backs,³² and further such examples are the quadruped in the Bargello and the two aquamanile in the form of a peacock, one in Cagliari and the other in Paris.³³ There is a further aquamanile in the form of a lion in the Keir collection in London which has some similar decorative, incised, features, and has been attributed by Fehérvári to either Sicily or Spain and to the 11th or 12th century.³⁴

In addition, Michael Rogers has observed that the decoration on the back of the Griffin, with its scattered circles bordered by a 'kufic' inscription, is extraordinarily similar to Spanish textiles of the beginning of the 13th century.³⁵ This form of decoration is common to all the animals assigned to Spain. Further, as pointed out above, Fernández Puertas has noted that the style of kufic used in the Griffin is basically identical to that on a metal lamp in Madrid assigned to the late 11th–early 12th century.³⁶

Function

The Griffin and the New York Lion confront us with problems of function. Are the two animals pieces for a fountain, as has sometimes been supposed?³⁷ The fact that both have an opening in the belly and mouth and that the Lion has round lips almost as if to house a pipe, could

³¹ Amador de los Ríos 1875. The piece is now in the Musée du Louvre, no. 7883. For a discussion of the piece and a bibliography on it see Contadini 1993, 125, note 6 and Contadini 2000, 58 and col. Pl. on 59. See also Granada and New York 1992, 270, no. 54.

³² Now in Cordoba, Museo Arqueológico Provincial, no. 500. See Granada and New York 1992, 210–211, no. 10.

³³ Contadini 1993, 124–125, no. 41 (Bargello quadruped) and 125–126, no. 42 (Cagliari aquamanile). For the Paris aquamanile (Musée du Louvre, no. MR 1569) see Paris 1990, 148, no. 119.

³⁴ Fehérvári 1976, no. 28, fig. 9b.

³⁵ Rogers 1992, 552, no. 15.

³⁶ Fernández Puertas 1975.

³⁷ For the Griffin see, for example, Scerrato 1966, 78–80, and 83, fig. 33 and Cynthia Robinson in Granada and New York 1992, 218; and for the same suggestion for the Lion see Christie's 1993, 127.

be cited in support of such a hypothesis. Further, around the aperture on the belly of the Lion (but not the Griffin) is a square recess into which a plate of some sort had evidently been set, thus suggesting a function which required the aperture to be sealed, possibly therefore one involving the insertion of a pipe. What is certain is that any water would have to come through this route, since in both animals the legs are sealed at the top, so that water could not be channelled through them as, for example, in the Alhambra stone lions. Either, then, a pipe would have to be fed through from belly aperture to mouth or the belly would have to be sealed around an inlet pipe and function as a tank. But there is now no trace of a hydraulic system in either the Griffin or the Lion, and whichever method was used to convey water no discernible purpose would be served by the bowl-shaped vessels in the interior.

Could these have been receptacles of some sort? Nothing notable has come up from the samples taken from the interior of the two vessels, and the idea that they could be containers for fire is unlikely. The incense burners in the form of animals that we have from the medieval Islamic world are all of a much smaller scale and have pierced bodies to permit the smoke to come out.³⁸ Also, the angle at which the vessel is placed in both runs counter to it to be a receptacle, especially for anything liquid, as in both animals it is slightly downwards, towards the aperture of the belly (fig. 6.1).

Is it possible that the internal vessel was part of a mechanism to produce sound? We may take into consideration that the beasts are hollow, that the metal is resonant, and that the internal vessel could have functioned as a further resonator. On an anecdotal level I have always been fascinated by the accounts, found in the documents, which relate that when the original Griffin was still on top of the Cathedral, and the wind was blowing, it would emit eerie and fascinating sounds, channelling the wind through its hollowed body. It is also quite interesting to find that both al-Hamadani (early 10th century) and Yaqut (1179-1229/575-626) in describing the big and high Ghumdan palace in San'a' relate that '... on each of its corners a statue was set, of yellow brass(?), of the biggest size of lion there is. When the wind blew in the direction of one of these statues it would go in through its posterior and come out through the mouth and make the sound of a wild beast roaring.'³⁹

It is possible that both the Griffin and the Lion were designed to produce such effects, but if we recall the tenth century account by Liutprand of Cremona of the Byzantine throne having, around it, lions that roared, it may be preferable to consider them in the context of such contrivances.⁴⁰ The sound-producing mechanism, it may be hypothesized, resembled that of a bagpipe, with the bowl-shaped vessel in the interior acting as a rigid container for the air bag, both holding it in place and helping maintain pressure. Richard Camber consulted an organ builder,⁴¹ who confirmed that this was feasible, and suggested that the Griffin and Lion were originally set on plinths containing bellows.⁴² Air would be pumped through a tube set in the opening of the belly up to into the bag. When this was fully inflated and pressing against the vessel the air would be forced out through a reed-pipe leading towards the mouth. The bag would have to be sealed around both pipes and the reed(s) would have to be placed at the beginning of the sounding pipe to make the column of air vibrate. The longer the reed-pipe, the lower the sound, hence the position of the vessel at the back of the

⁴⁰ For Liutprand's account, see Liudprand 1930, *Antapodosis*, book VI, chapter 5, 207-8: '... Before the emperor's seat stood a tree, made of bronze gilded over, whose branches were filled with birds, also made of gilded bronze, which uttered different cries, each according to its varying species. The throne itself was so marvellously fashioned that at one moment it seemed a low structure, and at another it rose high in the air. It was of immense size and was guarded by lions, made either of bronze or of wood covered over with gold, who beat the ground with their tails and gave a dreadful roar with open mouth and quivering tongue ...'; also Hammerstein 1986, 45.

⁴¹ Mr Murice Merrel, FRSA, of Bishop and Sons, Organ Manufacturers, London and Ipswich, to whom we are very grateful. Mr Merrel recreated the mechanism in his workshop.

⁴² However, according to the various descriptions in both Western and Arab sources the driving mechanism could have been either pneumatic or hydraulic: see Brett 1954 for Byzantine sources. For both Byzantine and Arabic sources, see Hammerstein 1986, chapters 3 and 4 respectively. For a critical list of the Arabic sources, which go back to the eighth century, see Farmer 1965, which includes Yuhanna ibn al-Bitriq (d. c. 815/200), 1, no. 7, who briefly mentions a hydraulic organ used in warfare to create fear among the enemy; Banu Musa ibn Shakir (d. 873/259), 7, no. 43, who wrote a treatise on an automatic hydraulic organ, for which see Farmer 1931, 88-114 (Hill 1979 does not talk about the musical automaton); A'yrun (Hero), translated in the ninth century, 18, no. 110, who wrote a treatise on pneumatic machines; and Muristus (Moristos or Myrtos), translated in the ninth century, 18, no. 113, who wrote a treatise on the construction of the reed-pipe pneumatic organ 'the sound of which may be heard sixty miles.' For this, see also Farmer 1931, 60-73 and fig. 1, which is a diagram of the Muristus pneumatic organ. See also the treatise on Automata by Ibn al-Razzaz al-Jazari (early thirteenth century), *Kitab fi ma'rifat al-hiyal al-handasiyya*: Hill 1974, especially 170.

³⁸ See examples in the form of small birds in Fehérvári 1976, pl. 37, nos. 109-111; and one in the form of a lion in Ward 1993, col. pl. 3 (Hermitage Museum, St. Petersburg, IR-1565).

³⁹ Yaqut 1866-73, vol. 3, 811; see also Serjeant and Lewcock 1983, 44, quoting al-Hamadani, *Iktil*, VIII, Baghdad, 1931, 24.

belly. This hypothesis would also account for the puzzling fact that in both the Griffin and the Lion the vessel is cracked: an imperfect casting would not be a problem, as the inner bag would not require a perfect seal around it.

The Griffin and the Lion

Anna Contadini and Richard Camber

The Pisa Griffin and the New York Lion have many characteristics in common. Both are constructed in a similar way, relying on the unusual technique of indirect lost wax casting, and both employed square-section wire or rod to support the internal core. In both there is a solid internal membrane at the top of the legs, a clear indication that the legs and body were cast separately. As already explained above, they have a large aperture on the belly and inside the belly is a very similar vessel which still bears traces of a ceramic mould.

Further, they have the same proportions and have similar incised decorations, including the feature of a 'saddle cloth' on the back with scattered incised circles beneath which is an Arabic inscription in angular script, and many other common decorative motifs, including the shields at the joints of the body with the legs. Indeed, on the foreleg shields of the Griffin a rampant lion is represented, corresponding to a griffin (with wings and tail) on those of the Lion, while on the hind leg shields of the Griffin we find a bird, possibly a dove, and in the Lion a rather more rapacious-looking bird, possibly an eagle.

Further, the style of the angular, floriated script, although not identical, is similar on both (pl. 6.7 and 8). The inscriptions, both made up of standard benedictory formulae, are as follows:

Griffin:

بركة كاملة ونعمة شاملة
غبطة كاملة وسلامة دائمة وعافية
كاملة وسعادة وعيدة (?) لصاحبه

'perfect blessing and complete well being
perfect joy and everlasting peace and perfect
health and happiness and wishes to its
owner'

Lion:

نعمة وبركة وعافية
وسلامة وسعادة ويمن
وكرامة وبقا لصاحبه

'God's favour and blessing and good health
and peace and happiness and prosperity and
honour and long life to its owner.'

Despite these similarities, however, it would be unwise to overlook the differences. It has, for example, been established that the bronze used for the Griffin is what is commonly known as gunmetal, with antimony as its most significant impurity, whereas that which was used for the Lion is an unleaded medium tin bronze, with silver as its most significant impurity. Additionally, although the legs in both cases were clearly separately cast, the membrane at the top of the legs of the Griffin is almost continuous with the body, whereas there is a slightly raised ledge around the membrane at the top of the legs of the Lion. Moreover, although the interior vessel of the Lion is cast from the same bronze as the body, in the case of the Griffin a high zinc brass entirely dissimilar to the gunmetal of the body has been employed.

Finally, although the presence in each of an inner vessel of similar structure is compelling, around the aperture on the belly of the Lion, as already noted, is a square recess into which a plate of some sort had evidently been set, while there is no such feature on the Griffin. However, the recess around the opening of the Lion, as Charles Little has observed, maybe due to later manipulation.

One may also add that while the general lack of repetition in the wish lists of the inscriptions might well be interpreted as suggesting complementarity, the style of script is not quite similar enough to indicate the same hand at work, and the inscription on the Griffin is also rather more clearly and accurately incised. These differences strongly suggest that, whatever the precise nature of the relationship between the Griffin and the Lion, they were not made in the same workshop.

Although a more detailed scientific examination of the Griffin is clearly desirable, it is by no means clear that this will cast further light on the nature of its relationship to the Lion. While it is tempting to think that one may have been the model for the other, it is equally conceivable that both derive from a common model. In either case, as the metallurgical evidence suggests, their respective places of origin could have been entirely different.

The New York Lion

Richard Camber⁴³

When it first appeared on the London art market in 1993, the New York Lion was described as being Spanish, 11th–12th century.⁴⁴ One of the objectives of the present contribution is to draw the attention of students of Islamic art to a body of material from another part of the Mediterranean with which it might perhaps more usefully be compared.

Lacking its lower legs, the lion is 73cm in height; even in its original state, it would almost certainly have been slightly smaller than the Pisa Griffin, which has a maximum height of 107cm. The distinctive and powerful head has pointed oval eyes, the pupils of which are formed by semi-circular depressions. The slightly open mouth, enclosed within stylised lips, has a central aperture above which there is a naturalistically modelled nose. On one ear, there is a shield-like depression, which, like the eyes and the mouth, may once have been inset with a decorative inlay in a different material. The mane is engraved with stylised loops similar to those found on the head of the Pisa Griffin, while the back is decorated with a design of incised and pounced circles in the manner of a *tiraz* textile with a border comprising a dedicatory *kufic* inscription. The shoulders and haunches bear engraved ogival cartouches comprising a surrounding band decorated with small circles: on the shoulders these enclose a panel with the figure of a griffin within a scrolling vine, while, on the haunches, the figure represented is that of a bird, possibly an eagle. On the rear joints of the legs, immediately above the point where they have been broken off, there is an incised 'tear-drop' motif, to which further reference will be made below. It should also be noted that, at several points, the body has been pierced by what would appear to have been a series of projectiles, in much the same manner as the Pisa Griffin and the very much smaller figure of a deer in Munich.⁴⁵

At the current stage of research, it cannot yet be determined whether the discovery that the raw copper

used for casting the New York Lion came from an identifiable district in Cyprus is itself of particular significance as regards its place of origin. Not only was Cyprus known to Arab geographers as a source of copper, but, at least until the end of the 10th century, the island was what has been described as 'a demilitarised and neutral no-man's-land in which Christian and Muslim settlers lived side by side, under pledges of mutual toleration and protection'.⁴⁶ More significant, however, may be the finding that the alloy used for the figure was an unleaded medium tin bronze: this is an alloy which, while totally uncharacteristic of the Islamic world, does occur in the Latin West, in, for example, aquamaniles and bells. Quite how this is to be interpreted remains uncertain. It could be taken to imply that the Lion was made by an Islamic craftsman familiar with medieval European bronze casting technology; alternatively, it could be taken to mean that it was made by a European craftsman familiar with Islamic models. It is probably true to say that not enough is yet known about the techniques of monumental bronze casting in the Islamic world to rule out the former possibility, but the evidence regarding the familiarity of European craftsmen with Islamic models is so well-known as to suggest that the latter possibility is one that is worth exploring in more detail.

The inscribed *du'a* on the *tiraz* of the Lion, with its invocation of God's favour and divine grace, points to a closer acquaintance with Islam and the Arabic language than the pseudo-Kufic inscriptions found on many medieval European objects. While the crouching lion from Monzón de Campos, which may, because of its findspot, have been made for a Christian ruler, has an inscription in a similar style of kufic, no detailed metallurgical analysis appears to have been undertaken which would warrant the conclusion that it came from the same cultural background as the New York Lion.⁴⁷ Similarly, although genuine kufic inscriptions do appear alongside Christian iconography on the three large Middle Byzantine bronze candelabra in the Grand Lavra Monastery on Mount Athos and St Catherine's on Mount Sinai, current knowledge of monumental bronze casting of this period in the Byzantine world is largely confined to the series of bronze doors that were commissioned by Maurus of Amalfi and his family between 1060 and 1087 for presentation to churches

⁴³ For advice and assistance over a number of years, I should like to thank the late Dr Robert Bergman, Dr Tessa Garton, Dr Brian Gilmour, Dr Charles T Little and Mr Rainer Zietz.

⁴⁴ Christie's 1993, Lot 293. The lion was first brought to the attention of a wider public by Dr Anna Contadini. See Contadini 1993, 126–131 and figs.43a and 43b.

⁴⁵ Erdmann 1938, 252, who remarks of the Munich deer that 'offenbar hat es einmal als Zielscheibe gedient'. On the damage to the Pisa Griffin, Drescher 1985, 344 notes that the holes in the body are 'durch Beschuss mit grosskalibrigen Gewehrkugeln in neuerer Zeit entstanden'.

⁴⁶ Jenkins 1953, 1006–14. The late 10th century Persian *Hudud al-'Alam* notes that Cyprus was at that time renowned for its silver and copper mines (Vryonis 1962).

⁴⁷ Paris, Musée du Louvre, section islamique, in.no.7883. Kühnel 1924, 73, pl.121; Migeon 1927, I, 382, fig.191; Gomez-Moreno 1951, III, 336, fig.396a; Paris 1990, no.127, 154; Granada and New York 1992, no. 54.

in Amalfi, Monte Cassino, Rome, Monte Sant'Angelo and Atrani.⁴⁸ None of these throws any direct light on the techniques used for large-scale figurative bronzes of Constantinopolitan manufacture, although there is considerable documentary evidence that such existed in the 9th and 10th centuries: the case of the bronze lions noted by Liudprand of Cremona during his audience with the Emperor Constantine VII in 949 is well-known, but other descriptions have survived of palaces and churches whose courtyards were embellished with fountains around which there were placed bronze figures of animals from whose open mouths there flowed constant streams of water.⁴⁹

All such evidence, it has to be admitted, is necessarily circumstantial and, in the present state of research, it would certainly be rash to draw hard and fast conclusions from the few fragmentary remains that have survived, whether in written form or otherwise. Scarcely less circumstantial, but certainly very much more abundant, is the evidence that has survived from Southern Italy and Sicily, where notwithstanding the gradual expansion of Norman rule from the second half of the 11th century onwards, local allegiance to Islamic and Byzantine cultural traditions remained widespread until late into the 12th century: from the period of the Norman occupation of Southern Italy, there have survived over seventy Arabic inscriptions, most occurring in a strictly Islamic context,

but others in an indubitably Latin context.⁵⁰ Even after the Norman conquest of Southern Italy and Sicily, large Arab communities continued to live in the areas around Lucera and Messina, Arab craftsmen were frequently employed on major building works and Arabic survived as one of the official languages of the kingdom. Arabic inscriptions, indeed, continued to be used on the coinage of the Emperor Frederick II in the early 13th century.⁵¹

The dependence of the Normans upon the cultural traditions of their Arab predecessors was not confined merely to matters of linguistic usage. Students of Early Romanesque sculpture in southern Italy have long been aware that much of what has survived in Apulia reveals the direct impact of Islamic models and that other centres, such as the coastline of Campania to the west, were home to a style which combined the influence of the Islamicizing Romanesque of Apulia with a more purely indigenous Lombard tradition.⁵² In the present context, a detailed survey of the Apulian parallels for the dominant stylistic features of the New York Lion is clearly impossible, but the following partial list should at least serve to draw the attention of Islamic specialists to some of the relevant monuments: the marble oxen flanking the entrance to the church of S. Nicola at Bari, which display a similarly stylised treatment of the junction between the shoulders and the legs and which have, in addition, the same type of 'tear drop' motif on the rear joints of the legs (pl. 6.9), the capitals in the crypt of S. Nicola itself, a solitary unprovenanced capital with a winged lion in the Pinacoteca Provinciale at Bari, the carvings on the capitals and tympanum of S. Trinita, Venosa, the marble lion from the base of a lost episcopal throne at Siponto and the elephants and lions supporting the episcopal thrones at Canosa (pl. 6.10) and Monte Sant'Angelo respectively.⁵³ All of these are generally dated to the second half of the 11th century. Of the same period, but from further to the west in Campania, are the pair of marble lions from the episcopal

⁴⁸ Bouras 1991, 19–26; Bouras 1982, 480. On the Byzantine bronze doors of Italy: Matthiae 1971, pl. 1–4, 63–65 (Amalfi), pl. 5–15, 67–72 (Monte Cassino), pl. 16–48, 73–82 (Rome, San Paolo fuori le Mura), pl. 49–66, 83–89 (Monte Sant'Angelo), pl. 67–70, 91–92 (Atrani); English Frazer 1973, 147–162; Bari 1975, no. 58; English Frazer in Salomi 1990, I, 271–277, II, pl. CCXIII–CCXXV; Bertelli in Salomi 1990, I, 293–305, II, pl. CCLIX–CCLXX. As English Frazer remarks in Salomi 1990, 275, the doors at Atrani, which are dated to 1076, may be a western copy of those at Amalfi, in which case they would be the earliest known bronze doors in southern Italy of local manufacture.

⁴⁹ Liudprand, *Antapodosis*, VI, 5, 8, in Mango 1972, 209–210 ('Now the Emperor's 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'). Also 162, for Theophanes Continuatus' description of the construction by the Emperor Theophilus' (829–842) of the Mystic Fountain of the Triconch, adjacent to the peristyle of the Sigma in the Great Palace at Constantinople ('There, too, next to the long side of the Sigma have been erected two bronze lions with gaping mouths. These spouted water and flooded the entire hollow area of the Sigma ...'), and 194–195 for the description by the anonymous author of the *Vita Basilii* of the stone fountain commissioned by the Emperor Basil I (867–886) for the atrium of the Nea Ekklesia in the Great Palace ('... all round the upper rim of the fountain the artist has fashioned cocks, goats and rams of bronze, and these, by means of pipes, vomit forth jets of water onto the underlying floor').

⁵⁰ Gabrieli and Scerrato 1985, 282. For a recently studied example (by Jeremy Johns) occurring in a Latin context, see the comments by Tronzo 1997, 44–45, on the monumental kufic inscriptions from Roger II's palace at Messina which refer to the Norman monarch as *Rujjanu*.

⁵¹ Curtis van Cleve 1972, 295, 303–306; Abulafia 1992, 15, 40–41; Matthew 1992, 169–170, 240–242 and 356; Gandolfo 1995, I, 46–47 and 54–55; Tronzo 1997, 101–105.

⁵² Garton 1973, 100–116; Bari 1975; Pace 1977, 226–255; Garton 1984; Glass 1991; Garton 1996, 96–105; Gandolfo 1999.

⁵³ Dotoli and Fiorino 1987 (entrance porch, S. Nicola at Bari); Garton 1984, pl. XLVc and fig. 55 (crypt capitals, S. Nicola at Bari); Bari 1975, no. 123 (unprovenanced capital, Pinacoteca Provinciale, Bari); Garton 1984, figs. 200, 204, 212c (S. Trinita, Venosa); Bari 1975, no. 74 (Siponto lion), no. 106 (Canosa elephants), no. 43 (Monte Sant'Angelo lions).

throne at Calvi Vecchia, capitals at Salerno and Aversa and the remarkable lion impost on the façade of the church at Carinola.⁵⁴

Limited as this list necessarily is, it should be sufficient to indicate that, in attempting to establish a possible place of origin for the New York Lion, the mainland of southern Italy in the late 11th century should not be overlooked. This is all the more true in that, as has frequently been remarked, much of this sculpture bears clear signs of having been derived directly from bronze prototypes, an observation which immediately raises the central issue of whether such prototypes were locally produced by Arab craftsmen or imported from elsewhere.⁵⁵ The present evidence is ambiguous. On the one hand, the fact that the series of silver-inlaid bronze doors commissioned by Maurus of Amalfi and his family between 1060 and 1087 were imported from Constantinople, as also were the two bronze Middle Byzantine candelabra now on Mount Athos, the so-called 'Amalfitan Candelabra', may suggest that there was no indigenous metalworking tradition in the area during the second half of the 11th century. On the other hand, several students of Early Romanesque sculpture in Apulia have noted that the fact that so much of this sculpture bears the imprint of metalwork prototypes may point to the existence in the region of a foundry with Arab craftsmen.⁵⁶ Still others have suggested that these prototypes may have been imported rather than made locally, as may have been the case with one of the bronze doors that was used between 1111 and 1118 for the tomb of Bohemond of Antioch at Canosa.⁵⁷ Placed at the entrance to a structure which is

itself totally uncharacteristic of the region and may have been derived from Syrian models, the two doors to Bohemond's tomb are solid castings, unlike, for example, the earlier series of Byzantine doors in which singly cast plaques are attached to a wood core. As the inscription indicates, the right-hand door was made locally by a craftsman with the characteristically Norman name of 'Rogerius', who identifies himself as a bell-founder and proudly states that he was also responsible for the Paschal candlestick in the adjoining cathedral.⁵⁸ Apart from its obvious indebtedness to the Byzantine doors in its use of a figurative silver inlay, it has long been recognised that this right-hand door is a loose copy of the left-hand door, which, with its applied *alif-lam* inscriptions around the lion's head masks, also repeated on the door of Rogerius, may either have been of local manufacture or a slightly earlier Near Eastern import. Even if it is a Near Eastern import, this does not necessarily imply that there was no indigenous tradition of monumental bronze casting before the end of the 11th century, since it could reasonably be argued that, both in this case as well as in that of the Byzantine doors, the recourse by the local Latin communities to Constantinopolitan or Near Eastern workshops is indicative of nothing more than the prestige that attached to such workshops and the admiration that these communities had for them. The whole matter, it must be said, remains very uncertain. All that is clear is that, at least from 1119 onwards, when the doors by Oderisius of Benevento were installed at Troia, all the other surviving sets of bronze doors in southern Italy are locally made.⁵⁹ The period of importation, spanning the last four decades of the 11th century and the opening years of the 12th century, had receded into history.

While none of the above necessarily implies that the New York Lion is unquestionably of south Italian origin, its use of a characteristically western alloy and its close stylistic relationship to the surviving Early Romanesque sculpture of the region does suggest that serious consideration should be given to the possibility that it was of local manufacture. Only further detailed

⁵⁴ Gabrieli and Scerrato 1985, figs. 451-453 (Calvi Vecchia lions); Pace 1977, fig. 23 (Salerno capital), nos. 48-50 ('capitello dell'organo' at Aversa) and no. 62 (Carinola imposts).

⁵⁵ Belli d'Elia and Garton have noted that, behind the lion at Siponto, there probably lay a long tradition of 'bronzetti arabi in forma di animali' and that this tradition also led to the 'celebri leoni della fontana di Granada, tardi, ma evidentemente esemplati, su più remoti modelli' (Bari 1975, 64). Valentino Pace in D'Onofrio 2001, 76-78, has recently remarked upon the closeness of the stylistic relationship between the Granada lions and the sculptures at Aversa and Canosa. Nor does the copying in marble seem to have been confined to objects made within the Islamic cultural tradition, since it has been suggested that the celebrated pulpit of 1039-1041 at Canosa may have been derived from a lost prototype made probably of bronze and wood (Bari 1975, 80-86).

⁵⁶ Garton 1973, 104: 'The existence of a bronze foundry with Islamic or Islamic influenced craftsmen in Canosa in the 11th century would explain the apparent influence of oriental metalwork on the style of the 11th century stone sculpture of Canosa'. Garton is here specifically referring to the elephants of the Canosa throne, a capital with adorsed winged lions and the eagle and masks on the pulpit.

⁵⁷ Cadeimi in Salomi 1990, 360-366, II, pl. CCCXIII-CCCXXVI; Mende 1994, 41-47, 139-141, pl. 40-43, figs. 26-30.

⁵⁸ Roger describes himself as *Melfie campananum*, which has been interpreted as meaning that he was a bell-founder from either Melfi in Apulia or Amalfi in Campania. Preference is now generally given to the former (see Mende 1994, 139-141). Francesco Aceto in D'Onofrio 2001, 56-58, has recently proposed that Rogerius is to be identified with the sculptor of the same name who, with his son Robertus, signed the ciborium and altar of shortly before 1150 at S. Clemente al Volmanno in the Abruzzi, a hypothesis which, as Pina Belli d'Elia remarks in D'Onofrio 2001, 260, gives rise to *non poche riserve*.

⁵⁹ Mende 1994, 141-143, pl. 44-49.

research, particularly in relation to the doors at Canosa, will reveal whether it should be regarded as an example of the type of either imported or locally made Islamic work upon which the Latin sculptors of the region based their own carvings or whether, by contrast, it should be thought of as an Islamicizing work made in the late 11th or early 12th century by a western bronze-caster familiar with Islamic models.

The Composition of the Lion and the Griffin

Peter Northover

The discussion of the compositions of the two sculptures will be made in the order in which the analyses were carried out, that is with the Lion first, followed by the Griffin. All the analyses have been made by electron probe microanalysis (EPMA) using wavelength dispersive spectrometry; this method has been well standardised against other current techniques so the results will be broadly comparable with those from other laboratories.⁶⁰

In the Lion, basically the same alloy was found at all eight locations analysed (Table). The data will be to some extent affected by corrosion and segregation but the analyses generally tell the same story of a plain tin bronze with 11.0–12.5 percent tin, with arsenic, lead and silver as the principal impurities. The low tin contents in #R785/9 and the higher tin content in #R786 are the result of segregation in the casting and the small amount of metal analysed in each sample. There are also consistent traces of nickel and bismuth, while the other elements sought are at or very close to their limits of detection.

Because all the parts of the Lion were cast in the same plain tin bronze without any addition of lead it appeared probable that new metal had been used without any incorporation of scrap. As a result a lead isotope analysis was commissioned. The results showed convincingly that the copper in the alloy had come from either Skouriotissa or Apliki in Cyprus.⁶¹ Archaeometallurgical interest in Cyprus has almost entirely been focussed on antiquity to the neglect of later periods so little is known about Byzantine, Arabic and Crusader exploitation of the island's resources. That copper production continued to be important in Cyprus is also shown by Cypriot copper being used in the manufacture of the 'Dardanelles Gun', a

16 tonne bronze cannon cast for the defence of the Dardanelles in 1464.

When originally considered these analyses were compared with the alloys typical of Islamic castings. Numerous analyses from the Islamic world are available in the literature⁶² and all show that alloys based on the copper-lead-zinc system were the norm for this. This is true even of the western Islamic world; indeed in tenth century Spain zinc contents in cast metalwork were higher than in many other areas. The use of bronze is rather more reminiscent of the alloys used in the Roman world where it was standard for large sculpture. Both leaded and unleaded bronzes were used, the latter for statues that were going to be amalgam gilded because of the reaction of lead with gold amalgam produced a grey compound that could not be turned golden and which disfigured the gilding.⁶³

As a first step the sculpture most closely related to the Lion, the Pisa Griffin, was analysed to determine whether the Lion was alone in being cast in bronze or was typical of a larger group of sculpture. With the cooperation of the authorities at the Cathedral Museum in Pisa five samples were taken from the Griffin as detailed in the table. It is immediately clear that both the alloy and copper source are very different. The alloy contains much less tin than in the lion but zinc and lead are now both part of the alloy. Again, the variation in composition is mainly the result of segregation but it would also appear from the results that the wings were made from a separate batch of metal, with less tin but more zinc and lead than in the body, and with more iron and less antimony than in the body.

The use of two different alloys for structurally very similar sculptures alters the question of the metallurgical traditions within which they were cast. The whole question of the main regional traditions in the demand for and the production of large castings in the period 1000–1250 AD—German, Italian, Islamic and Byzantine—into which we must fit the Lion and the Griffin would seem to be a profitable area for future research. We need to understand several aspects, among which are:

1. the origins of the casting technology in terms of moulding and also the melting of large quantities of metal;
2. the reasons for selecting specific alloys and the economic and political links portrayed by the sources of the metals used.

⁶⁰ Northover and Rychner 1998.

⁶¹ S Stos, personal communication.

⁶² Craddock, La Niece and Hook 1998.

⁶³ Anheuser 1996.

Analysis of the Lion and Griffin			Fe	Co	Ni	Cu	Zn	As	Sb	Sn	Ag	Bi	Pb	Au	S
sample	Object	Part													
R485/1	Lion	belly	0.08	0.01	0.05	87.96	0.02	2.57	0.01	8.94	0.26	0.07	0.05	0.00	0.00
R485/2			0.03	0.00	0.06	83.70	0.08	0.00	0.00	14.99	0.78	0.03	0.28	0.04	0.00
R485/3			0.04	0.00	0.03	89.68	0.07	0.00	0.02	9.80	0.25	0.00	0.08	0.02	0.00
R486/1	Lion	right fore leg	0.00	0.00	0.04	87.41	0.07	0.00	0.02	11.71	0.51	0.00	0.20	0.00	0.03
R486/2			0.01	0.00	0.07	81.71	0.04	0.00	0.00	16.14	0.89	0.17	0.95	0.02	0.00
R486/3			0.01	0.00	0.00	89.30	0.06	0.00	0.00	10.01	0.40	0.04	0.18	0.00	0.02
R487/1	Lion	interior vessel	0.00	0.00	0.05	86.70	0.10	0.00	0.01	12.01	0.63	0.09	0.41	0.00	0.00
R487/2			0.02	0.00	0.04	88.71	0.04	0.00	0.00	10.37	0.51	0.02	0.29	0.00	0.00
R487/3			0.02	0.00	0.00	83.88	0.03	0.00	0.00	14.80	0.75	0.13	0.29	0.10	0.00
R785/1	Lion	right hind leg	0.00	0.00	0.00	88.35	0.00	2.40	0.05	8.71	0.46	0.02	0.00	0.00	0.01
R785/2			0.00	0.00	0.06	87.27	0.08	1.62	0.00	9.48	0.39	0.01	1.01	0.09	0.00
R785/3			0.00	0.01	0.04	87.52	0.11	0.00	0.02	11.08	0.63	0.00	0.43	0.16	0.00
R786/1	Lion	right fore leg	0.03	0.00	0.03	88.52	0.02	0.00	0.03	10.63	0.41	0.00	0.15	0.14	0.03
R786/2			0.02	0.02	0.05	75.23	0.00	0.48	0.06	19.92	1.60	0.47	2.05	0.00	0.11
R786/3			0.00	0.03	0.03	86.79	0.04	0.00	0.01	12.07	0.73	0.00	0.20	0.05	0.05
R786/4			0.00	0.00	0.00	84.43	0.04	0.00	0.09	13.87	1.12	0.00	0.41	0.03	0.01
R787/1	Lion	interior vessel	0.01	0.03	0.08	79.37	0.12	0.00	0.00	16.05	1.32	0.02	0.84	0.01	2.16
R787/2			0.04	0.00	0.00	86.25	0.11	0.38	0.00	12.47	0.58	0.03	0.12	0.01	0.00
R787/3			0.02	0.02	0.00	90.15	0.03	0.00	0.00	9.32	0.46	0.00	0.00	0.00	0.00
R788/1	Lion	finning in neck	0.01	0.00	0.01	86.36	0.00	1.64	0.00	11.04	0.53	0.06	0.00	0.32	0.02
R788/2			0.00	0.01	0.02	84.93	0.09	0.00	0.00	12.81	0.99	0.02	1.13	0.00	0.01
R788/3			0.03	0.03	0.01	86.63	0.00	0.00	0.00	12.49	0.64	0.00	0.08	0.09	0.00
R789/1	Lion	finning in body	0.02	0.01	0.00	91.91	0.00	0.00	0.07	7.57	0.33	0.07	0.00	0.03	0.00
R789/2			0.00	0.00	0.00	89.52	0.02	1.87	0.00	8.19	0.39	0.00	0.00	0.00	0.01
R789/3			0.01	0.00	0.00	90.69	0.09	0.33	0.03	7.81	0.71	0.07	0.20	0.03	0.04
R865/1	Griffin	left wing, drill hole	0.42	0.00	0.06	87.03	11.33	0.00	0.13	0.73	0.09	0.00	0.21	0.00	0.00
R865/2			0.39	0.00	0.06	83.95	11.43	0.00	0.15	1.08	0.11	0.04	2.79	0.00	0.01
R865/3			0.33	0.02	0.03	84.25	11.39	0.00	0.14	1.00	0.12	0.05	2.64	0.00	0.03
R865/4			0.28	0.01	0.03	80.15	10.61	0.00	0.46	2.17	0.23	0.06	5.92	0.00	0.08
R866/1	Griffin	right wing, drill hole	0.66	0.00	0.05	79.47	15.16	0.36	0.10	0.94	0.09	0.03	3.07	0.00	0.08
R867/1	Griffin	body, finning	0.10	0.01	0.04	90.21	6.44	0.00	0.22	2.51	0.11	0.00	0.27	0.09	0.00
R867/2			0.05	0.00	0.08	87.41	4.36	0.04	0.98	5.01	0.38	0.04	1.65	0.00	0.01
R867/3			0.11	0.00	0.04	89.76	6.96	0.00	0.28	2.31	0.09	0.00	0.45	0.00	0.00
R868/1	Griffin	vessel, upper	0.13	0.01	0.03	84.75	11.35	0.87	0.24	1.99	0.16	0.00	0.40	0.03	0.02
R869/1	Griffin	vessel, lower	0.15	0.04	0.05	85.23	9.09	0.00	0.37	2.90	0.19	0.00	1.87	0.07	0.05
R869/2	Griffin		0.20	0.00	0.04	85.51	10.18	0.91	0.25	2.34	0.15	0.00	0.35	0.00	0.08
R485	Lion	belly	0.05	0.00	0.05	87.11	0.06	0.86	0.01	11.24	0.43	0.03	0.14	0.02	0.00
R486	Lion	right fore leg	0.01	0.00	0.04	86.14	0.06	0.00	0.01	12.62	0.60	0.07	0.44	0.01	0.02
R487	Lion	interior vessel	0.03	0.00	0.04	86.63	0.06	0.43	0.01	11.93	0.52	0.05	0.29	0.01	0.01
R785	Lion	right hind leg	0.00	0.00	0.03	87.71	0.06	1.34	0.02	9.76	0.49	0.01	0.48	0.08	0.00
R786	Lion	right fore leg	0.01	0.01	0.03	83.74	0.03	0.12	0.05	14.12	0.96	0.12	0.70	0.06	0.05
R787	Lion	interior vessel	0.02	0.02	0.03	85.26	0.09	0.13	0.00	12.61	0.79	0.02	0.32	0.01	0.72
R788	Lion	finning in neck	0.01	0.01	0.01	85.97	0.03	0.55	0.00	12.12	0.72	0.03	0.40	0.14	0.01
R789	Lion	finning in body	0.01	0.00	0.00	90.70	0.04	0.73	0.03	7.86	0.48	0.05	0.07	0.02	0.02
R865	Griffin	left wing, drill hole	0.36	0.01	0.05	83.84	11.19	0.00	0.22	1.25	0.14	0.04	2.89	0.00	0.03
R866	Griffin	right wing, drill hole	0.66	0.00	0.05	79.47	15.16	0.36	0.10	0.94	0.09	0.03	3.07	0.00	0.08
R867	Griffin	body, finning	0.09	0.00	0.05	89.13	5.92	<0.20	0.49	3.28	0.19	0.01	0.79	0.03	0.00
R868	Griffin	vessel, upper	0.13	0.01	0.03	84.75	11.35	0.87	0.24	1.99	0.16	0.00	0.40	0.03	0.02
R869	Griffin	vessel, lower	0.17	0.02	0.05	85.37	9.63	0.45	0.31	2.62	0.17	0.00	1.11	0.03	0.07
R1075	Hind on stand	weld metal	0.05	0.01	0.04	89.01	3.66	0.56	0.01	5.55	0.95	0.00	0.13	0.00	0.03
R1076	Hind on stand	shaft	0.00	0.00	0.05	88.11	3.67	0.73	0.01	5.89	1.07	0.02	0.41	0.04	0.01
R1077	Hind on stand	left hind hoof	0.03	0.00	0.04	88.82	3.85	0.45	0.00	5.12	1.28	0.00	0.20	0.04	0.16

1. Inspection of the interior of both sculptures suggest that they were made by an indirect lost wax process with slabs of wax laid up inside a removable mould, the hollow wax filled with a clay core, and the exterior invested with a ceramic mould. The bodies were cast with projecting stubs for the legs which were then cast on separately. It was not possible to determine whether the heads had also been cast separately since severe finning inside the necks of both figures obscured any joins. The Griffin's wings were also separate castings which were then riveted in place. Chaplets were of square section wire; radiographic examination of the Lion has indicated the location of most and an endoscopic survey has shown that surviving chaplets are of iron wire. Moulding material is available for future study as much of the ceramic mould surrounds the vessel cast inside the Griffin. It is to be hoped that further large figures come to light for comparison.

2. References to the analysis of contemporary large copper alloy castings are very scattered. A useful survey of the compositions of a number of bronze doors is given by Forshell.⁶⁴ There was clearly knowledge of the behaviour of several alloy systems to call on:

a) High tin bronze and bell metal in, for example, the Vatican and in Orvieto cathedral, as well as part of the Hildesheim column.⁶⁵

b) Plain low to medium tin bronze, as in the Lion, and in the lion and griffin from Perugia as well.⁶⁶ Later this became the preferred alloy for gun founding, as in the Dardanelles gun already referred to.

c) Leaded bronze.

d) Gunmetal, as in the body of the Griffin and in the doors at Montecassino.⁶⁷

e) Brass, especially leaded brass; the Griffin's wings just about fall in this category (gilding metal and statuary bronze are more usual names for these alloys with relatively modest zinc contents. The brass can be free of bronze as in the work of Master II on the doors at Verona.⁶⁸ The use of brass may derive from both Islamic and Byzantine traditions.

With all these groups there appears to be a real division into unleaded and heavily leaded bronzes. It would be interesting to know whether this reflects the classical

Roman tradition of using an unleaded alloy where, as mentioned above, amalgam gilding was to be used. Both the New York Lion and the body of the Pisa Griffin are cast in alloys which could be so gilded. The same possibly applies to the Griffin's wings, but the 3 percent lead that was measured could have caused problems.

As yet we have, at best, a limited technical context for the Lion and Griffin. However, recently, an interesting parallel for the impurity pattern in the Lion has come to light. This is a figure of a hind which is believed to have formed part of a composition with a stag on a fountain in Cordoba, Spain.⁶⁹

Although the alloy is a gunmetal more like the body of the Griffin it has the same high silver content together with arsenic and lead impurities as the Lion. Given that coppers with high levels of silver are not particularly common it is very possible that much of the copper in the hind came from the same Cypriot source as already identified for the Lion. A *niello*-inlaid door knocker recently sold at Christie's may just fall into the same category although it contains only 0.3 percent silver.⁷⁰ Further comparisons are difficult because the published analyses of the bronze doors do not include impurities such as silver.

The metallurgical study of these sculptures has been very profitable but has potentially raised more questions than it has answered. The identification of Cyprus as source for the copper used is important for a period when Cyprus was accessible to both Arab and Byzantine worlds and in the eleventh and twelfth centuries to the Norman kingdom of Sicily. Much more work has to be done, though, on identifying the technological tradition in which they were designed and cast.

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⁶⁴ Forshell 1992, 67-72.

⁶⁵ See respectively: Angelucci 1990; Gramaccini 1987; Drescher 1993.

⁶⁶ Marabelli 1973 and Cuccini 1994.

⁶⁷ Matthiae 1971, 71.

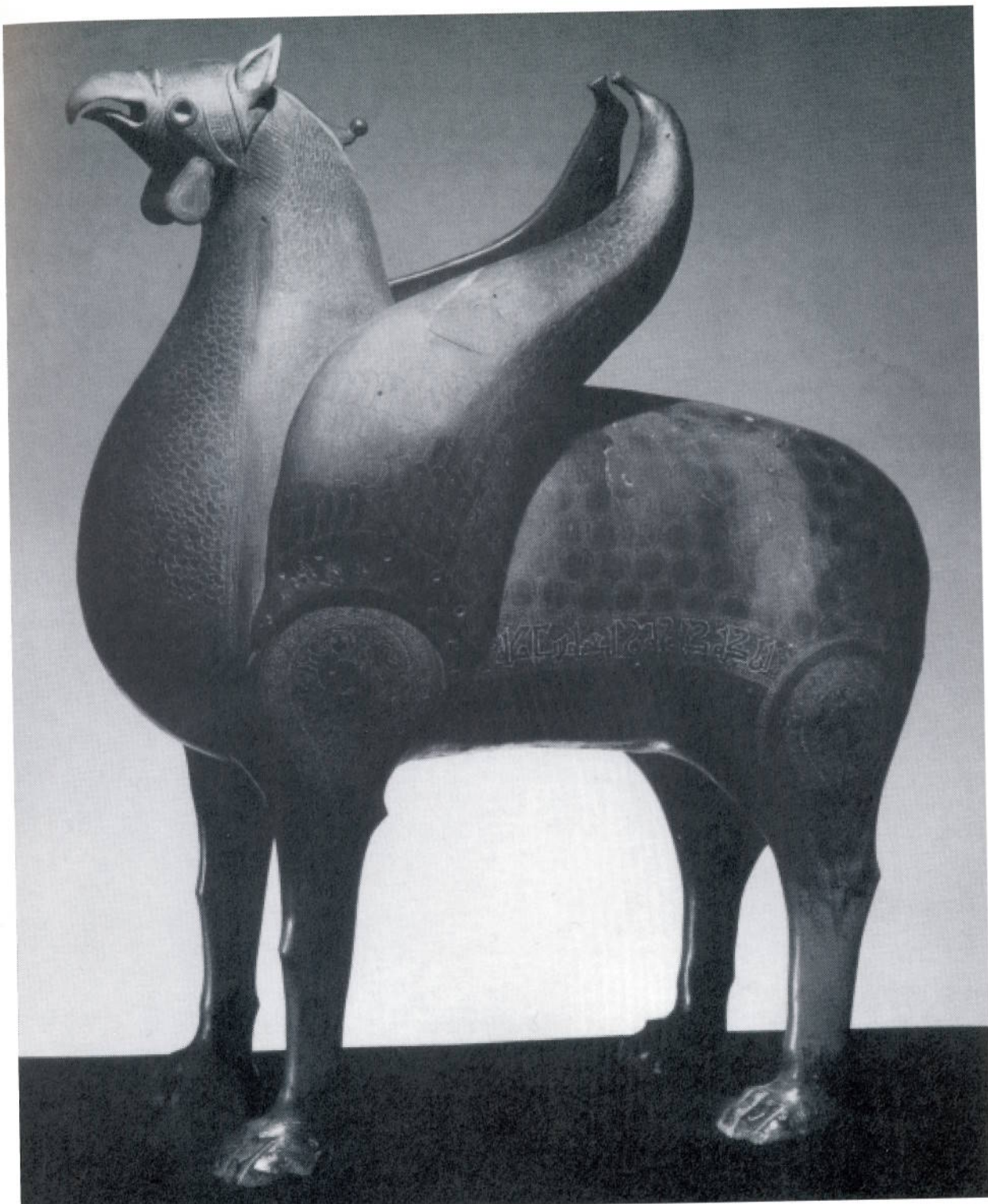
⁶⁸ Salomi 1990, I, 433.

⁶⁹ Christie's 1997, Lot 293.

⁷⁰ Christie's 2000, Lot 276.

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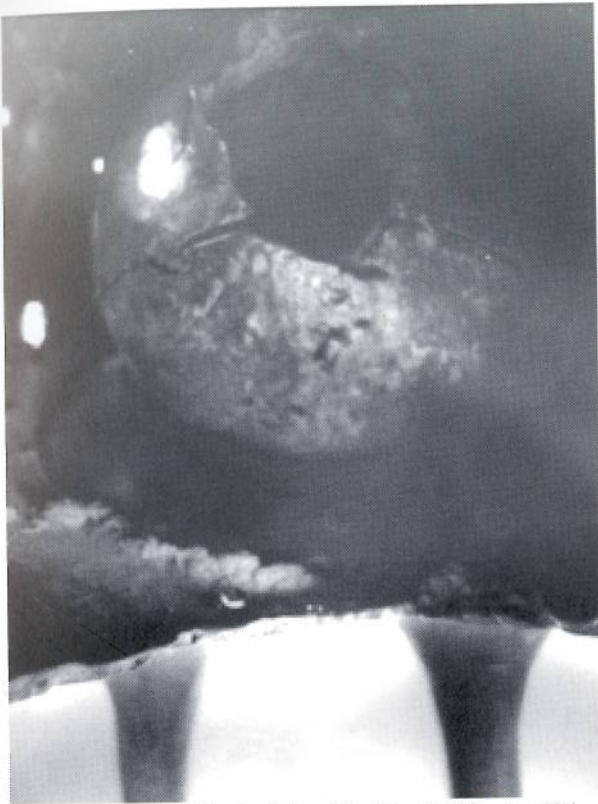
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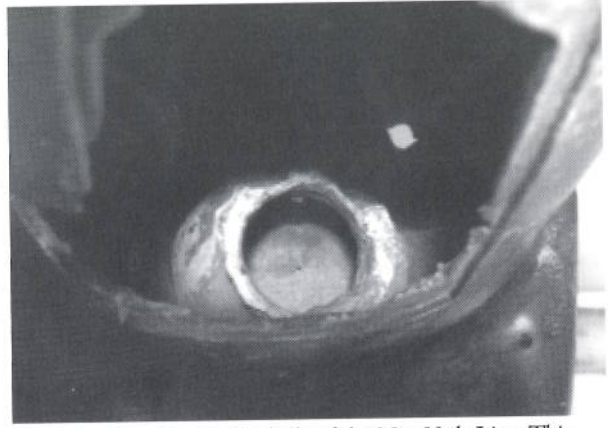
Pl. 6.1 *The Pisa Griffin, bronze. Museo dell'Opera del Duomo, Pisa. Spain (?), 11th-12th century. H. 107cm, L. 90cm, W. 46cm.*



Pl. 6.2 *The New York Lion, bronze. Metropolitan Museum of Art, New York, Mari-Cha Collection Ltd, L.2000.84. Southern Italy (?), 11th-12th century. H. 73cm (without lower legs), L. 82cm, W. 35cm.*



Pl. 6.3 Vessel inside the belly of the Pisa Griffin, L. c. 24 cm; diameter of the opening c. 9.5cm. Unlike the body, the vessel is not of bronze, but brass. The vessel was moulded in a ceramic mould, traces of which are still present. The cracks clearly visible on the vessel are not a result of later damage, but of the original, moulding process.



Pl. 6.4 Vessel inside the belly of the New York Lion. This vessel is, as the body, made of bronze. As in the case of the Pisa Griffin, the vessel was moulded in a ceramic mould, traces of which are still present. The everted rims are here more pronounced, and again the cracks visible are not a result of later damage, but of the original, moulding process.

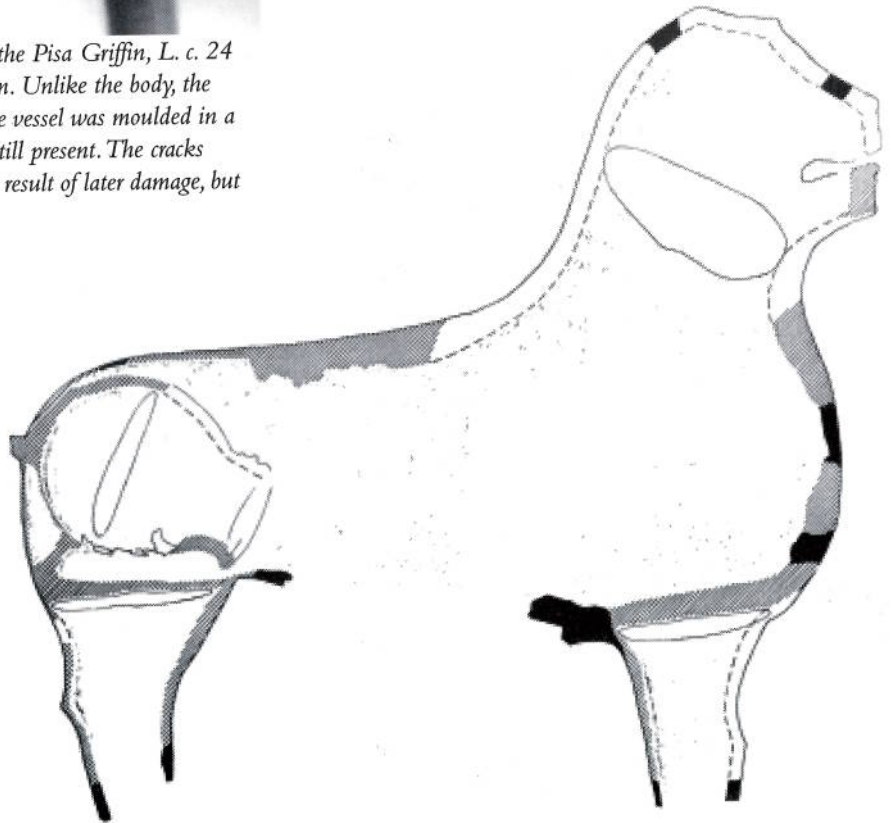
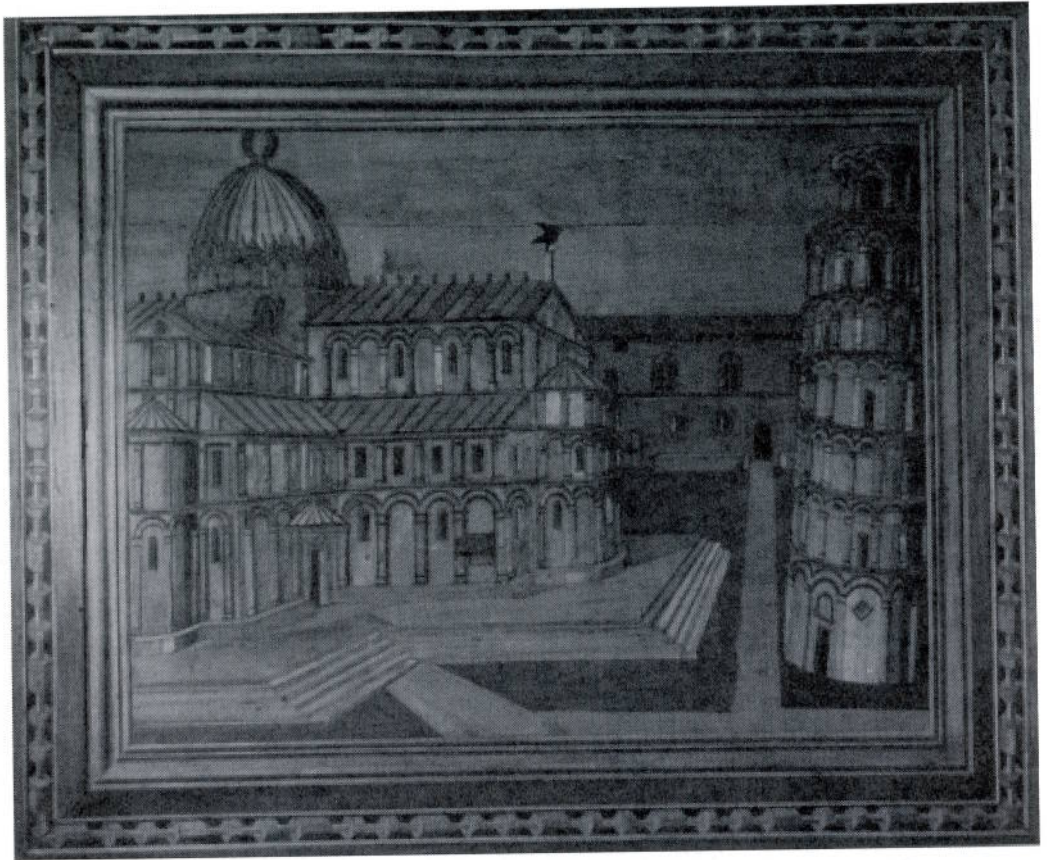
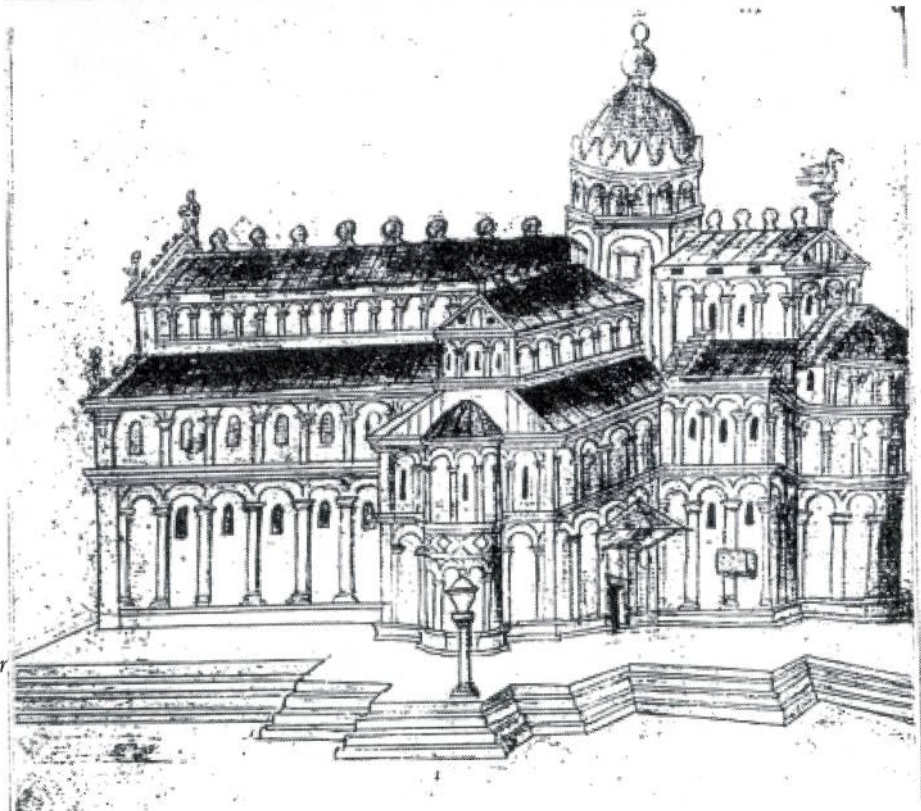


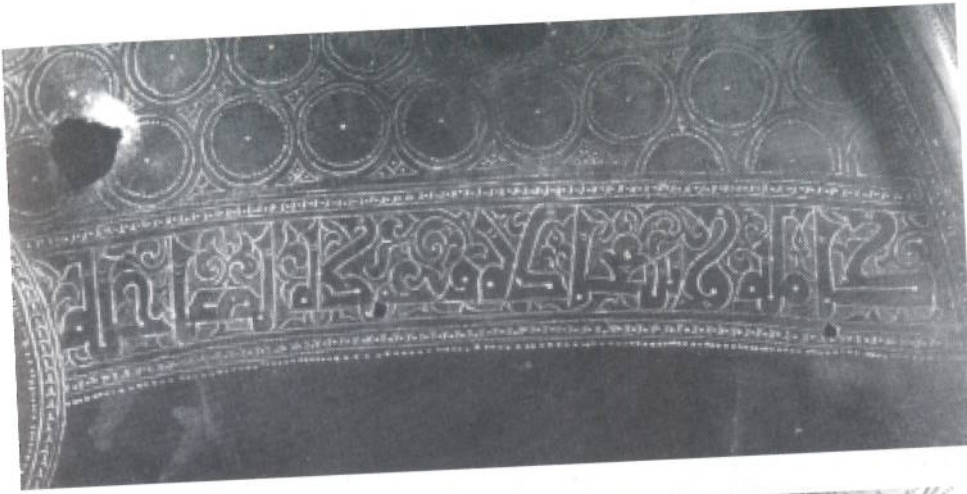
Fig. 6.1 Drawing showing the construction of the New York Lion, by Kikar Singh, Museum of London.



Pl. 6.5 Marquetry panel on the underside of a chorus seat of the Pisa cathedral. Late 15th century.



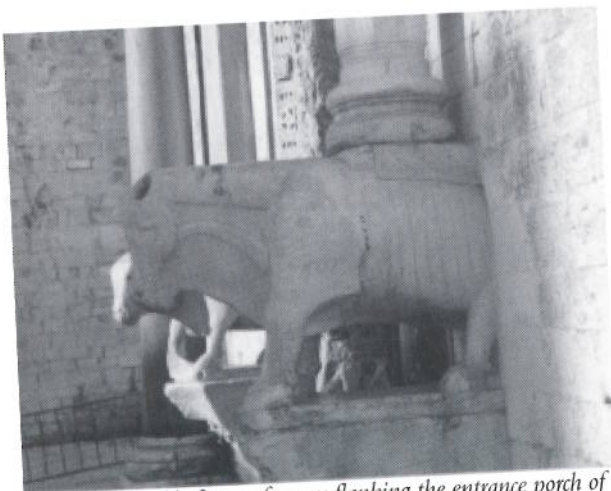
Pl. 6.6 Watercolour by Paolo Tronci, c. 1643, fol. III (detail) (from Tronci, P, 1922).



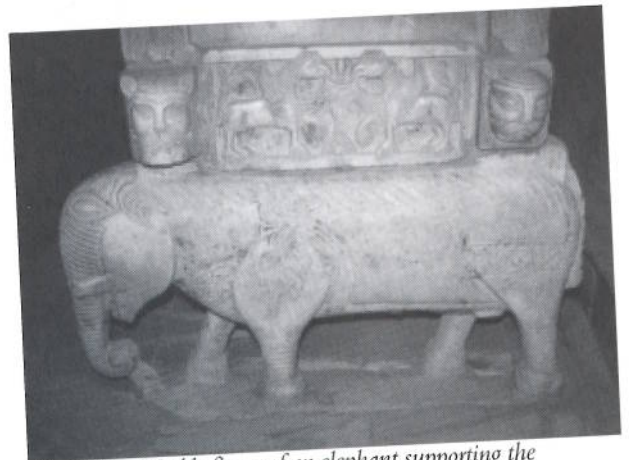
Pl. 6.7 Detail of the inscription on the breast of the Pisa Griffin.



Pl. 6.8 Detail of the inscription on the right side of the body of the New York Lion.



Pl. 6.9 Marble figure of an ox flanking the entrance porch of S. Nicolò, Bari (Apulia), second half of the 11th century.



Pl. 6.10 Marble figure of an elephant supporting the episcopal throne. Canosa (Apulia), second half of the 11th century.

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MELISENDE
LONDON

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Cairo to Kabul
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First published 2002
by Melisende
an imprint of
Fox Communications and Publications
39 Chelmsford Road
London E18 2PW
Tel: 020 8498 9768
Fax: 020 8504 2558
e-mail: M106040@cs.com

ISBN 1 901764 12 5

Printed in England by the St Edmundsbury Press