The lone surviving.
A 16th-century bronze cannon once fitting the Spanish Duchy of Milan now in the Museu Militar, Lisbon

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1. *Introduction*

About ten years ago I happened to be contacted by Jeremy Warren then Head Curator in the Wallace Collection. He had turned to me in my quality of expert on Italian historical artillery asking me if I knew some surviving cannon cast by members of the Busca family active in Milan from the 15th to the 17th century as artistic bronze founders engaged also in bells and guns production. He needed this information as he was working to his prestigious catalogue, very recently printed, concerning the Italian sculpture in those collections[1] but then I was not able to help him as I was not acquainted with any existing exemplar of those objects. Only recently, quite by accident, I came across a piece that almost certainly can satisfy his question but unfortunately too late.

In the summer of last year, when a I was observing in a website a general view of some cannons on display in the internal yard of the Museu Militar of Lisbon, I was impressed by the aspect of a bronze piece that appeared to a first sight having a rather Italian shape (Fig. 1). So, in order to satisfy my increasing curiosity about it, I decided to write to the Director of that institution, Col. Luís Sodré del Albuquerque, a very kind and helpful person who had already helped me on the occasion of my previous researches. He was very prompt in replying sending me good images, measures and information about this gun enabling me to begin the study on it.

At present it has the inventory number MML 01218being previously enlisted with the mark R-2 in the guide of the museum[2] into the collections of which entered in December 1866 coming from the Fort of São Sebastião[3]. This fortification had been built by the Por-

[1] WARREN 2016.

[2] MUSEU MILITAR 1979, p. 43.

[3] MARZIA 2014, p. cxxxvi.

tuguese in the 16th century on the northern coast of Mozambique in order to establish a foothold and control on the route (*carreira*) to India[4]. Taking into account the chronology of this cannon, which we will specify later, it is quite possible that it had participated in the defence of the fort during the Dutch attacks of 1607 and 1608. It has been considered in a degree thesis[5] where its category and general dating have been properly defined though without recognizing its place of production generically attributed to Spain.

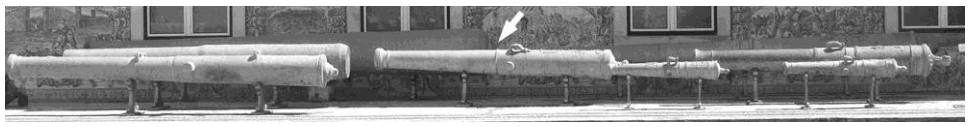

Fig. 1 – The position of the bronze cannon in the court of the Museu Militar in Lisbon (Photo by Museu Militar, Lisbon).
Fig. 1 – Posizione del cannone di bronzo nel cortile del Museu Militar di Lisbona (Foto del Museo Militare, Lisbona).

2. *Description of the piece*

And now we can move on to analyze visually our piece (Figs. 2-3) describing its different parts starting from the rear end. As we will refer to the current terminology used to describe the historical artillery, it seemed appropriate to highlight the particular terms in a drawing to help readers who have not familiarity with them (Fig. 4).

At the beginning we can observe an almost spherical button flattened at its rear and characterized by a central astragal between two fillets and by a simple moulding before and another astragal on the tail joining it to the breech moulding. These last are composed of concentric toroids not too raised, which precede a base ring showing a rather unusual width. On it some groups of letters and numbers are engraved. The larger ones, 50 Q + PAVIA + 57 Ł, run at the centre followed by a smaller T placed under an **a**. Two other couples of smaller letters, ES and AS, lie well outdistanced on an upper line. The common convex-concave motif joint to the base ring is immediately followed by a decorative composition formed by a mascherone, its mouth corresponding to the touchhole, placed under an elaborated foliage and flanked by two dolphins (Fig. 5,a).

[4] ALBUQUERQUE 1994, II, pp. 751-753.
[5] MARZIA 2014, pp. cxxxv-cxxxviii.

Fig. 2 – General views and details of the piece (Photos by Museu Militar, Lisbon).
Fig. 2 – Vista generale e dettagli del pezzo (Foto del Museu Militar, Lisbona).

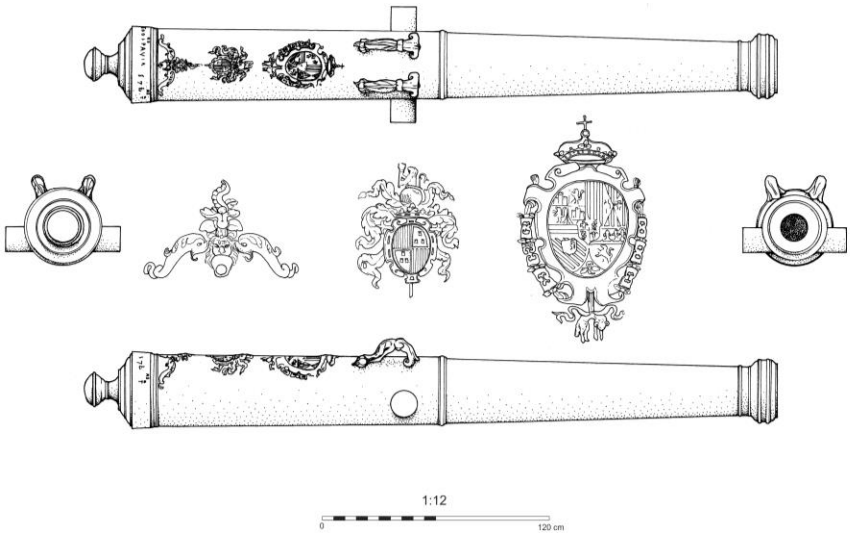

Fig. 3 – Drawing of the piece (Drawing by Serena Zanetto).
Fig. 3 – Disegno del pezzo (Tavola di Serena Zanetto).

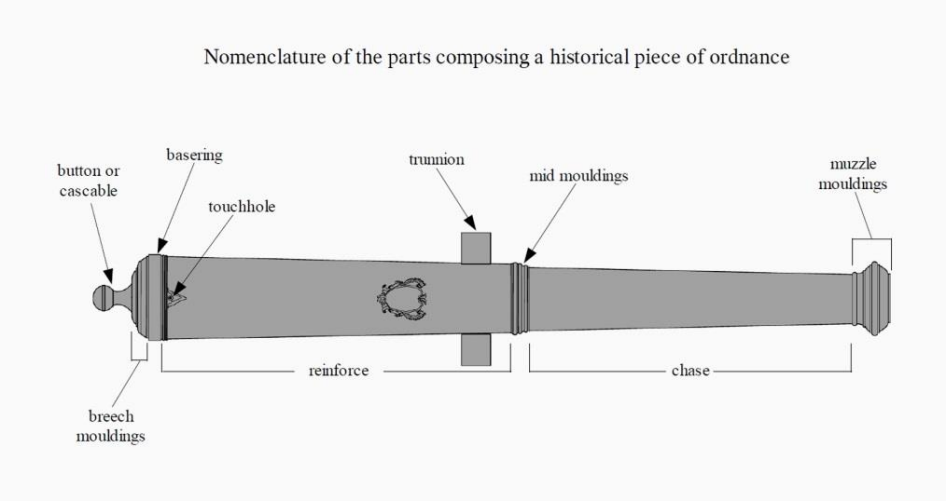

Fig. 4 – Terms used in the description of the cannon (Arrangement by R.G. Ridella).
Fig. 4 – Glossario illustrato (Tavola di R.G. Ridella).

Going on along the reinforce a first coat-of-arms appears formed by an oval shield surrounded by vegetal festoons and overtopped by a ducal crown bearing a helm with a lion grasping a torch. Inside the shield there are two quartered heraldic motifs (Fig. 5,b). That one in the 1st and 4th quarter is formed by four vertical bars (pales) and the other (2nd, 3rd quarter) by three rooks in a field encircled by an indented frame. Of course, the complete recognition of all these elements was allowed after the identification of the coat-of-arms with which we will widely deal later.

A second and larger coat-of-arms (Fig. 5,c) appears a little ahead and could be immediately acknowledged as that of the Reign of Spain during the Habsburg dynasty (1516-1700). The oval shield inside a cartouche is overtopped by the royal crown and encircled by the Golden Fleece collar and includes the heraldic symbols of the possessions of this family both from the Spanish branch and from the Burgundy one. We list here briefly, following the clockwise order as they are represented, Castilla y Leon, Aragon, Grenada, Naples, Sicily, Burgundy modern, Brabant, Burgundy old, Flanders, Tyrol and Austria. Placed in a central position, the little pointed shield contains a snake quartered with an eagle and represents the Sforza's coat-of-arms hinting the Duchy of Milan passed into Spanish hands in 1535 and remained until 1714.

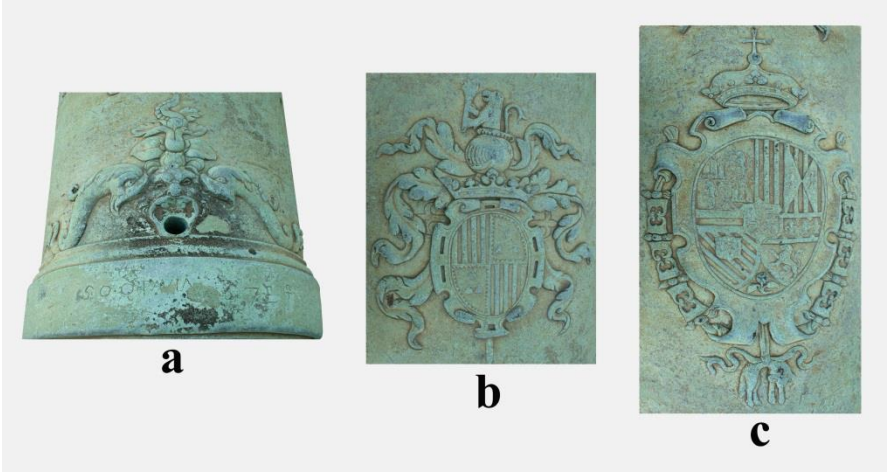

Fig. 5 – Decoration and coats-of-arms of the piece (Photos by Museu Militar, Lisbon).
Fig. 5 – Decorazioni e arme araldica del pezzo (Foto del Museu Militar, Lisbona).

Then, more ahead and still in the upper part of the reinforce, we find the pair of handles which in this case would be really improper define with the usual term of dolphins. Really, they do not show the shape of these marine animals but rather that of vegetable elements.

In coincidence with the front end of the handles, but of course at a lower level, the trunnions are positioned in a point for which their axis seems tangent to the circumference of the bore. These cylindrical pivots lie about ten centimetres before the mouldings dividing the reinforce from the chase. This last is the most tapered part of the gun toward the front and appears completely smooth until the astragal preceding the muzzle mouldings which present a rounded shape enriched by two astragals.

Before closing this chapter, it seems appropriate to me to spend a few lines on the stylistic aspect of its albeit limited decoration and, it being not my matter, to do it I asked the help of Mariangela Bruno art historian and a friend of mine. First of all the mascherone on the touchhole, shaped as a lion's head, topped with vegetal elements and accompanied by two darting dolphins placed side by side, is perfectly befitting the so-called grotesque style. It had a wide diffusion in the Italian and European courts and consisted in the imitation and reinterpretation of the rich and original reper-

toire of classical Roman ornaments brought to light with the rediscovery and exploration of Nero's *Domus Aurea* in the last two decades of the 15th century[6]. Also the vegetable components forming the handles fall within this current but belong particularly to the metamorphic imagination emerged in the second half the 16th and which will characterize also the artistic production of the following century. We will see ahead as this chronological aspect agree with the precise dating of the cannon offered by its heraldry.

3. *Identification of provenance and maker, dating and typology*

We have already told as this piece at a first glance appeared connoted by a certain Italian look and the main reason of that is the presence of a single reinforce. This feature remained in use in the most part of Italian states country until the last decades of the 17th century while in other areas, like the German, Flemish, English, French and Spanish ones, they have passed to the double reinforce shape more than a century before[7].

Besides, the muzzle mouldings of this gun have a shape rather similar to those of two Genoese pieces one of which is a Saker (Figs. 6,b and 7) cast by Dorino II Gioardi in 1576 for the city walls of Palermo[8] and now on display in the Castillo de la Mota at San Sebastian/Donostia, Spain. The other one is represented only by the chase of a broken heavy *Petriere* (muzzle-loading stone thrower) recovered from a wreck off Brsecine near Dubrovnik, Croatia (Fig. 6,c). Also a Demi Culverin cast in 1599 by the Neapolitan founder Innocenzo Giordano, now in the Artillery Museum of Saint Petersburg (Figs. 6,d and 8) presents an almost akin aspect in this part and its general shape results quite different from that of the coeval pieces produced in Naples in this period being closer to that of the Genoese ones.

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[6] To get a general view on this argument one can look at CHASTEL 2010.

[7] The author has already mentioned this problem in some works of his (RIDELLA, PALAZZOLO 2009, p. 5; RIDELLA, ALII 2016, p. 5) and has developed the topic more extensively in the paper *Differences in the shaping of European bronze cannons between the Mediterranean countries and the Northern/Continental ones, starting from the 16th century*, presented to the conference *Cannon Casting in Medieval and Early Modern Period*, Sárospatak (Hungary) 6th-7th November 2014.

[8] RIDELLA 2011, p. 50, f. 6.9,b.

This sort of muzzle mouldings, characterized by rounded profiles with two astragal on the main circumference, could have been intended to resemble those adopted by the Austrian gunfounder Gregor Löffler[9] probably already in the 1530s and then also by Remy de Halut who worked at Mechelen, western Flanders, until his death in 1568[10]. This one (Fig. 6,d), which we can rightly call the German-Flemish type of muzzle mouldings, is well evident in a Falconet (Fig. 9) cast by de Halut in 1561 for the Reign of Portugal also it preserved in the Museu Militar of Lisbon (inv. D-2). Further on this shape will found a wide spread through the whole Europe till the 18th century.

Fig. 6 – Comparisons of the muzzle mouldings in the piece object of this work (a) with those of two Genoese guns of the second half of the 16th century (b, c), a Neapolitan of 1599 (d) and with that (e) of a Flemish gun cast in 1561 (Arrangement by R.G. Ridella).
Fig. 6 – Confronto tra le modanature della bocca del pezzo oggetto di questo lavoro (a), con quelli di due cannoni genovesi della seconda metà del XVI secolo (b, c), di uno napoletano del 1599 (d), e con quella di un cannone fiammingo gettato nel 1561 (e) (Montaggio di R.G. Ridella).

[9] EGG 1961, pp. 128-157.
[10] ROOSENS 1977, pp. 183-197.

Fig. 7 – Bronze Saker produced in 1576 by the Genoese founder Dorino II Gioardi for the city wall of Palermo in Sicily, presently on display at San Sebastian/Donostia, Spain (Photos by José Manuel Matés Luque).
Fig. 7 – Sagro in bronzo gettato nel 1576 dal fonditore genovese Dorino II Gioardi per le mura della città di Palermo, attualmente in mostra a San Sebastian/Donostia, Spagna (Foto di José Manuel Matés Luque).

The confirm that our piece had been produced and firstly used in Italy was immediately inferable by the presence of the coat-of-arm of the Duchy of Milan under the Spanish reign and by the inscription PAVIA which is an important town in Lombardy a thirty kilometres south from the capital. It was originally a Ligurian settlement and had been occupied and then re-founded by the Romans in 89 b C with the name of Ticinum from the river on which it lay. Since 572 a D it became the capital of the Longobard kingdom in Italy and, after having been a powerful free commune in the Middle Ages, it and its territory were annexed to the Milanese state under the Visconti in 1360[11]. The surroundings of Pavia were also the theatre of the famous battle in which, on 24 February 1525, the troops of the emperor Charles V defeated the French army capturing also their king Francis I. That was the first step of the military progresses that will lead Spain to the more than secular domain on this part of Italy.

[11] SACCO 1993.

Fig. 8 – Bronze Demi Culverin cast in 1599 by the Neapolitan founder Innocenzo Giordano, held at present in the Military-Historical Museum of Artillery, Engineer and Signal corps in St. Petersburg in Russia (Photos by Yuri Kulicov).
Fig. 8 – Mezza colubrina in bronzo prodotta nel 1599 dal fonditore napoletano Innocenzo Giordano, attualmente conservata presso il Museo Storico Militare di Artiglieria, Corpo del Genio e Trasmissioni di San Pietroburgo in Russia (Foto di Yuri Kulicov).

In my opinion the presence of this inscription could have two significations. That is this piece was produced in Pavia remaining there or going elsewhere, otherwise it was cast in Milan and then placed on the city walls of the first one. However, up to now, we are not able to determine what of these possibilities is the really correct. From some archival records we know in the 16th century a cannon foundry was functioning in Pavia[12] but no register of its activity seems to have survived until our days. Besides, the only in-

[12] Archivio di Stato di Milano (ASMi), *Atti di Governo, Militare parte antica*, n. 51bis.

ventory found at present, entering the pieces of artillery which fitted the city walls of this town, dates back to 1554[13] that is some years before the Spanish built the bastioned enceinte (Fig. 10) completed in 1560[14]. The little number of pieces listed in the respective document, comprehending only 1 Quarter Cannon, 1 Demi Culverin, 1 Saker, 1 Falcon and 6 Falconets, can mean only they fitted the old medieval walls while the modern ones required a well more sizeable equipment.

Fig. 9 – Bronze Falconet, cast in 1561 by the Flemish founder Remy de Halut for the Reign of Portugal, now in the Museu Militar, Lisbon (Photos by Museu Militar, Lisbon).
Fig. 9 – Falconetto in bronzo, gettato nel 1561 dal fonditore fiammingo Remy de Halut per il regno di Portogallo, oggi conservato presso il Museu Militar di Lisbona (Foto del Museu Militar, Lisbona).

Even if we lack this information, nevertheless we can get a rather accurate idea about the period in which our cannon was produced as we are helped in this task by the smallest of the coats-of-arms present on it. When I started trying to identify it I understood I had to look for among those of the Spanish governors of the Duchy of Milan in the 16th and 17th century, that is in the period in which Spain ruled this state, and quite soon it revealed to be that of the nobleman Luis de Requesens holding that charge from April 1572 to September 1573 (Fig. 11). And now, before going on, it seems me right to spend some words about this well-known historical personage.

[13] ASMi, *Atti di Governo, Militare parte antica*, n. 311.
[14] GALANDRA 1994.

Fig. 10 – The ramparts and the Pavia urban fabric in an engraving of mid 17th century (from MARTIN ZEILLER, *Itinerarium Italiae Nova Antiqua*, Frankfurt 1640).
Fig. 10 – I bastioni e il tessuto urbano di Pavia in un'incisione di metà del XVII secolo (da MARTIN ZEILLER, *Itinerarium Italiae Nova Antiqua*, Francoforte 1640).

Fig. 11 – Luis de Requesens' coats-of-arms and he in a portrait of the 16th century (painting from https://www.dorotheum.com).
Fig. 11 – Arme araldica di Luis de Requesens e lui in un ritratto del XVI secolo (ritratto dal sito ttps://www.dorotheum.com).

He was born in Barcelona in 1527 from a noble family and had a Jesuit as his first tutor. When seven years aged he followed his father, Don Juan de Zúñiga y Avellaneda, called to the Spanish court as the tutor of Prince Don Felipe. There he became a page of the latter receiving the same education of the prince. After having got, in 1537, the membership in the exclusive Order of Santiago from the Emperor and King of Spain Charles V he was granted of his first official charge in1563 when was sent to Rome as a representative of the Spanish Crown to the Pope. Five years later he was appointed lieutenant-general of Felipe's step-brother Don Juan de Austria during the repression of the Moorish uprising in Andalusia and in 1571 he followed him as his main advisor during Holy League expedition against the Turks ended with the Christian great victory in the naval battle of Lepanto. We have already seen in 1572-1573 he was the governor of the state of Milan then passing to the important military and political task of ruling the Spanish Netherlands. There he tried to reach an agreement with the Dutch protestant rebels through a general amnesty and lessening taxes in order to take them again to the Catholic orthodoxy and obedience to the king of Spain. However, these concessions did not convince the insurgents and the only solution remained in his hands was to retake the war in which he obtained a significant victory in the Battle of Mookerheydein the valley of the Meuse (14th April 1574). Despite this success he was unable to exploit the situation because of lack of money to pay his troops so he was obliged to seek an agreement with the Dutch opponents. These negotiations were once again unsuccessful but he could not retake the struggle as his Spanish soldiers mutinied for the usual lack of pay and the military operations remained stopped for a year. Luis de Requesens died unexpectedly in Brussels on 5th March 1576 and his body was brought to Barcelona where was buried in the chapel annexed to his family palace. He was replaced in that difficult charge to face such a chaotic situationby the young prince Juan de Austria who will pass away in those lands only two years later[15].

Having come to the conclusion that our gun was produced in the years 1572-1573, with a sufficient certainty in the Lombard region, at this point we have to try to figure out who was its maker and this does not seem an easy task, apparently, as no authorship

[15] XAVIER 1984.

inscription appears on it. So the only way to resolve this question might be to look for him among the gunfounders working at that time in the Duchy of Milan and, in my opinion, the most probable candidate belongs the family Busca.

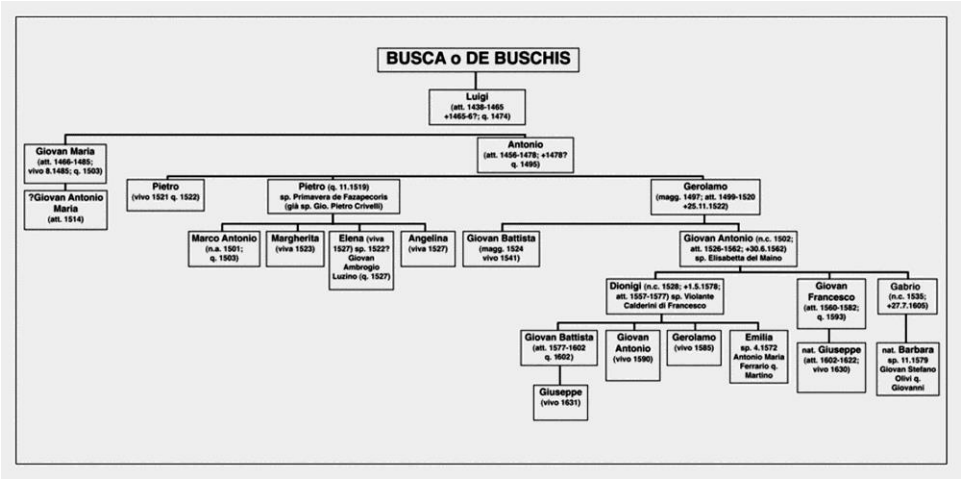

Fig. 12 – Genealogical tree of the Milanese family of bronze founders named Busca (from LEYDI 2010).
Fig. 12 – Albero genealogico della famiglia milanese dei fonditori di bronzo di cognome Busca (da LEYDI 2010).

This dynasty of bell and cannon founders, recently well analyzed by Silvio Leydi[16], results active in Milan during six generations from the 1430s to the first decades of the 17th century (Fig. 12). In 1515 one of its member, Gerolamo, cast a bell still ringing in the concert of the Duomo di Milano[17] that bears a shield with the three fleurs-de-lys of France as this nation was then ruling on this city and its territory (Fig. 13). He is, very probably, also the maker of a finely decorated battery Cannon (Fig. 14) presently preserved at the Byzantine Museum in the island of Chios, Greece. This piece has a twisted chase and shows a crowned L and a shield containing the three flurs-de-lys quartered with Visconti's snake, heraldry that refers to the French king Louis XII when he was also Duke of Milan (1499-1512) and means the gun was produced in that period possibly in that area[18]. On the plain breech there is the

[16] LEYDI 2010.
[17] LEYDI 2010, p. 139.
[18] RIDELLA 2013, pp. 22-23.

bas-relief of a mythological scene representing a dog between two armed standing personages (Odysseus and his dog Argo?) while the band of the touchhole (vent field) is filled with vegetable spirals a typical motive used by these craftsmen in their bells.

Fig. 13 – The bell cast in 1515 by Gerolamo Busca and still placed in the Duomo di Milano. On the right the particular showing the fleurs-de-lys of France (from LEYDI 2010).
Fig. 13 – La campana gettata nel 1515 da Gerolamo Busca e ancora collocata nel Duomo di Milano. Sulla destra il particolare che mostra i gigli di Francia (da LEYDI 2010).

I deepened the speech on this personage as his grandson, Dionisio Busca[19], could reasonably be the founder who cast the piece we are dealing with. He was born around 1528 from Gio. Antonio, Gerolamo's youngest son, and had two brothers become quite famous named Gio. Francesco and Gabrio. The first news concerning him date to 1557 when he was in charge as an ordinary founder at the cannon foundry in the Sforzesco castle of Milan then in course

[19] LEYDI 2010, pp. 142-144.

of transformation into a bastioned fortress by the Spanish. In December of that year these last, in order to fit both the city walls and the just quoted fortress, had issued an invitation to tender for the supply of 142 bronze pieces of artillery for a total weight of 9,000 *centanari* (each of 100 Milanese pounds) equivalent roughly to 294 metric tons. He had participated in the tender but the contract was won by a group of Genoese founders headed by Battista Merello who offered such a strong bearish that the bargain turned later into a partial failure[20].

Fig. 14 – Battery cannon with a twisted chase probably cast by Gerolamo Busca when Louis XII of France was also Duke of Milan (1499-1512). It is now at the Byzantine Museum in the island of Chios, Greece (Photos by Manolis Vournous).

Fig. 14 – Cannone da batteria con volata tortile, gettato probabilmente da Gerolamo Busca quando Luigi XII di Francia era anche duca di Milano (1499-1512). Oggi presso il Museo Bizantino nell'isola di Chios, Grecia (Foto di Manolis Vournous).

[20] RIDELLA 2005, pp. 105-108.

Despite this loss our Dionisio Busca certainly did not lack the orders and in the following decennium he produced a number of bells and bronze architectural and decorative elements, like capitols and festoons, for some Milanese churches comprehended the Cathedral. Just for the Duomo in 1566, working by himself, he produced the main bell which was so large and weighed so much (about 8 metric tons) that he had to cast it in the already quoted cannon foundry[21]. Indeed, his brothers had passed into the service of the Duke of Savoy, Emanuele Filiberto, who appointed Gio. Francesco as a master gunfounder in 1560[22] before in Vercelli and then, from 1568, in the new foundry of Turin planned by the other brother Gabrio[23] become in the meanwhile a renowned military architect[24]. Both of them had been staying abroad for the following decades, Gio Francesco until 1579 and Gabrio until 1594. For this reason they cannot be the authors of our cannon that on the contrary we are allowed to attribute to their brother Dionisio.

We know, actually, this last had received orders to supply pieces of artillery both by the Spanish government in Milan and by a stranger state. For example, from a register of expenses[25], in 1568 he results to have cast a certain number of guns for the stronghold of Piacenza then belonging to the Milanese Duchy. Three years before he had moved to Guastalla in the Duchy of Mantova where he had cast 2 Cannons, 1 Culverin, 4 Sakers and 5 Falcons for the count Cesare I Gonzaga. Besides, the ruler of that state, the duke Guglielmo Gonzaga, had asked his work in 1571, probably to fit the fortified town of Casale Monferrato, but Dionisio was not allowed to leave by the Spanish authorities[26].

Now we are arriving to the years in which the piece we are dealing with was made, that is 1572-1573 and, just in this regard, an archival record informs us in July 1572 the governor Luis de Requesens had ordered to fit with wooden carriages the pieces newly cast in the Castle of Milan and to produce other new guns using the scraps of twenty unserviceable pieces present in other castles of the

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[21] LEYDI 2010, p. 142.
[22] DUFOUR, RABUT 1883, p. 140.
[23] BRIANTE 1995, p. 145.
[24] DAMERI 2016.
[25] ASMi, *Atti di Governo, Militare parte antica*, n. 311.
[26] LEYDI 2010, p. 144.

state[27]. We suppose that Dionisio Busca was involved in these supplies considering an important order he received in the just following years when, in 1575, he was charged to produce bronze pieces of artillery for the considerable weight of 20,000 *centanari* equivalent to 654 metric tons[28].

This amount, following the ratio of the1557 supply (294 tons / 142 pieces), can mean not less than 300 guns of different sizes, ranging from the heavy Culverins (3.5 tons) to the much lighter Falcons (0.5 ton). It is very probable that through this order the Spanish authorities intended not only to strengthen and modernize the artillery equipment of Milan but also those of other fortresses and fortified towns in the Duchy. Indeed, a ten years after the Spanish military engineer Luis Collado, then serving in the Milanese *Regio Castello*, wrote[29] in this fortress 236 bronze pieces were placed (12 Culverins, 69 Battery Cannons, 22 Demi Cannons, 18 Demi Culverins, 28 Quarter Cannons, 38 Sakers and 49 Falcons) surely comprehending those fitting this stronghold and those devoted to be deployed on the city walls when threatened of attack. We do not know if Dionisio Busca succeeded in completing this large supply in the last three years remaining him to live as he died on 1st May 1578 for fever caused by a pleurisy, maybe one of gunfounders' professional diseases[30]. Just the previous year he had cast a bell for the Cathedral of Milan[31], which is still surviving close to that of his grandfather Gerolamo we have already seen.

Having established, to a some extent, the name of the person who could have cast our gun it remains to understand to which category of pieces it belonged and we are able to do that by examining its dimensions and weight. First of all, looking at the bore diameter resulting of 145 millimetres, we can think to a Demi Cannon with a conventional length[32] of 23.5 diametres. Assuming the windage[33] were 1/21 of the bore diameter as Collado[34] suggests, that is 7 mm,

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[27] ASMi, *Registri Cancellerie Stato*, XXII, 20, c. 44v, 22.VII.1572.

[28] LEYDI 2010, pp. 143-144.

[29] COLLADO 1586, c. 19v.

[30] LEYDI 2010, p. 144.

[31] LEYDI 2010, pp. 142-143.

[32] It is the measure taken from the base ring (included) to the muzzle face.

[33] We call windage the difference between the bore and the shot diameters and this margin was necessary to avoid the jamming of imperfect shots inside the bore.

[34] COLLADO 1586, c. 54r.

the shot diameter would measure 138 millimetres corresponding, at a specific gravity of 7.2, to a cast iron ball weighing 9.900 kg equivalent roughly to 30 Milanese pounds[35]. However, this apparently correct determination does not stand up in front to the evident thickness of the barrel. Indeed, the external diameter of our piece at its touchhole (380 mm) means the thickness of bronze in this critical point, particularly subject to the pressure of the explosion gas, is only 90 mm equivalent to 5/8 of the bore diameter. Now we know in this period such a type of cannons should have been thick at least a 7/8 of the bore diameter[36] in this point (mm 127) giving in our case an external diameter of 399 mm. In my opinion, the only solution to this discrepancy can be found in the possible reaming of the piece during its long operative service in order to regularize its bore worn out or damaged for the use. If its original bore had been planned to shot a 25 Milanese pounders ball (8.170 kg - 130 mm at a specific gravity of 7.2) it should have had a diameter of 137 mm meaning an original thickness of 120 mm (7/8) and, in this case, the conventional length would be passed to 25 bore diameters. According to this hypothesis, we can define our piece as a 25 Mil. pdr Demi Cannon of the longer type.

The last question to tackle is represented by the weight mark engraved on the base-ring of our gun and also its understanding is not so immediate. The mark 50 Q - 57 L in Italian can mean 50 *Quintali* and 57 *Libbre*. We have already seen in the Milanese Duchy the weight of artillery was expressed in *centanari* (one hundred pounds - 32.680 kg) and, taking for granted the correspondence beteween the terms *quintali* and *centanari*, the mass of our exemplar would amount to 1,653 kg. This weight results excessively low for a piece of this class and dimensions and besides, a quick volumetric-ponderal calculus gives us a result of about 2,200 kg, a weight much nearer to that obtained using the Spanish units (*Quintal* = 46 kg - *Libra*. 46 kg) which arrives to 2,326 kg. That observation can only mean that the weight mark could have been put after the moving of the gun out his original placing in Lombardy and, very probably, on the occasion of its voyage toward the Portuguese colony of Mozambique about which we will speak just ahead.

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[35] The Milanese *libbra* was equivalent to 32679 kg.

[36] COLLADO 1586, c. 42r.

4. *Conclusions*

Arrived at this point we can take stock and fix the answers to the questions that our examination of a bronze cannon in the Museu Mlitar Lisbon presented us. First of all we have established the piece was produced in a foundry of the Duchy of Milan, possibly in this same city or in the near town of Pavia as the inscription present on its base ring could suggest. The main coat-of-arms, with the heraldic symbols of the kingdom of Spain and containing also those of the quoted Duchy, means a period in which this territory was under Spanish control (1535-1714). The other crest helps to reduce greatly this period as it belongs to Luis de Requesens who remained in charge as governor of this possession from April 1572 to September 1573, lapse of time during which the cannon was cast. It does not bear any gunfounder's inscription of paternity like in other guns but the age and zone bring us to identify him with enough certainty in the person of Dionisio Busca master in the Milanese foundry from 1557, at least, to 1578 year of his death.

Though only this example of the 16th-century large production of bronze artillery in the Duchy of Milan has arrived to our days, from its shape we can guess a certain similarity of architecture with the pieces cast in the same period in the other two states of northwest Italy, Duchy of Savoy and Republic of Genoa. Outcomes that may have been caused by the moving of craftsmen from one to the other of these states such as the Milanese Gio. Francesco Busca and the Genoese Giacomo Merello and Segurano D'ormea passed into the service of the dukes of Savoy from the 1560s or the same Genoese Battista Merello's group gone to work in the foundry of Milan in the years 1558-1559[37]. These building specifities consist of the particular profile of the breech mouldings and the terminal button, the position of trunnions outdistanced from the mid mouldings and the rounded muzzle mouldings with one or two astragals or square bands (Fig. 15,a). Features making them rather different from those ones produced in the neighbouring Republic of Venice that had generally a bud shaped button, trunnions in contact with the mid mouldings and very simple cylindrical muzzle mouldings (Fig. 15,b). Turning to South Italy, also the Neapolitan pieces showed well recognizable peculiarities like a vent astragal, trunnions very close to the mid mouldings and very characteristic muzzle mouldings (Fig. 15,c).

[37] RIDELLA 2009, pp. 25, 34-37.

Fig. 15 – Comparison among Italian bronze guns of the second half of the 16th century; a) Genoese Saker cast by Gio. Battista Gandolfo in the 1580s-1590s (Photos by Renata Andjus); b) Venetian Saker produced by Giovanni II Alberghetti I 1582 (Photos by Carlo Beltrame); c) Neapolitan Demi Cannon cast by Cristoforo Giordano in the 1580s (Photos by Museu Militar, Lisbon).

Fig. 15 – Confronto tra cannoni di bronzo italiani della seconda metà del XVI secolo; a) Sagro genovese gettato da Gio. Battista Gandolfo nel 1580-1590 (Foto di Renata Andjus); b) Sagro veneziano prodotto da Giovanni II Alberghetti I 1582 (foto di Carlo Beltrame); c) Mezzo Cannone napoletano fuso da Cristoforo Giordano negli anni Ottoanta del Cinquecento (Foto del Museu Militar, Lisbona).

Coming back to the Milanese gun, we hypothesized the name PAVIA engraved on its bronze could also mean this piece had been produced to be placed on the bastioned walls of this town but, up to now, the archives have not yet confirmed this supposition. Moreover, the period, reasons and ways it was moved from Italy to a Portuguese fort on South Eastern African coast remain still undefined even if we can think it had happened during the Spanish regency over Portugal lasted from 1580 to 1640. The shortest way to reach a port of embarkation in a friendly territory consisted in heading for Genoa by a hard crossing through the Apennine Mountains. The only other alternative would have been the fluvial route along the Ticino and the Po arriving in the Adriatic Sea in an area partially controlled by the Dukes of Este but, above all, by the Republic of Venice not always very favourable to the Spanish interests after the temporary alliance that had leaded to the victory of Lepanto (1571). All these interrogative remain open and only a busy and hopefully lucky research in Spanish and Italian archives will be able to give us the respective answers. Will anyone else want to venture into this challenge?

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