# Model of a Basilisk by Petrus de Arena

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THE VALUABLE COLLECTION of arms and armor donated in 1913 by William H. Riggs to The Metropolitan Museum of Art included an early firearm dated 1523 (Figure 1), acquired by the donor in 1895 at an auction sale of the famous Spitzer collection. Of unusual appearance and construction, this 29-inch-long bronze barrel had been dubbed *coulevrine* (culverin) in the printed catalogues of the Spitzer collection[1] and was so recorded in the Museum's files.

The barrel consists of three sections screwed together, with spiral threads at the end of the frontal section indicating that the barrel originally consisted of four parts. The muzzle section was already missing by the time the barrel was published in the Spitzer catalogues, which describe it as being in three pieces. Screwed together by rotation to the left, less usual than rotation in the opposite direction, the sections formed one barrel tapering from the breech to the muzzle.

The rear, or breech, section (Figure 2) has at each end a massive and wide molding bordered by concentric rings. Each molding forms a hollow housing with rectangular perforations; between them are cast sunken squares with ornamental devices. A similarly perforated molding is on the cascabel (a knob and its base behind the breech), whose button displays a frowning male face with a cloth headdress, reminiscent of an Arab wearing a burnoose (Figure 5). The forward end of the breech section is made as a screw-plug fitting a threaded socket inside the rear molding of the next section. The vent (ignition channel) starts from an oblong recessed pan, which is protected by a pivoted cover. On the underside is a solid lug with a hole for the attachment of the barrel to a stand or a carriage.

Behind the front molding of the breech, an architectural composition is formed by decorative columns placed between a dado and a cornice. A reinforcing ring below this arcade bears the Latin inscription in Roman capital letters: PANORMO FVIT HE DEFICATVS. Two letters are clearly incorrect renderings of an *N*, so the inscription should read "Panormo fuit ne deficatus" (Palermo did not fail).

Prominently placed on the breech is a coat of arms with heraldic charges representing all major dominions of Charles (1500–58), King of Spain as Charles I (1516–56) and Holy Roman Emperor as Charles V (1519–56). The large shield is surmounted by four crowns and is superimposed on the imperial eagle. On both sides of it is the emperor's personal device, crowned columns of Hercules and a banderole with the motto PLVS VLTRA (more beyond).

The second section of the barrel (Figure 3) also has two large perforated moldings at each end. The rear one, decorated with large floral ornaments, has a threaded socket inside for the screw of the breech section, while the forward end has a screw thread cut on it for attachment to the next part of the barrel. In the middle of this section is a reinforcing ring flanked by moldings. Above the ring is a bust of Emperor Charles V seen in three-quarter view and wearing the collar of the Order of the Golden Fleece (Charles became grandmaster of the Order in 1516 as king of Spain and successor to the dukes of Burgundy, original sovereigns of the Order). The bust is placed over the Order's emblems, the fire-striking steel, and the rugged staves of St. Andrew's cross. This bust seems to have been copied in mirror image, in a fairly amateurish way, from one of the numerous woodcut portraits, like the one in Figure 6,[2] rather than from a small effigy on a medal (also, medals struck prior to 1523 show this monarch in profile only).[3]




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1. Model of basilisk barrel (assembled, viewed from the top) by Petrus de Arena, Italian (Sicily), dated 1523. The Metropolitan Museum of Art, Gift of William H. Riggs, 1913, 14.25.1814

2. Detail of Figure 1, showing breech section of barrel

3. Detail of Figure 1, showing second section of barrel

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4. Detail of Figure 1, showing third section of barrel

5. Detail of Figure 1, showing the button of the cascabel of the barrel

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6. Woodcut portrait of Emperor Charles V, South German, 1519. Vienna, Albertina (after Campbell Dodgson, pl. XLI)

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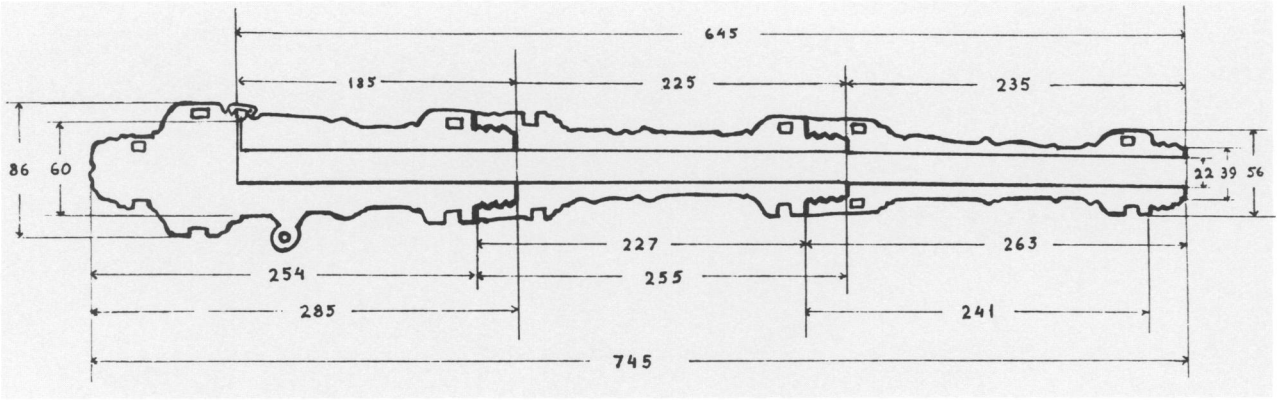



7. Diagram of the barrel of Figure 1 (dimensions are in millimeters)

Under the reinforcing ring runs the inscription in Roman capital letters: MAGISTER PERTVS/DE ARENA SICVLVS/MEFECIT, 1523. In fashioning the mold for casting this barrel, the *R* and *T* in the master's name seem to have been mistakenly placed in reverse order, while the *N* in his surname was in mirror-image (as in the previous inscription). The signature thus can be read "Magister Petrus de Arena Siculus Me Fecit 1523" (Master Petrus de Arena the Sicilian Made Me [in] 1523). Since the master was, most likely, an Italian, his name can probably correctly be interpreted as Pietro d'Arena.

The third section of the barrel (Figure 4) is of the same construction as the second but is slightly longer. Its rear molding is decorated with a band of floral scrolls, and on both ends rectangular perforations alternate with ornamental squares showing an animal's head (a howling dog?). The emperor's device and motto, exactly as on the breech, are cast above the rear molding.

Dimensions of the barrel are given in the chart below and in a diagram (Figure 7).

| | |
|---|---|
| Length of breech section overall | 11.25 in. (286 mm.) |
| Length of breech without cascabel and plug | 7.87 in. (200 mm.) |
| Length of bore in breech (with plug) | 7.28 in. (185 mm.) |
| Length of second section | 10.03 in. (255 mm.) |
| Length of bore (with plug but excluding socket) | 8.85 in. (225 mm.) |
| Length of third section | 10.35 in. (263 mm.) |
| Length of bore (with plug but excluding socket) | 9.25 in. (235 mm.) |
| Total length when assembled | 29.33 in. (745 mm.) |
| Total length of bore | 25.39 in. (645 mm.) |
| Caliber | 0.86 in. (22 mm.) |
| Length in calibers | 29 (645 mm.: 22 mm.-29.3) |
| Weight | 27 lbs. (12.247 kg.) |

With an adjustment for windage—that is, a clearance between the projectile and the bore—the diameter of the round shot can be taken as about 0.78 inch (20 mm.). Proceeding from this figure, one may be able to determine that the weight of a spherical lead shot for the barrel of this caliber would be about 0.1 pound (about 45 g.).[4] Whenever it was practical to cast iron shots for guns of such a small caliber, an iron ball for this firearm would weigh 0.66 pound, or about 30 grams.[5]

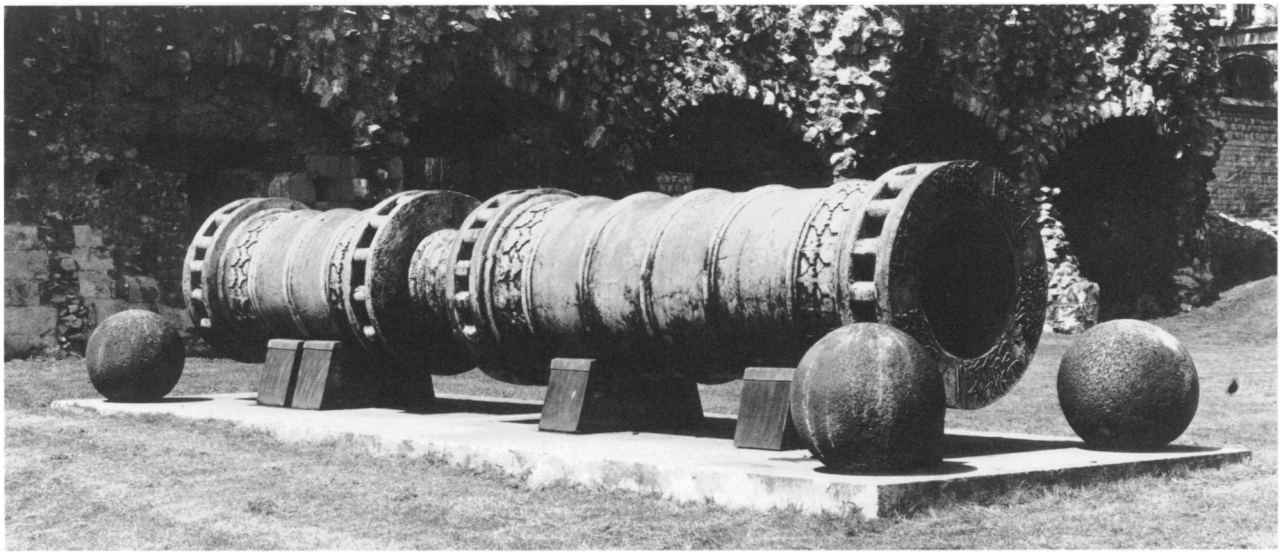
The now-missing muzzle section of the barrel probably had approximately the same length as its two middle parts, i.e., about 10.2 inches (260 mm.), with the bore about 9.25 inches (235 mm.) long. The overall length of the assembled barrel would originally have been 38.5 inches (980 mm.), and its bore length 34.64 inches (880 mm.). In round figures, the whole barrel was thus forty calibers long.

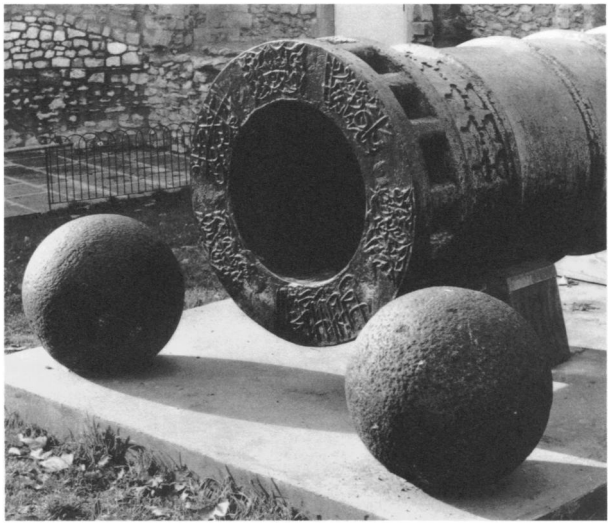
The construction and technical characteristics of the barrel raise the question as to what kind of firearm it represents. The barrel cannot be properly called a culverin, since this term was applied in the sixteenth and seventeenth centuries to heavy artillery

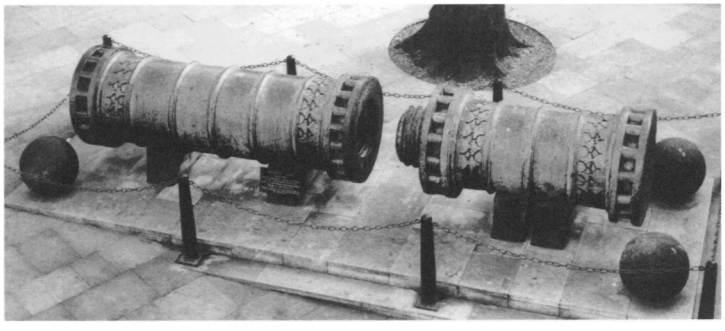
pieces so nicknamed (from the Latin *colubra*, snake) because their barrels were long in proportion to their bores, which made them look different from other cannons of heavy ordnance. The caliber of this barrel would have been proper for rampart guns, that is, smoothbore or rifled firearms, with the calibers in the range of about .80 to .100 inch (19–25 mm.); they closely resembled infantry arquebuses and muskets but were considerably larger and heavier. Rampart guns were usually mounted on, and fired from, the fortress walls, being too cumbersome for foot soldiers but too light and inefficient to be used as field-artillery pieces. The complicated construction and time-consuming, expensive production of this cast-bronze barrel, however, make it highly unlikely that it was intended as a rampart gun. A cheap, large-caliber, heavy arquebus, with a simple and sturdy one-piece steel barrel, used as a rampart gun, would fire a bullet of a similar weight with the same or even better efficiency, without inevitable gas leakages at the joints of a screwed barrel.

Looking for analogous pieces among firearms of the period, one finds this barrel structurally similar to some gigantic guns of the fifteenth and early sixteenth centuries, whose barrels were made in two or three parts screwed together. Much more easily transported separately, these sections were assembled into one barrel on a wooden bed in a stationary position, usually opposite a besieged fortress, to be used as a wall-breaker. The huge bronze cannon of this construction known as the "Dardanelles Bombard," made in Turkey in 1464 (Figures 8–10), consists of two sections screwed together, the breech and the

8–10. The "Dardanelles Bombard," Turkish, dated 1464. The Royal Armouries of the Tower of London, XIX.164 (photo: Board of Trustees of the Royal Armouries, H.M. Tower of London)

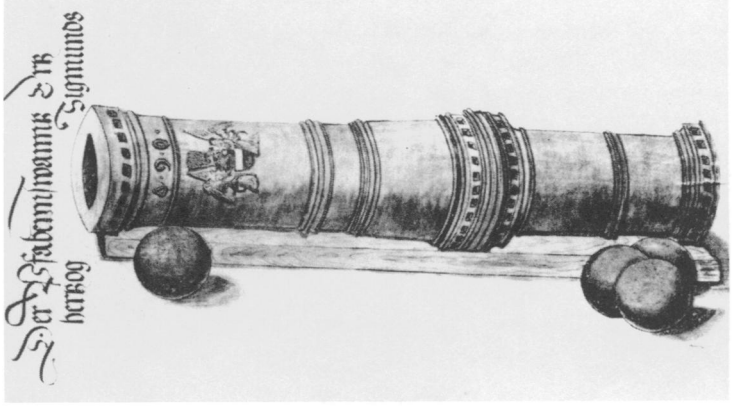




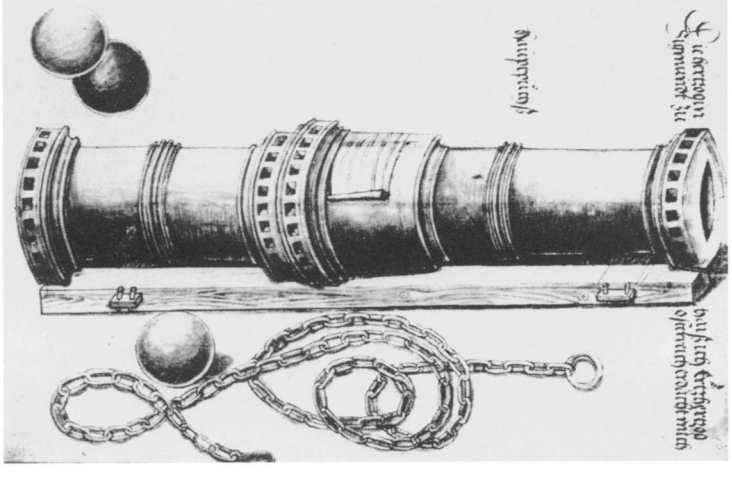


chase. At the ends of both sections, massive moldings with square receptacles served to accommodate properly shaped levers that facilitated the process of assembly. Handled by strong men, such levers kept the breech section steady with its vent up, while the chase was rotated with levers until both parts were tightly screwed together. The weight of this monstrous cannon is 37,630 pounds (17,069 kg.), its total length is 17 feet (518.2 cm.), and the caliber is 25 inches (63.5 cm.).[6]

11. Bombard (*Hauptstück*), Austrian, dated 1490. Illustration in *Zeugbücher* (I, fol. 5) of the Emperor Maximilian I (1493–1519), a manuscript in the Ambraser Sammlung, Österreichische Nationalbibliothek, Vienna (after Egg, *Der Tiroler Geschützguss*, pl. VIII, fig. 15)



12. Bombard (*Hauptstück*), Austrian, ca. 1490. Illustration in the *Entwurfscodex* 10.824, a manuscript in the Österreichische Nationalbibliothek, Vienna (after Egg, *Der Tiroler Geschützguss*, pl. VIII, fig. 16)

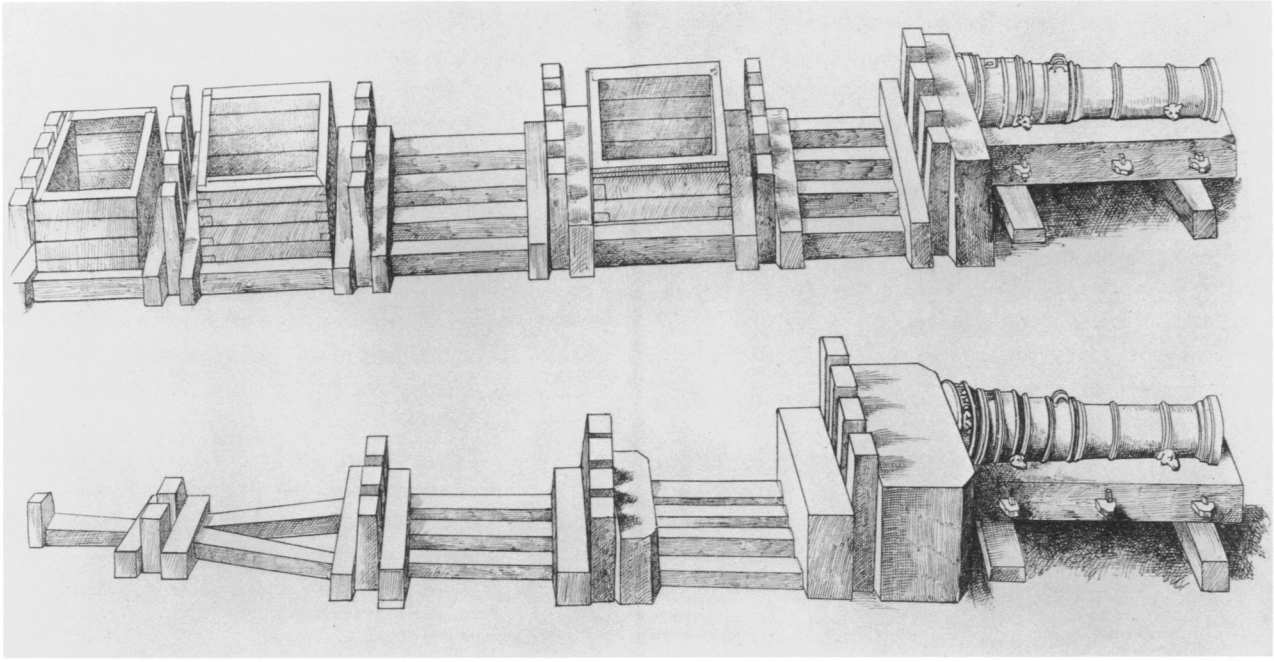


Two late-fifteenth-century Austrian heavy cannons of the same construction are depicted and described in the inventories of the ordnance of Emperor Maximilian I (1493–1519). These large bombards (*Hauptstücke*) had a two-part barrel screwed together, with moldings perforated to fit the assembly levers (Figures 11, 12). Nicknamed *Pfauenschwanz* (Peacock's Tail) and *Weckauf von Österreich* (the Wake-up of Austria), the cannons weighed 22,707 pounds (10,300 kg.) and 18,188 pounds (9,250 kg.), respectively.[7] Since the wheeled carriages would not have withstood for long such payloads and the powerful reverberations caused by discharges, the heaviest siege cannons were mounted on sturdy wooden beds with strong recoil fenders, whose construction is illustrated in contemporary documents (Figure 13).[8]

While the barrel made by Petrus de Arena is designed like these heavy ordnance pieces, it is so light and manageable that it does not require assembly tools and a special support bed. On the other hand, as has been already noted, for a rampart gun this barrel is unnecessarily complicated and expensive. It must therefore be concluded that the barrel represents a scaled-down model of a heavy cannon, which was cast either as a proposed design or, perhaps, as a small replica of an actual cannon.

The Italian metallurgist and gun founder Vannoccio Biringuccio Senese (1480–1538/39) describes in his treatise *Pirotechnia*, first published in 1540, various artillery pieces of the period and mentions, among them, the basilisk. He writes that the great guns "in old times" were the bombards (*bombardi*), while smaller but much longer pieces were the basilisks (*basilischi*).[9] To produce a longer basilisk barrel, some gun founders made it in three pieces, joining them together in the same manner that was used with the breeches of the bombards.[10] Both the Dardanelles Bombard and the barrel by Petrus de Arena illustrate well Biringuccio's expert description.

Longer barrels provided for a fuller consumption of the gunpowder charge, considerably increasing the propulsion force acting on the missile inside the bore. Consequently, such barrels, compared with shorter ones, were more efficient at longer distances and produced better trajectories and more accurate hits. The appearance, sound, and destructive action



13. Beds for heavy ordnance pieces, ca. 1470–80. Illustration in the *Codex Germ.* 599, a manuscript in the Bayerische Staatsbibliothek, Munich (after *Quellen zur Geschichte der Feuerwaffen*, pls. A.LIII–LIV)

of a firing basilisk must have been very impressive and were probably responsible for its nickname. In legends of classical antiquity, the basilisk was a serpentlike monster capable of destroying life in animals and plants by merely looking at them.

Since a full-size cannon represented by this model is not known, it is hard to determine precisely the model's reduction scale. According to Biringuccio, the forms and sizes of cannons varied greatly from master to master and from piece to piece, depending each time on the gun founder's ideas, particular design, and professional secrets.[11] A Venetian basilisk made in 1504 is recorded as firing twelve-pound (5.45-kg.) shots,[12] which would approximately correspond to the caliber of 4½ to 4¾ inches (about 114–120 mm.). Another cannon, cast in Utrecht in 1544 and classified as *basilisco* by an early-seventeenth-century master gunner, is still preserved in Dover Castle. It was presented by the States of Holland to the British monarch and was subsequently nicknamed "Queen Elizabeth's Pocket Pistol." This cannon has a caliber of 4½ inches (about 114 mm.) and a barrel length of 23½ feet (7.16 m.); in other words, the barrel is 63 calibers long.[13] Some English sources contain disparate data on other basilisks whose calibers range from 5 to 8¾ inches (127–222 mm.) with spherical iron shots weighing, respectively, 17 to 90 pounds (about 7.7 to 40 kg.).[14] One of these cannon was recorded in 1639 as having the barrel 26 calibers long.[15] Proceeding from this information and the calculated ratio of approximately 1:40 between the caliber and the full length of the barrel model by Petrus de Arena, it is possible to conjecture that the length of the real basilisk represented by the model would have been in the range of 15 to 29 feet (about 4.6 to 8.9 m.).[16]

During the period 1510–30 the production of the heaviest forms of siege cannons, including the basilisks, was discontinued in the Holy Roman Empire owing to their tremendous weight (in the range of 8,000–13,000 pounds) and the related difficulties of transportation and installation.[17] In light of this development, it seems that the design of a new long-range "super-cannon" conceived by the Sicilian master had been outdated by 1523 and would not have been accepted by the emperor's artillery experts. It can be surmised that at this time Petrus de Arena was an elderly master of the traditional school, possibly trained even before the turn of the century. An Italian cannon dated 1503 in Istanbul bears the strikingly similar name of Master Petrus the Sicilian, son of Master Anton.[18] It is probable, therefore, that

both this cannon and the Metropolitan Museum's model cannon, chronologically separated by only twenty years, were produced by the same gun founder. The master's reference, on the earlier piece, to his father—and almost certainly his teacher—can be understood as a reverent tribute to his parent, himself probably a gun founder who had died not long before 1503. By 1523 Petrus the Sicilian might have won a professional reputation of his own and felt it sufficient to refer only to his family's origin in Arena, a small town in Calabria, on the Italian mainland, about forty miles from Sicily.

The date 1523 and the proud statement "Palermo did not fail" on the model cannon recall an event in the history of Sicily that put to the test the political loyalties of the local population. The Kingdom of Sicily was a Spanish possession inherited by the grandson of the *Reyes Católicos* in 1516 when he became King Charles I of Spain, and he remained Sicily's sovereign after he had been elected king of Germany and Holy Roman Emperor, as Charles V, in 1519. Ruled by Spanish viceroys residing in the capital city of Palermo, Sicily had been going through a period of internal strife fed by feudal rivalries, political ambitions, and economic problems. In 1523, when Charles V was already engaged in a war with France, a group of nobles, including four brothers of the Imperatore family and some government officers, formed a plot to secede from Spain and proclaim Sicily an independent monarchy. Instigated from France and encouraged from Rome by Cardinal Francesco Soderini, the conspirators counted on French invasion and subsequent protection, but their rebellion lacked any substantial popular support and was swiftly and cruelly crushed by forces loyal to the Spanish crown.[19]

It is possible that the basilisk model, with an inscription commemorating this event, was presented to the victorious monarch both as the master's expression of loyalty and as a proposal to engage his professional services to produce a cannon of this particular design.

Apart from the rather unusual four-part construction, the barrel by Petrus de Arena has a certain exotic appearance in its general structure. The mask on the cascabel, reminiscent of a burnoose-wrapped Saracen head, the assembled barrel with its wide flanges, and the sculptured colonnade and ornaments make one think of some structures in Islamic architecture, especially minarets, those tall, slender mosque towers encircled on one or several levels by balconies. For more than two centuries, before the Norman conquest (1061), French, Swabian, and, finally, Aragonese rule (from 1282), Sicily had been an Arab dominion and retained a strong Islamic architectural heritage, particularly evident in the capital city of Palermo, which was almost as famous for its palaces and hundreds of mosques as Córdoba. As strange as comparisons between a basilisk and a minaret may seem at first glance, the architectonic resemblance appears too strong in this case not to surmise that a gun founder familiar with Islamic architecture was indeed inspired, or influenced, by such highly visible landmarks as minarets when he was conceiving a very long cannon of this particular proportion and construction.

While model cannons of the early sixteenth century are extremely rare,[20] the barrel by Petrus de Arena remains, so far, the only known model of a heavy siege gun with a barrel in sections that are screwed together.

## NOTES

1. [Eugène Müntz, Jean-Baptiste Giraud, and Émile Molinier] *La Collection Spitzer* VI: *Les Armes* (Paris, 1892) p. 103, no. 533; *Catalogue des Armes et Armures faisant partie de la Collection Spitzer* (Paris, Galerie Georges Petit, June 10–14, 1895) p. 61, no. 302. No provenance for the barrel is given in either publication.

2. Campbell Dodgson, "Eine Gruppe von Holzschnittporträten Karl V. um die Zeit der Kaiserwall," *Jahrbuch des Kunsthistorischen Sammlungen der allerhöchsten Kaiserhauses* 25 (1905) pp. 237–244.

3. Max Bernhart, *Die Bildnismedaillen Karls des Fünften* (Munich, 1919) pp. 33–38, nos. 1–23, pls. I–III.

4. To determine weight (W) of a sphere, its volume (V) is first calculated by the formula $\frac{1}{6}\pi \times d^3$, where $\pi$ is taken as 3.1416 and d is the diameter of the sphere; $\frac{1}{6}\pi = 0.5236$. For the ball with d = 0.78 in., $V = 0.5236 \times 0.78^3 = 0.248$ cu. in. W = V

× weight per cubic inch of material, which for lead is 0.4096 lb., i.e., 0.248 × 0.4096 = 0.101 lb. or 46 g. An iron ball of the same caliber would weigh 0.066 lb. or about 30 g.

5. Special equipment was needed to cast iron shot because of a much higher melting point of this metal, compared with lead, namely the temperature in the range of 2000–2300 F. (1100–1240 C.), compared with 621 F. (326 C.) for lead. Since lead shots could easily be cast with simple tools under almost any condition, hand firearms, wall guns, and sometimes even one-pounder falconets, the latter with calibers of about two inches, were supplied with lead bullets (see Erich Egg, *Der Tiroler Geschützguss 1400–1600* [Innsbruck, 1961] p. 29).

6. Howard L. Blackmore, *The Armouries of The Tower of London*. I: *Ordnance* (London, 1976) p. 172, no. 242, pl. 3.

7. Egg, *Der Tiroler Geschützguss*, p. 42, pl. VIII: 15, 16.

8. [August von Essenwein] *Quellen zur Geschichte der Feuerwaffen* (Leipzig, 1877) p. 49, pl. A.LIII–LIV.

9. Vannoccio Biringuccio Senese, *Pirotechnia* (Bologna, Gioseffo Longhi, 1678) p. 297.

10. Ibid., p. 299.

11. Ibid., pp. 295, 299.

12. Egg, *Der Tiroler Geschützguss*, p. 64.

13. Oliver F. G. Hogg, *Artillery: Its Origins, Heyday and Decline* (London, 1970) pp. 70–75; Blackmore, *The Armouries*, p. 219.

14. William Bourne, *The Arte of Shooting in Great Ordnance* (London, 1587; facsimile ed., Amsterdam/New York, 1969) p. 14.

15. Blackmore, *The Armouries*, p. 219.

16. For 4½ in. caliber: 4½ × 40 = 180 in., i.e., 15 ft. (4.57 m.). For 8¾ in. caliber: 8¾ × 40 = 350 in., i.e., 29 feet, 2 in. (8.89 m.).

17. Egg, *Der Tiroler Geschützguss*, pp. 66, 101.

18. Arthur N. Kennard, *Gunfounding and Gunfounders. A Directory of Cannon Founders from Earliest Times to 1850* (London, 1986) pp. 35, 127. Pietro Arena is also recorded by another scholar but only in connection with the barrel under discussion (see Enzio Malatesta, *Armi ed Armaioli* [Milan, 1939] p. 28).

19. Denis Mack Smith, *A History of Sicily: Medieval Sicily 800–1713* (New York, 1969) pp. 108–112.

20. Bruno Thomas and Ortwin Gamber, *Kunsthistorisches Museum, Wien, Waffensammlung. Katalog der Leibrüstkammer*, I: *Der Zeitraum von 500 bis 1530* (Vienna, 1976) pp. 198–199, fig. 100 (A74: model cannon dated 1507) pp. 208–209, fig. 101 (A175: model mortar dated 1515).