

# From the Mediterranean to the Atlantic

Technology, Expertise and Knowledge Transfer in Early  
Modern Times



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# Abstract:

Traditionally, scholars have argued that the discovery of new technologies, the advance of map making skills and the knowledge exchange in the Mediterranean world positioned Spain and Portugal at the vanguard in the new era of exploration and expansion in the Atlantic world. In this lesson plan, I focus my attention on other types of innovations and technologies, mostly related to the so called “military revolution” in the early modern period. More specifically on the development of siege weapons, fortifications and ship salvage technology.

The lesson is most suitable for a Colonial Latin America History class but could be adapted to other courses, such as Military History or Piracy in Colonial Latin America. The lesson could be used for one or two sessions of 75 minutes.



# Lesson objectives:

- Students would be able to describe the military revolution as a process which took place mostly in Europe, but had significant consequences in the Atlantic World
- Students would be able to identify relevant sources in the development of the military knowledge of the time.
- Students would be able to identify the different defense strategies that the Spanish Empire implemented in the newly colonized territories.
- Students would be able to recognize different primary sources, including maps, manuscripts, images and books.



## Previous readings:

- Students will be assigned to read chapter 1 of *The Military Revolution: Military Innovation and the Rise of the West, 1500-1800* 2nd Edition, by Geoffrey Parker (1996)
- They should have read Part II of the book. *Latin America in Colonial Times* by Restall & K. Lane (Cambridge U. Press, 2012).



# La herencia de Carlos V



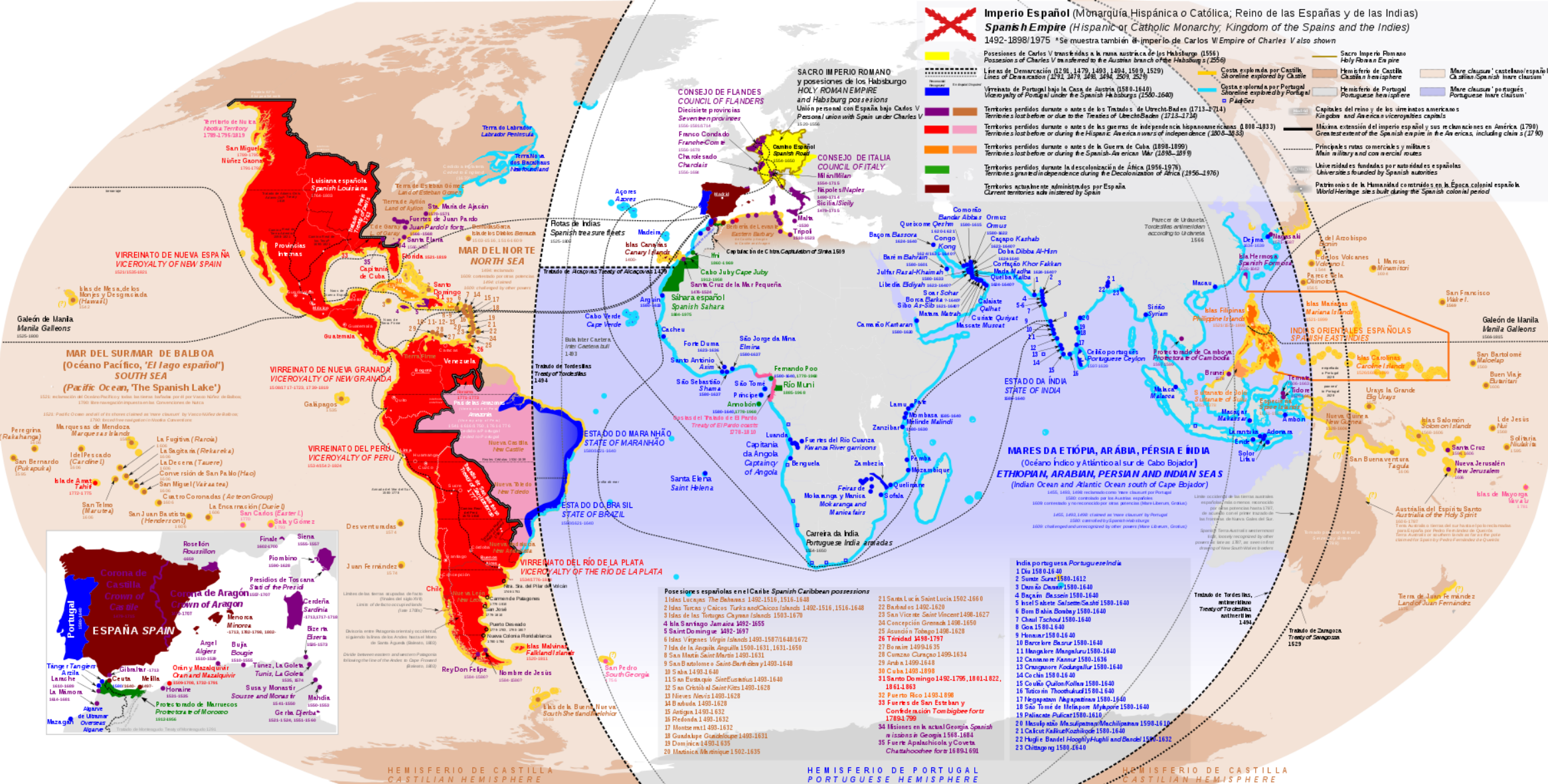
**European Possessions of Charles V, 28 June 1519 – 27 August 1556**





**Imperio Español** (Imperio Hispánico o Católica; Reino de las Españas y de las Indias)  
**Spanish Empire** (Hispanic or Catholic Monarchy; Kingdom of the Spains and the Indies)  
 1492-1898/1975 \*Se muestra también el Imperio de Carlos V / Empire of Charles V also shown

- Posesiones de Carlos V transferidas a la rama austríaca de los Habsburgo (1556)  
 Possessions of Charles V transferred to the Austrian branch of the Habsburgs (1556)
- Lineas de Demarcación (1493, 1494, 1494, 1500, 1529)  
 Lines of Demarcation (1493, 1494, 1494, 1500, 1529)
- Virreinato de Portugal bajo la Casa de Austria (1580-1640)  
 Viceroyalty of Portugal under the Spanish Habsburgs (1580-1640)
- Territorios perdidos durante o antes de los Tratados de Utrecht-Baden (1713-1714)  
 Territories lost before or due to the Treaties of Utrecht-Baden (1713-1714)
- Territorios perdidos durante o antes de las guerras de independencia hispanoamericanas (1800-1833)  
 Territories lost before or during the Hispanic American wars of independence (1800-1833)
- Territorios perdidos durante o antes de la Guerra de Cuba (1898-1899)  
 Territories lost before or during the Spanish-American War (1898-1899)
- Territorios perdidos durante la descolonización de África (1956-1976)  
 Territories lost during the decolonization of Africa (1956-1976)
- Territorios actuales administrados por España  
 Current territories administered by Spain
- Sacro Imperio Romano Holy Roman Empire (1556)
- Henriériste de Castilla Castilian Henriériste
- Henriériste de Portugal Portuguese Henriériste
- Mare clausum 'castelano/español' Castilian Spanish Mare clausum
- Mare clausum 'portugués' Portuguese Mare clausum
- Capitales del reino y de los virreinos americanos Kingdom and American viceregal capitals
- Máxima extensión del imperio español y sus reclamaciones en América (1790)  
 Greatest extent of the Spanish empire in the Americas, including claims (1790)
- Principales rutas comerciales y militares Main military and commercial routes
- Unas ciudades fundadas por autoridades españolas  
 Cities founded by Spanish authorities
- Patrimonio de la Humanidad construido en la época colonial española  
 World Heritage sites built during the Spanish colonial period



**CONSEJO DE FLANDES**  
**COUNCIL OF FLANDERS**  
 Diecisiete provincias  
 Seventeen provinces  
 Franco Condado  
 Franche-Comté  
 Charolais  
 1556-1609

**CONSEJO DE ITALIA**  
**COUNCIL OF ITALY**  
 Milán  
 Milán  
 Nápoles  
 Sicilia/Sicily  
 1556-1713

**ESTADO DO MARANHÃO**  
**STATE OF MARANHÃO**  
 1629-1654

**ESTADO DA INDIA**  
**STATE OF INDIA**  
 1505-1600

**Posesiones españolas en el Caribe**  
**Spanish Caribbean possessions**

- 1 Isla Luzerna The Bahamas 1492-1511, 1516-1640
- 2 Islas Turques y Caicos Turks and Caicos Islands 1492-1516, 1516-1640
- 3 Islas de las Tortugas Cayman Islands 1503-1670
- 4 Isla San Cristóbal San Cristóbal 1492-1655
- 5 San Domingo Santo Domingo 1492-1628
- 6 Islas Vírgenes Virgin Islands 1493-1587/1648/1672
- 7 Isla de la Anguila Anguilla 1500-1631, 1631-1650
- 8 San Martín Saint Martin 1493-1631
- 9 San Bartolomé Saint Bartholomew 1493-1640
- 10 San Juan Saint John 1493-1640
- 11 San Eustaquio Saint Eustace 1493-1640
- 12 San Cristóbal Saint Kitts 1493-1628
- 13 Nevis Nevis 1493-1628
- 14 Antigua Antigua 1493-1628
- 15 Antigua 1493-1632
- 16 Redonda Redonda 1493-1632
- 17 Montserrat Montserrat 1493-1632
- 18 Guadalupe Guadalupe 1493-1631
- 19 Dominica Dominica 1493-1635
- 20 Martinica Martinique 1502-1635
- 21 Santa Lucía Saint Lucia 1502-1660
- 22 Barbados Barbados 1492-1620
- 23 San Vicente Saint Vincent 1498-1627
- 24 Concepción Grenada 1498-1650
- 25 Trinidad Trinidad 1498-1628
- 26 Trinidad 1498-1797
- 27 Beaufort Beaufort 1499-1635
- 28 Curaçao Curaçao 1499-1634
- 29 Aruba Aruba 1499-1640
- 30 Cuba Cuba 1493-1698
- 31 Santo Domingo 1492-1795, 1801-1822, 1861-1863
- 32 Puerto Rico Puerto Rico 1493-1908
- 33 Fuertes de San Esteban y Concepción Tom bigbee forts 1789-1799
- 34 Islas en la actual Georgia Spanish islands in Georgia 1565-1684
- 35 Fuerte Apalachicola y Coqueta Chatahochee forts 1689-1691



HEMISFERIO DE CASTILLA  
 CASTILIAN HEMISPHERE

HEMISFERIO DE PORTUGAL  
 PORTUGUESE HEMISPHERE

HEMISFERIO DE CASTILLA  
 CASTILIAN HEMISPHERE

# Siege Weapons







## **Gun - The Great Turkish Bombard (1464), Ottoman Empire**

Great bronze gun also known as the 'Dardanelles gun'. A similar gun was used by the Ottomans in the Siege of Constantinople (1453) Source: Royal Armouries Collection, UK



Source: Bombarde de la Chapelle aux Naux © musée de l'Armée (Dist. RMN-Grand Palais) photo Emilie Cambier



## Bombard Mortar, France (circa 1450)

The bombard mortars are the most imposing artillery pieces of the Middle Ages. Made of wrought iron or bronze, their weight often reaches several tons. Used during the sieges of cities or castles, these pieces were transported on tanks drawn by oxen or sometimes on boats. Bombards fired stone balls.



QVĒSITI ET INVEN-  
TIONI DIVERSE  
DE NICOLO TARTAGLIA,

DI NOVO RESTAMPATI CON VNA  
GIUNTA AL SESTO LIBRO, NELLA  
quale si mostra duoi modi di redur una Città inespugnabile.

LA DIVISIONE ET CONTINENTIADI TVTTA  
l'opra nel seguente foglio si trouara notata,  
CON PRIVILEGIO



APPRESSO DE L'AVTTORE  
M D L I I I,

# Niccolò Fontana Tartaglia (1499-1557)

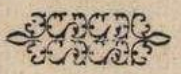
- Tartaglia was an Italian mathematician who is often considered the father of the science of ballistics. His publications had a major impact on the development of gunnery treatises in Europe.
- *Nova Scientia* (1537; “A New Science”),
- *Trattato di numeri et misure*, 3 vol. (1556-60; “Treatise on Numbers and Measures”)



# IL PRIMO LIBRO DELLI QUESITI,

ET INVENTIONI DIVERSE  
DE NICOLO TARTAGLIA,

SOPRA GLI TIRI DELLE ARTIGLIERIE,  
ET ALTRI SVOI VARI ACCIDENTI.



## QVESITO PRIMO FATTO DALL'ILLVSTRISS.

Signor Francesco Maria Duca Eccellentissimo di Urbino.  
L'anno. M. D. XXXVIII.

IN VENETIA.

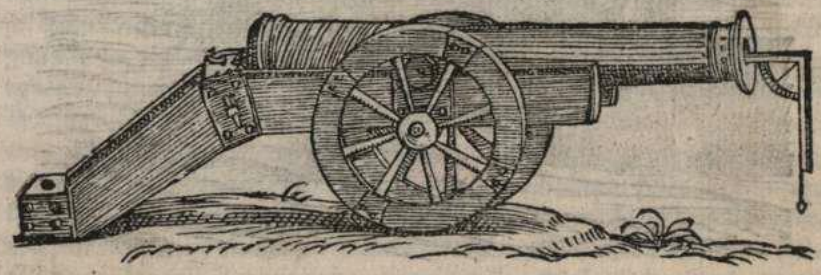


**D**UCA. Che ragioni sono quelle che dicete bauer trouato, nel vostro libro à me intitolato, sopra al tirare dell'artiglierie. **NICOLÒ.** La proportione, & ordine de i tiri lontani, & propinqui di qual si voglia pezzo, & con qual si voglia sorte di balla. **S. D.** Io non u'intendo, parlatemi piu chiaro, & datemi un essempio. **N.** Volendo essemplicar questa nostra inuentione à uost'ra Eccellentia, sono astretto à parlar prima di quello istrumento materiale, da noi ritrouato, figurato nel principio del detto nostro libretto à quella intitolato: il qual istrumento è una squadra di legno, ouer di alcun metallo fatta con diligentia, alla similitudine della sotto scritta figura. **b. a. c.** laquale ha interchiuso uno quadrante, cioè una quarta parte di un cerchio, alla similitudine della figura. **b. i. g. k.** la qual figura, ouer quadrante. **b. i. g. k.** si descrive con un compasso sopra il centro. **b.** cioè ponendo il piede immobile del detto compasso, in nel detto punto. **b.** angolo intrinseco di tal squadra, & l'altro piede mobile girandolo per. **i. g. k.** formando il detto lato curuo. **i. g. k.** del detto quadrante, & dapoi restringere alquanto il detto compasso, & descrivere un'altra linea curua, equidistante alla prima, quale sia la linea. **e. f.** & tutto quel spatio, ch'è fra queste due linee curue, cioè fra il lato curuo. **i. g. k.** & la curua. **e. f.** uol esser diuiso, prima in dodici parte eguali, le quali diuisioni uogliono esser tirate con una riga, che uenga dal punto. **b.** (centro del quadrante) à ciascheduna di dette diuisioni, accioche ciascheduna diuisione risguardi il detto centro. **b.** come in la figura appare, & queste dodici parte le chiameremo ponti.

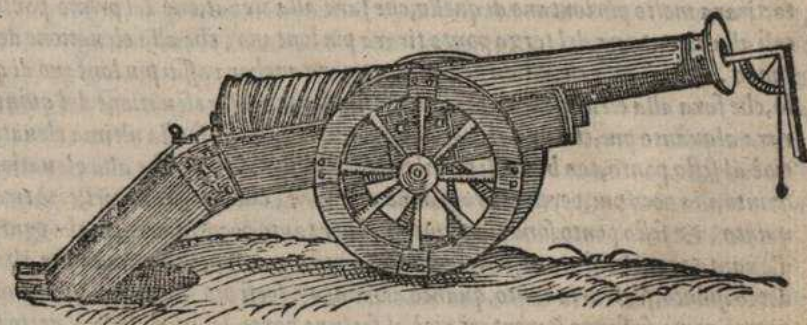
B Anchora

tende alla maggiore eleuatione, che eleuar si possa. (Dico un pezzo d'artiglieria, perche li mortari poi si possono eleuare in tutti li altri seguenti per fin al duodecimo ponto.) Et questo che habbiamo detto de i ponti, se debbe anchora intendere de i minuti, cioè, che quando, che uno pezzo sia talmente eleuato, che il perpendicolo caschi precisamente sopra la diuisione del primo minuto, cioè sopra la duodecima parte del primo ponto, tal pezzo s'intende esser eleuato uno minuto, & quando cascherà sopra alli due minuti, s'intendera essere eleuato duoi minuti, il medesimo s'intendera de tutti li altri, per fin alla maggior eleuatione, cioè alla eleuatione del sexto ponto, ouero settantadue minuti, come nella detta terza figura appare: Li altri minuti che seguita per fino in capo, sono per le eleuationi di mortari.

Pezzo aliuellato.



Pezzo eleuato vn ponto, ouero dodici minuti.



B ij Pezzo

- Italian edition of *Quesiti et inventioni diverse*, 1562/ "Queries and Different Inventions" by Tartaglia



J. M. Keith.

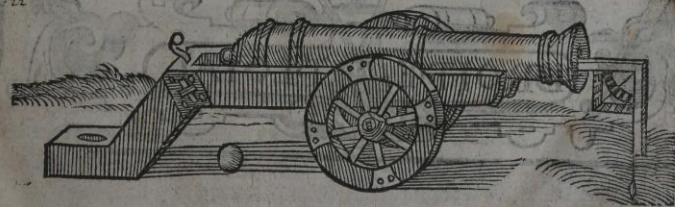
William Harrison  
J. M. Keith  
Society of Arts.

# THREE BOOKES OF COLLOQUIES CONCERNING THE ARTE OF SHOOTING IN GREAT AND SMALL PEECES OF ARTILLERIE, VARIETIE

randges, measure, and waight of leaden, yron, and marble stone pellets, minerall saltpeter, gunpowder of diuers sortes, and the cause why some sortes of gunpowder are corned, and some sortes of gunpowder are not corned: Written in Italian, and dedicated by *Nicoblas Tartaglia* vnto the Royall Prince of most famous memorie *HENRIE* the eight, late King of England, France, and Ireland, defender of the faith, &c. And now translated into English by *CYPRIAN LVCAR* Gent, who hath also augmented the volume of the saide Colloquies with the contents of euery Colloquie, and with all the Corollaries and Tables, that are in the same volume.

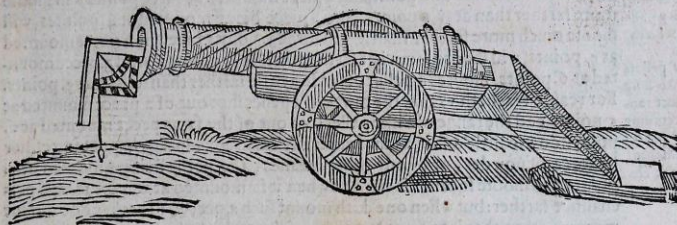
Also the saide *CYPRIAN LVCAR* hath annexed vnto the same three bookes of Colloquies a Treatise named *LVCAR APPENDIX* collected by him out of diuers Authors in diuers languages, to shew vnto the Reader the properties, office, and dutie of a Gunner, and to teach him to make and refine artificial saltpeeter, to sublime brimstone for gunpowder, to make coles for gunpowder, to make gunpowder of diuers sortes and of diuers colours, to make gunmatches, touchwood, and fire stones, to know the waight and measure of any pellet, to make carriages, ladles, rammers, scourers, and cartredges for any great peece of artillerie, to know the proportioned length, due thicknesse, and waight of euery great peece of artillerie, to know what number of men, horses, or Oxen will drawe any great peece of artillerie, to make platformes for great ordinance, to make gabillions of earth for the defence of gunners in time of seruice, to charge euery great peece of artillerie with his due charge in serpentine gunpowder, and also in corne gunpowder, to shoote well at any marke within point blanke, to shoote well at any marke vpon a hill, or in a valley without poynt blanke, to shoote well at a marke in any darke night, to mount mortar peeces to strike any appointed marke, to tell whether a thing seene farre of doth stand still, come towards him, or goe from him, to make and vse diuers Trunkes, and many sortes of fire workes, to make mynes, to measure altitudes, longitudes, latitudes, and profundities, to draw the true plat of any place, and to do other commendable things which not onelie in time of warre, but also in time of peace may to a good end be practised,

*La possessione delle ricchezze non è sicura,  
se la non si salua con la difesa delle armi.*



IMPRINTED AT LONDON FOR  
John Harrison. 1588.

A Peece mounted at one point or 12. minutes.



Also a Peece shall be said to be eleuated two points, when the saide threed and plummet doth fall precisely vpon the diuision of the second point: and when the saide threed & plummet doth fall precisely vpon the third point, then the Peece is eleuated at three points: and so we must say of the fourth, fift, and sixt points. But when a Peece is mounted at the sixt point, then the saide Peece is mounted to the greatest eleuation that it may be at. I speake this of a Peece of Artillerie, because the mortar peeces may be eleuated vnto all the other points following: I meane euen vnto the 12. point. This which wee haue spoken of points, ought also to be vnderstood of minutes: that is to say, when a Peece is so mounted that the saide threed and plummet falleth precisely vpon the diuision of the first minute, that Peece shalbe said to be mounted one minute. And when the saide threed and plummet shall fall vpon the diuision of two minutes, it shall be said to be mounted at two minutes. In like sort it shall bee sayd of all the rest euen to the greatest eleuation, that is to say, to the eleuation of the sixt point, or of 72. minutes, as this figure next following doth manifestly shewe. The other minutes from thence to the end are for mortar peeces,

A peece mounted at 6. points or 72. minutes.



A Duke.

Three bookes of colloquies concerning the arte of shooting, 1588 by John Harrison

English edition of the first three books of Tartaglia's 1546 *Quesiti et Inventioni Diverse*



A. p. 375. 386.

# PLATICA MANVAL DE ARTILLERIA, EN LA QVAL SE TRACTA DE LA EXCELENCIA DE EL ARTE MILITAR, Y ORIGEN DE ELLA, Y DE LAS MAQVINAS CON QUE LOS ANTIGVOS COMENÇARON A VSARLA,

DE LA INVENCION DE LA POLVORA, Y ARTILLERIA,  
De el modo de conducirila, y plantarla en qualquier empresa,

Fabricar las Minas para bolar las Fortalezas, y Montañas, Fuegos artificiales,  
Varios secretos, y importantísimos aduertimientos, al arte de la  
Artilleria, y vfo de la Guerra vtilísimos, y muy necesarios.

*Y à la fin un muy copioso, y importante examen de Artilleros,*

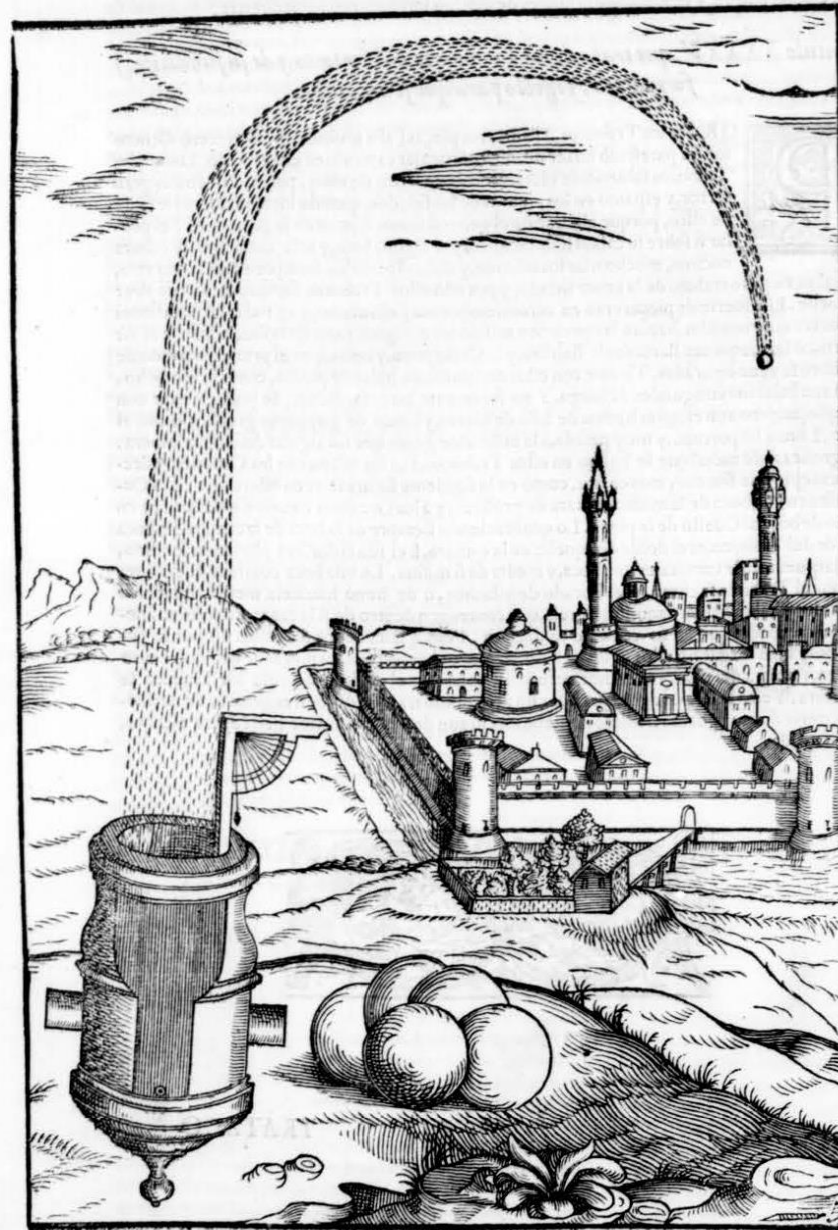
DIRIGIDA A LA Magestad Cath. DE EL GRAN PHILIPPO II.  
digníssimo Rey de las Españas, Por Luys Collado, natural de Lebrixa,  
Ingeniero del Real Exercicio de Lombardia, y Piemonte.

*Con licencia del muy Reverendo P. Inquisidor General del Estado de Milan,  
y del Reverendíss. Señor Arçobispo, y Illustríss. Senado.*



EN MILAN,

Por Pablo Gorardo Poncio, stampador de la Real Camara, el año 1592.



Edition of the book  
*Platica manual de  
artilleria* by Luis Collado,  
1592.

This edition was printed  
in Milan, Italy and is  
dedicated to the Spanish  
King Philip II. It is  
considered a translation  
of Tartaglia's books.

<https://gredos.usal.es/jsui/handle/10366/83270>



IESVS.

**BREVE TRATADO DEL ARTE DE**  
Artilleria, Geometria, y artificios de fuego.

*Compuesto por Lazaro de la Isla  
Genoves.*

Dirigido a Don Iuan de Acuña Vela,  
Capitan General de la  
Artilleria.



*Jacobus Fisher  
D.*

CON PRIVILEGIO.

En Madrid, por la viuda de P. Madrigal.  
Año, M. D. XCV.

Breve tratado del arte de artillería, geometría y artificios de fuego / compuesto por Lázaro de la Isla Genovés (1595)

*Brief Treatise on the Art of Artillery, Geometry and Fireworks by Lazaro de la Isla, Genoese (1595)*

This short treatise was printed in Madrid by the widow of P. Madrigal and a copy can be found in the [Biblioteca Virtual del Ministerio de Defensa, Spain](#). This is an abbreviated version of the third volume of Tartaglia's 1546 *Quesiti et Inventioni Diverse*

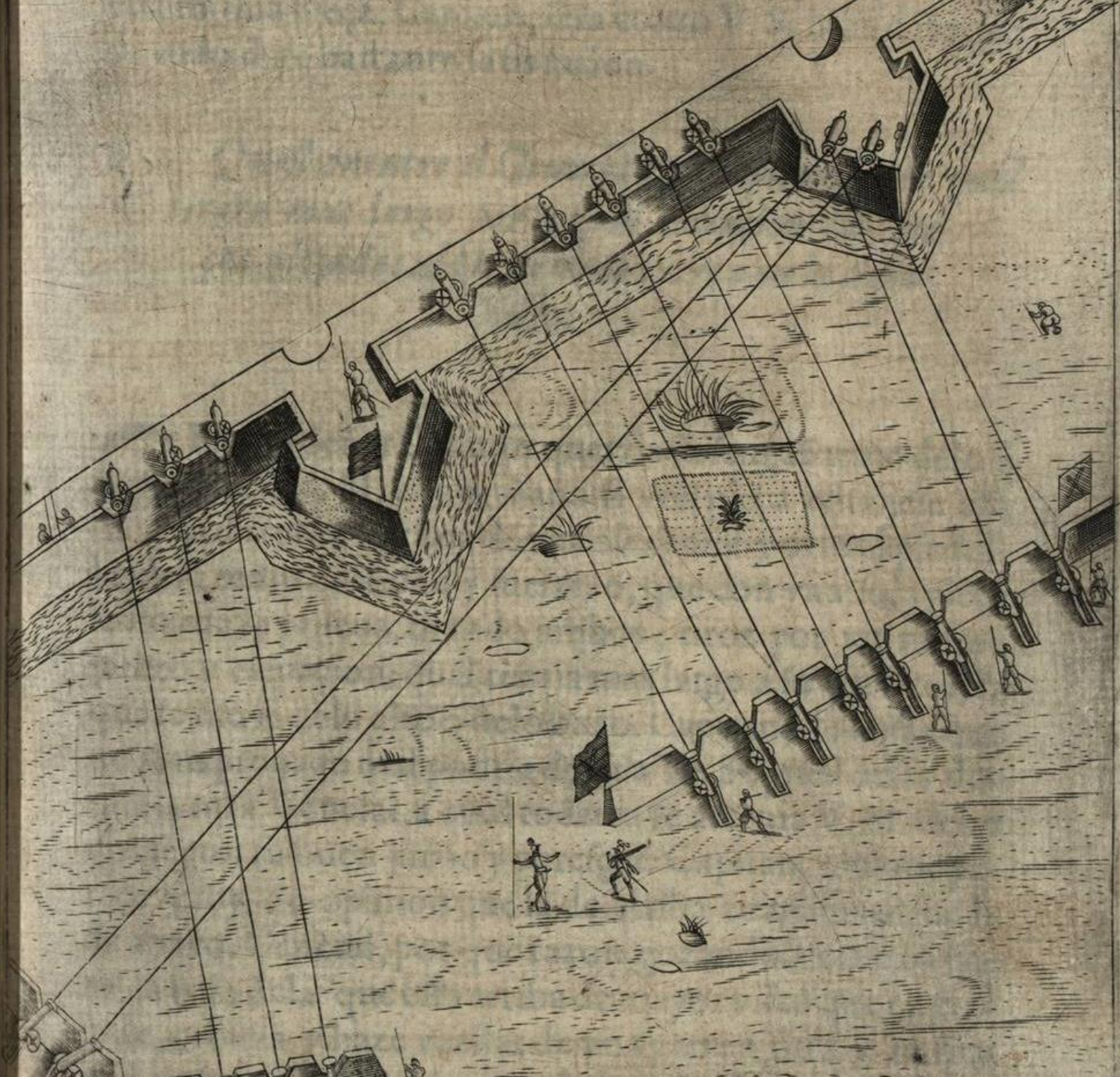




- In 1613, Diego de Ufano published the book [\*Tratado de la Artilleria/Treatise on Artillery\*](#). Diego was a Spanish military engineer and participated in several battles in Flandes. The influence of Tartaglia and Luis Collado in his publication is noticeable. However, he added new ideas on how to calculate the elevation and distance of the projectiles (ball).
- The book also contains innovations and devices to salvage ships and artillery.

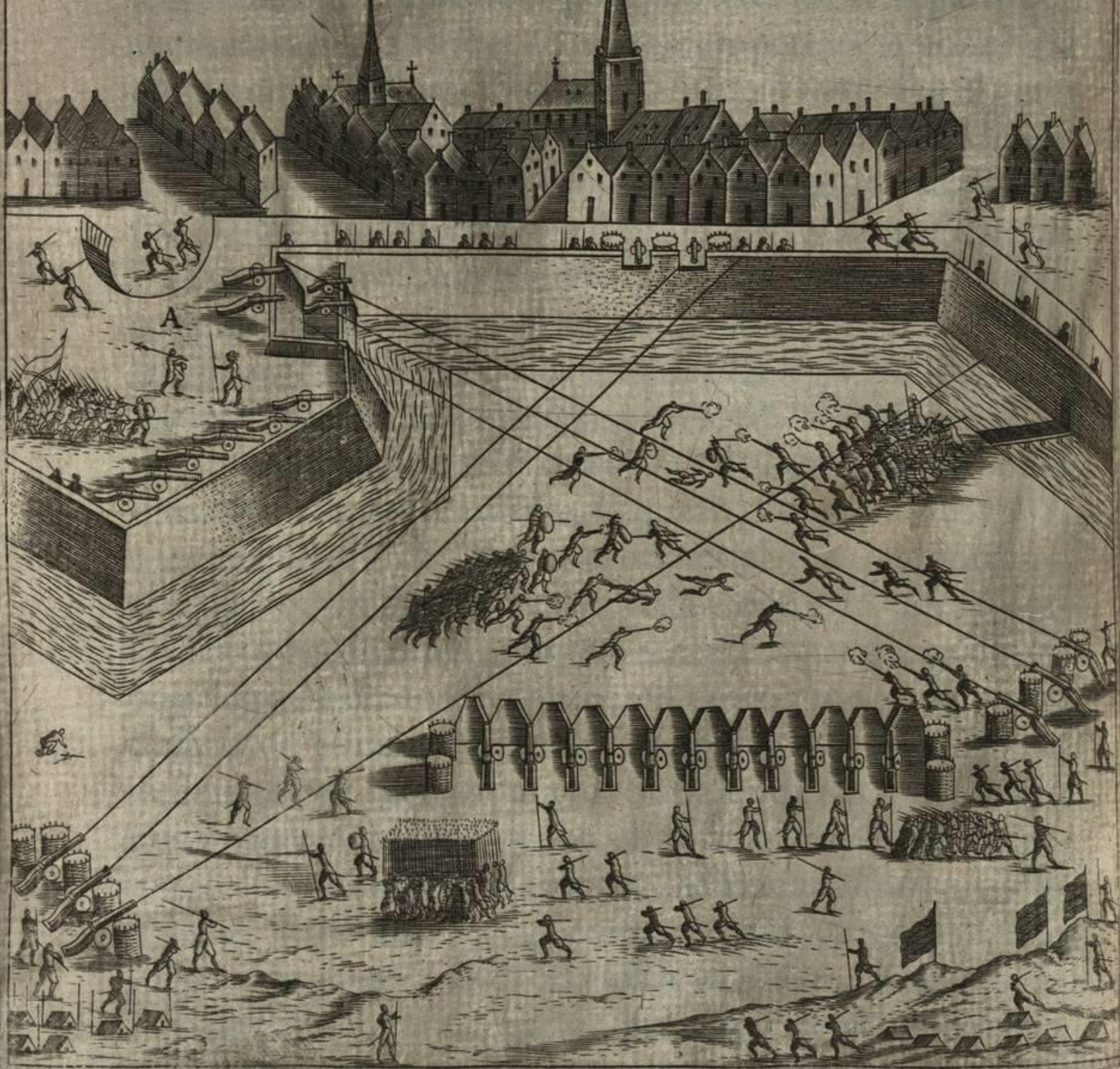






Diego de Ufano, *Tratado de la Artillería/Treatise on Artillery* (1613). Image showing how to build a proper artillery defense wall when attacking a fortress. (p.154)





Diego de Ufano, *Tratado de la Artillería/Treatise on Artillery* (1613). Here, Ufano is suggesting how to place the artillery when defending a city (p.174)



# Architects of the King

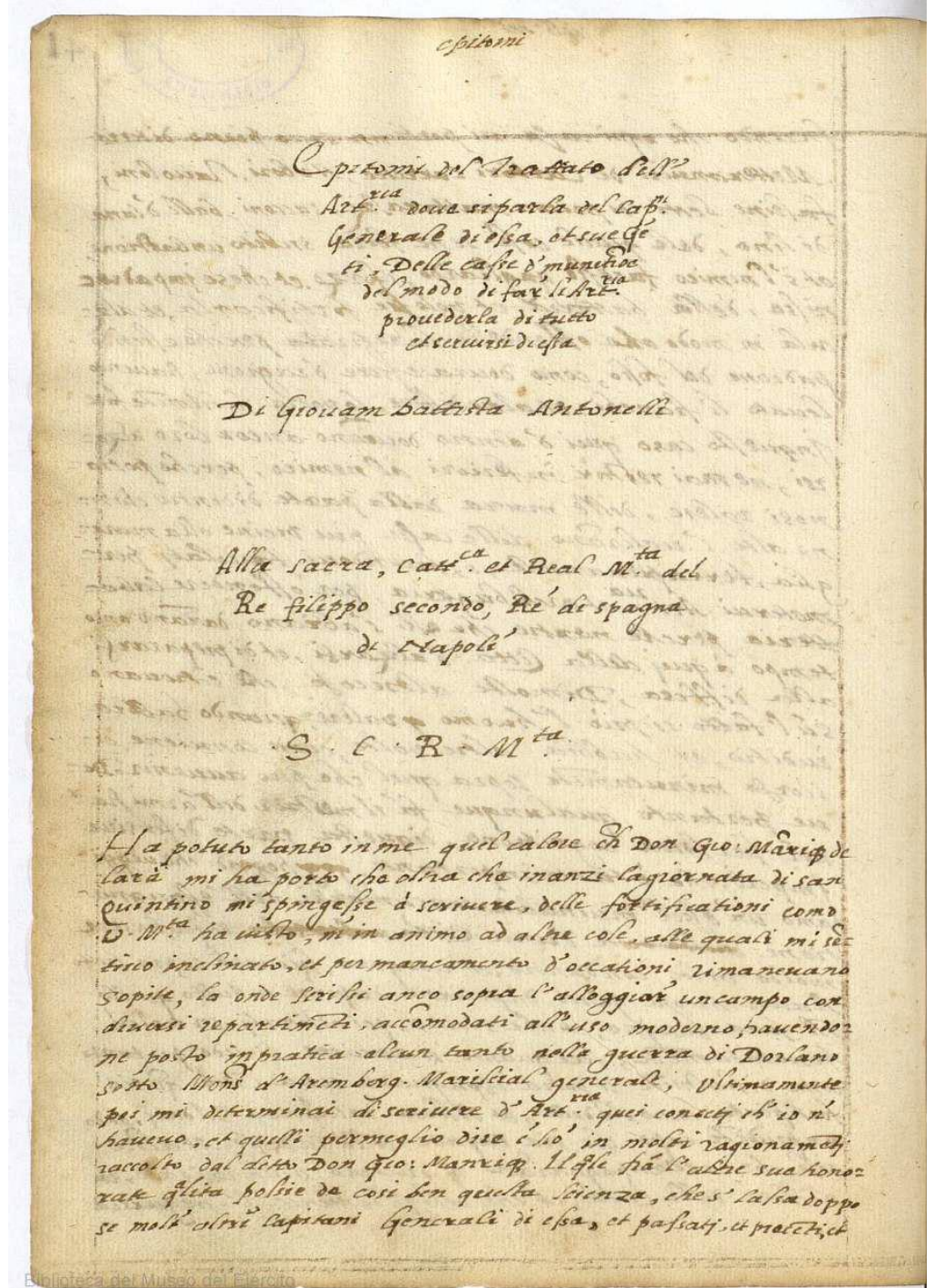
The Antonellis were a renowned Italian family of military engineers who served the Spanish crown for almost a century, between the sixteenth and seventeenth centuries. They built important fortifications across Europe, Africa and the “New World”. Here is the list of some of them:

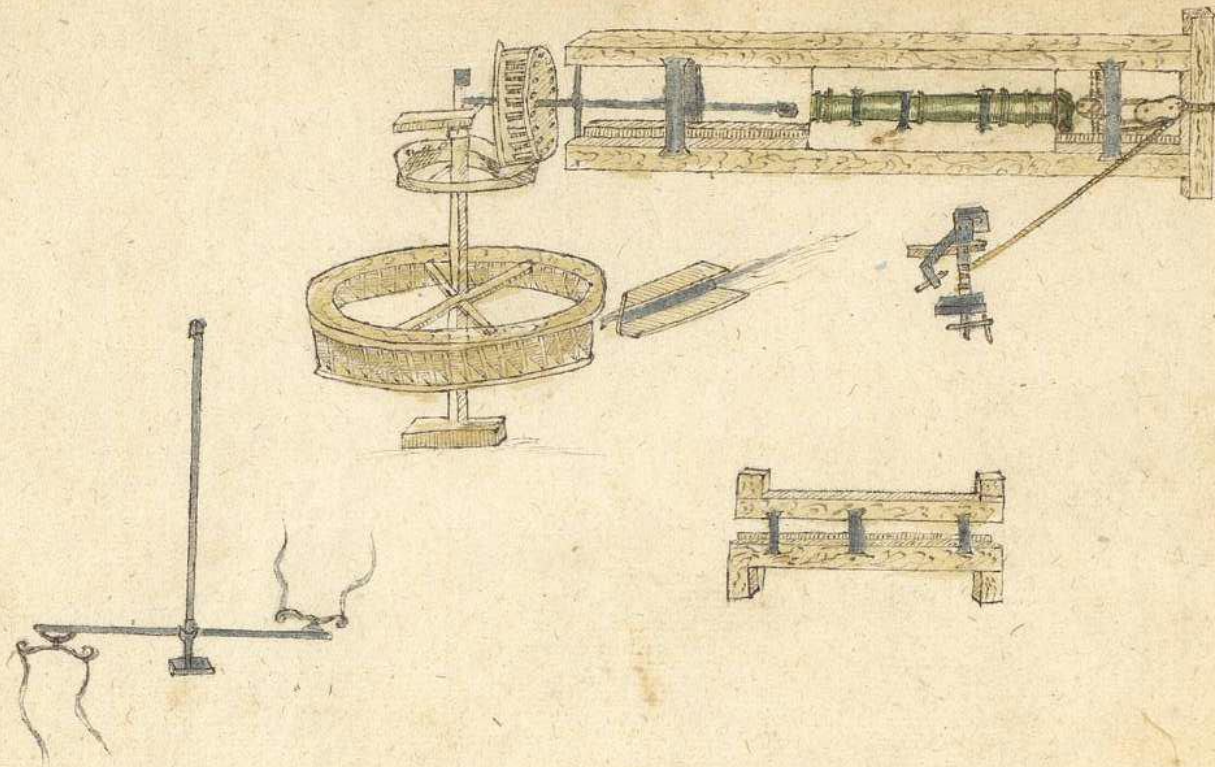
- Giovanni Bautista Antonelli, (Gatteo, Italy 1527 - Toledo, Spain 1588)
- Bautista Antonelli, (Gatteo, 1547 - Madrid, Spain 1616)
- Cristobal Roda Antonelli, (Gatteo, 1560 - Cartagena, New Granada 1631)
- Juan Bautista Antonelli (son), (Madrid 1585-Cartagena, New Granada. 1649)



Giovanni Bautista Antonelli, (Gatteo, Italy 1527 - Toledo, Spain 1588) *Epitomi del Trattato dell' Artilleria/Treatise on Artillery*, 1561. OAI-PMH, PLAN 4/2/1(02)

One of the three manuscripts written by Giovanni Bautista. [Digital copies can be found at the Biblioteca Virtual del Ministerio de Defensa, Spain.](#) These manuscripts were dedicated to Philip II, King of Spain.

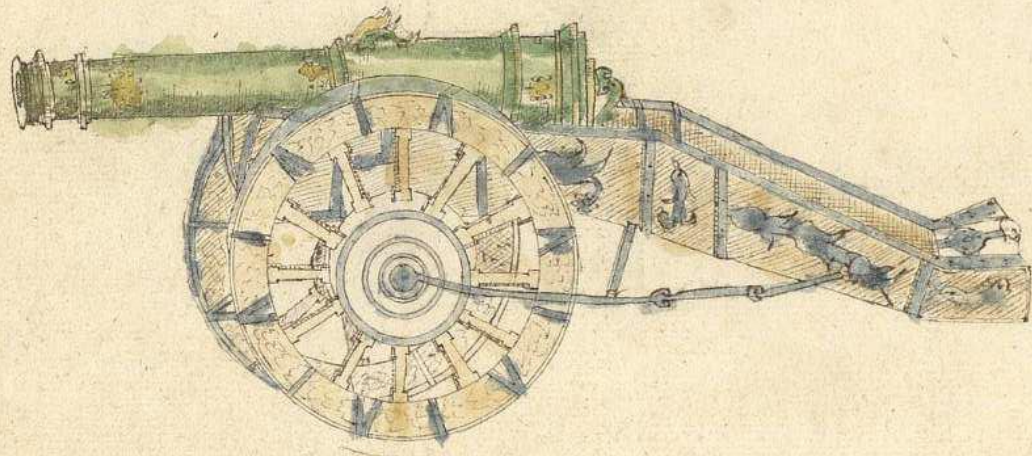




Giovanni Bautista Antonelli,  
(Gatteo, Italy 1527 - Toledo, Spain  
1588) *Epitomi del Trattato dell'  
Artilleria/Treatise on Artillery*,  
1561. OAI-PMH, PLAN 4/2/1(02)

Drawing made by Giovanni Bautista  
of the machinery used to polish the  
interior of a cannon (p.67)





Giovanni Bautista Antonelli,  
(Gatteo, Italy 1527 - Toledo, Spain  
1588) *Epitomi del Trattato dell'  
Artilleria/Treatise on Artillery*,  
1561. OAI-PMH, PLAN 4/2/1(02)

Drawing of a finished cannon. By  
Giovanni Bautista, 1561 (p.78)



*Epitomi delle fortificationi moderne  
Di Giouambatta Antonelli*

*L*

*All' Ill<sup>mo</sup> sig.<sup>o</sup> Don Gio: Manrique de  
Lara Cauero de Calatrua Cap.<sup>o</sup>  
Gnle dell' Art.<sup>ia</sup> Maff.<sup>o</sup> domo,  
et del Consig.<sup>o</sup> supremo di  
S. M.<sup>ta</sup> Catt.<sup>ica</sup>*

*3*

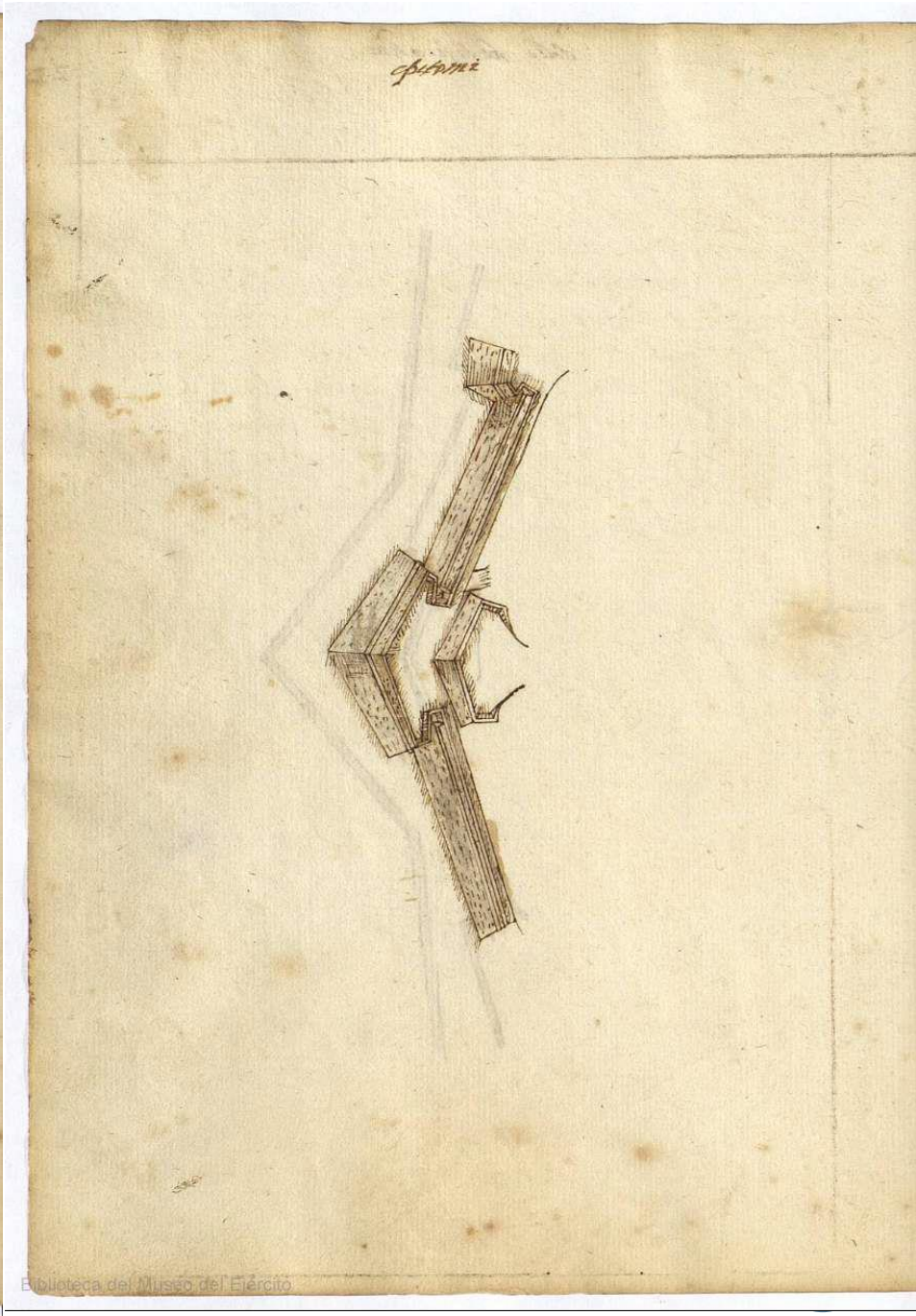
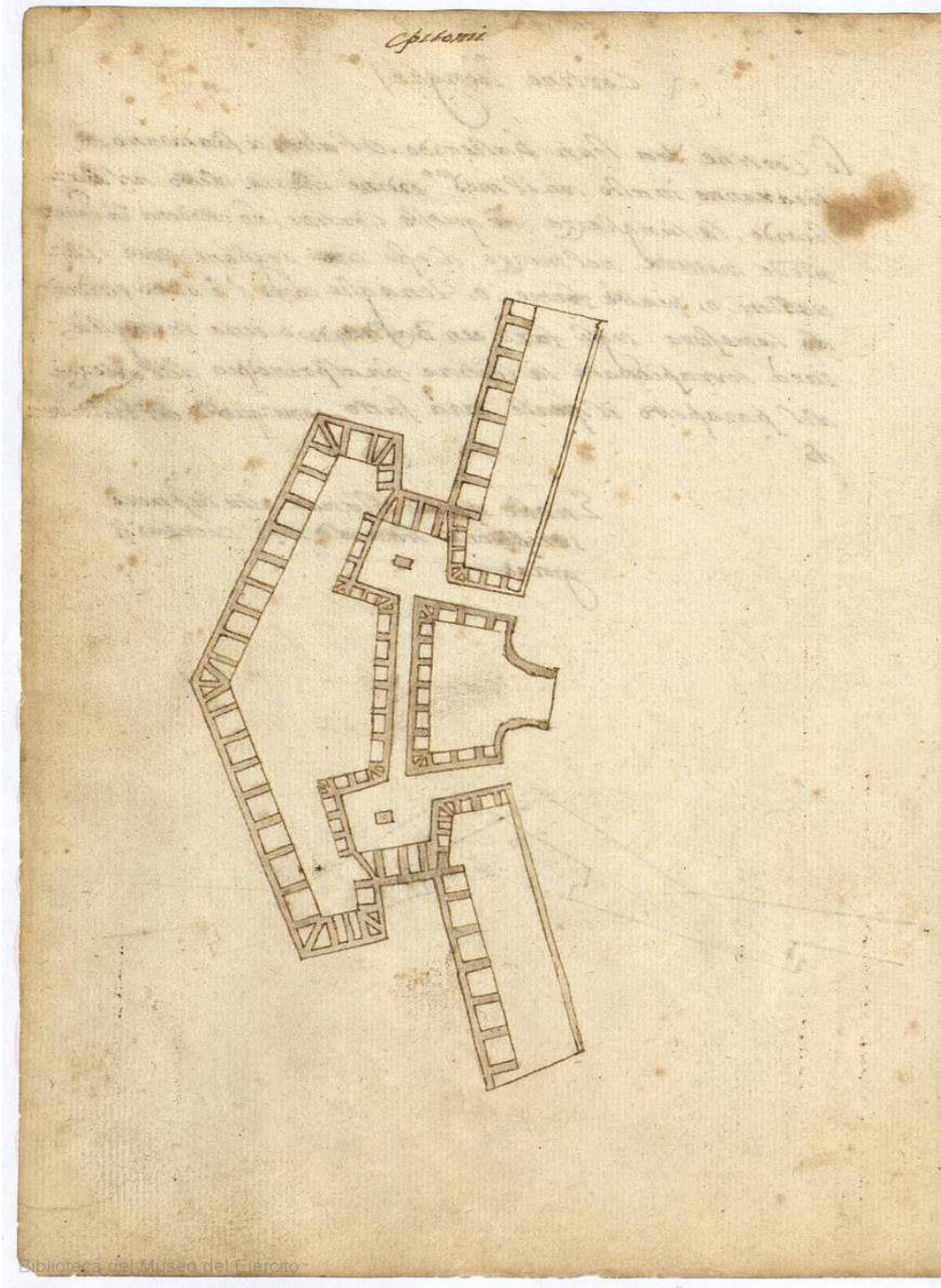
Giovanni Bautista Antonelli, (Gatteo, Italy 1527 - Toledo, Spain 1588) *Epitomi delle fortificationi moderne* (1560) / *Treatise on Modern Fortifications*. Source: OAI-PMH, PLAN 4/2/1(01)

This manuscript was dedicated to the Spanish captain Giovanni Manrique de Lara. It is believed that the first copy was ready to publish but was stolen. The present work is a shorter and more concise version sent to Manrique de Lara by 1561. In his designs, it could be noticed the clear fundamentals of the *Trace Italienne* architecture and other elements that were quickly incorporated into the Spanish domains. This type of architecture was already known in Europe, but the arrival of Giovanni Bautista and his younger brother, Bautista Antonelli to Spain marked an important moment in the expansion of this technique.

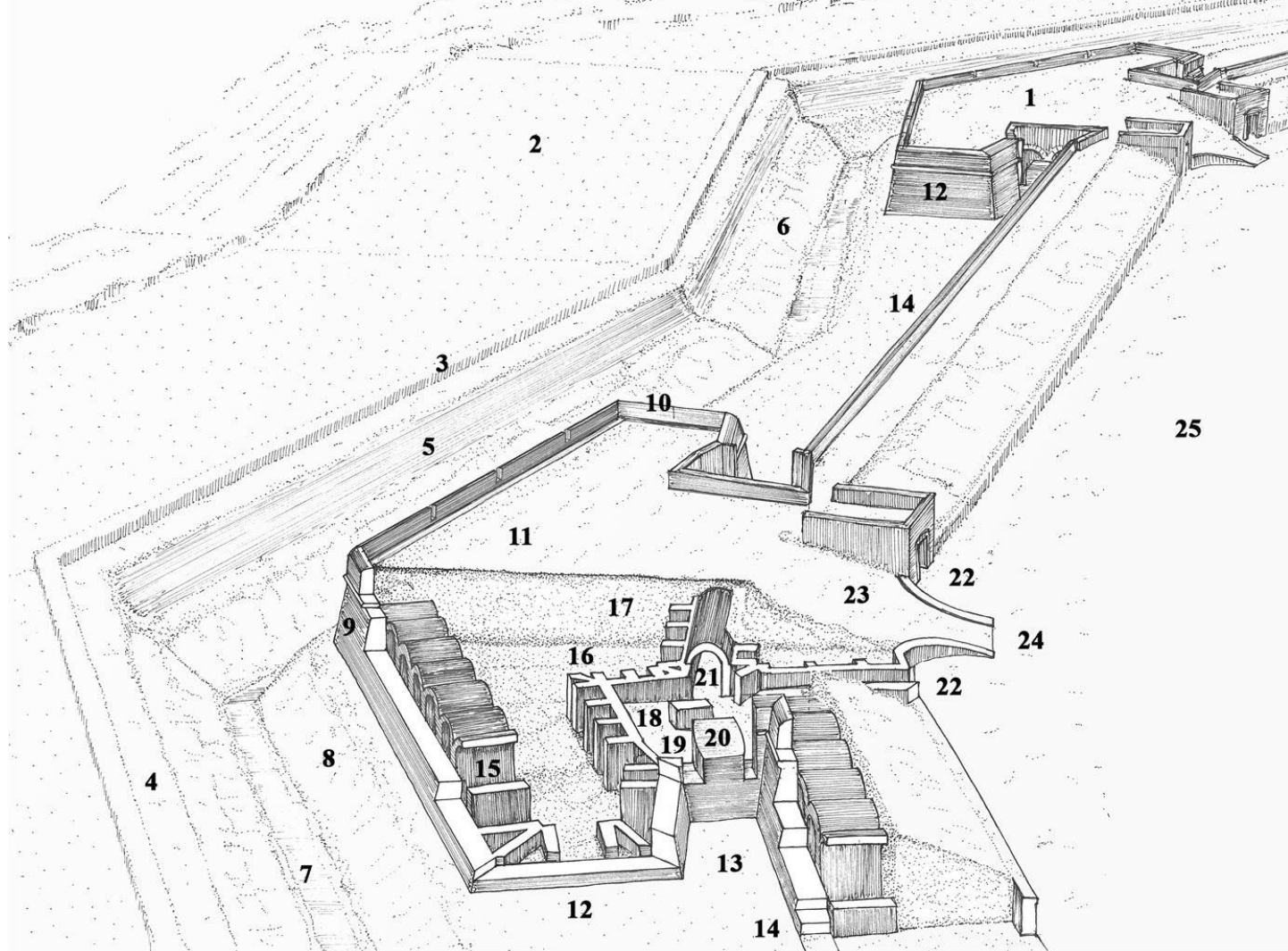


Giovanni Bautista Antonelli,  
(Gatteo, Italy 1527 - Toledo,  
Spain 1588) *Epitomi delle  
fortificationi moderne*  
(1560)/*Treatise on Modern  
Fortifications*. Source: OAI-PMH,  
PLAN 4/2/1(01)

Design of a bastion made by  
Giovanni Bautista, 1560.



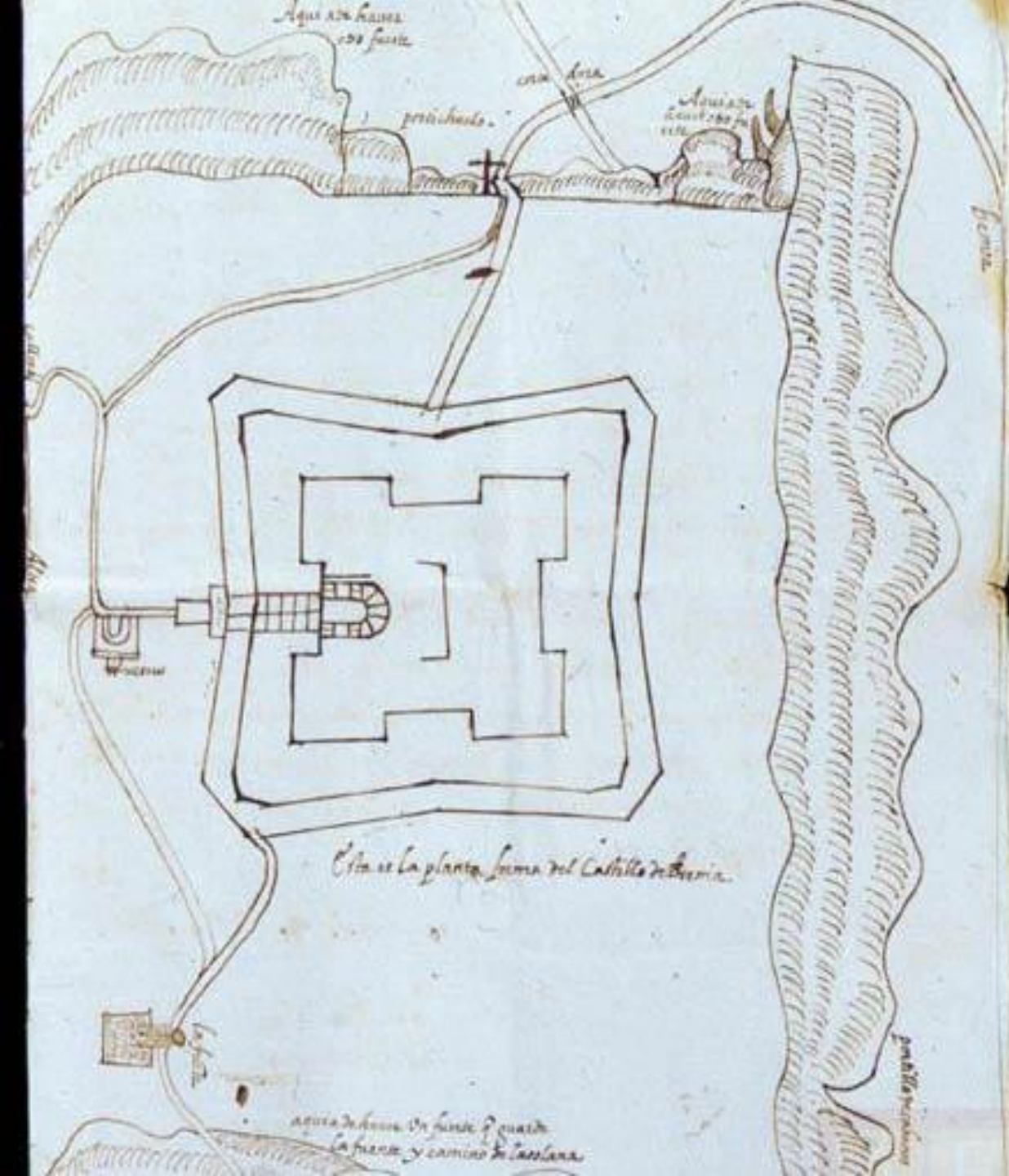




Reconstruction of the bastioned fortress according to Antonelli's precepts on modern military architecture and interpreting his sketches. Drawing by Silvia Bertacchi.

- |                      |                           |                                      |
|----------------------|---------------------------|--------------------------------------|
| 1 - BASTION          | 10 - PARAPET              | 19 - EMBRASURE                       |
| 2 - GLACIS           | 11 - PARADE GROUND        | 20 - MERLON                          |
| 3 - BATTLEMENT       | 12 - FLANK                | 21 - CORRIDOR                        |
| 4 - PROTECTED STREET | 13 - SIDE                 | 22 - ENTRANCE TO THE SQUARE          |
| 5 - COUNTERSCARP     | 14 - CURTAIN              | 23 - RAMP                            |
| 6 - DITCH            | 15 - VAULTED SYSTEM       | 24 - GORGE                           |
| 7 - MOAT             | 16 - BUTTRESSES           | 25 - INSIDE OPEN SPACE OR "POMERIUM" |
| 8 - SCARP            | 17 - TERREPLAIN           |                                      |
| 9 - FRONT            | 18 - SQUARE FOR ARTILLERY |                                      |





**[Planta del castillo de Bèrnia, en la provincia de Alicante] / Design of the Castle of Bernia. Archivo de la Corona de Aragón,ACA,CONSEJO DE ARAGÓN,Legajos,0555,nº 005,/6**

The design and construction of the castle was made by Giovanni Bautista Antonelli in 1562 and lasted until 1613, when Philip III decided to demolish the castle.

Google Earth link of the castle:

<https://earth.app.goo.gl/a927DL>



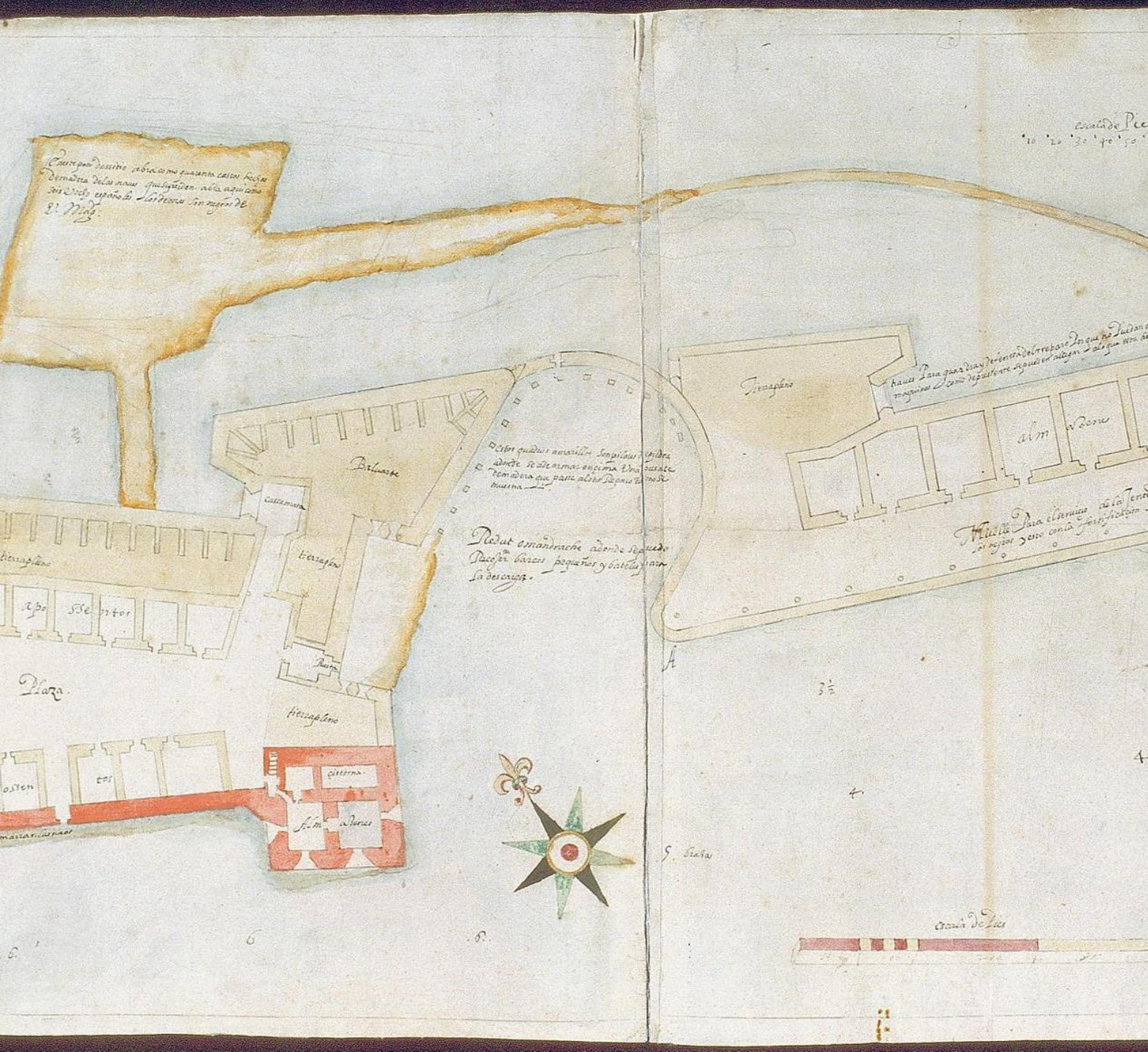
# Bautista Antonelli (Gatteo, 1547 – Madrid, Spain 1616)

Planta del fuerte de San Juan de Ulúa  
con las mejoras y ampliaciones  
proyectadas por Bautista Antonelli.  
Archivo General de Indias, MP-  
MEXICO, 37

Design of the castle of San Juan de  
Ulúa, Mexico by Bautista Antonelli  
(1590)

Google Earth link:

<https://earth.app.goo.gl/PkACfU>





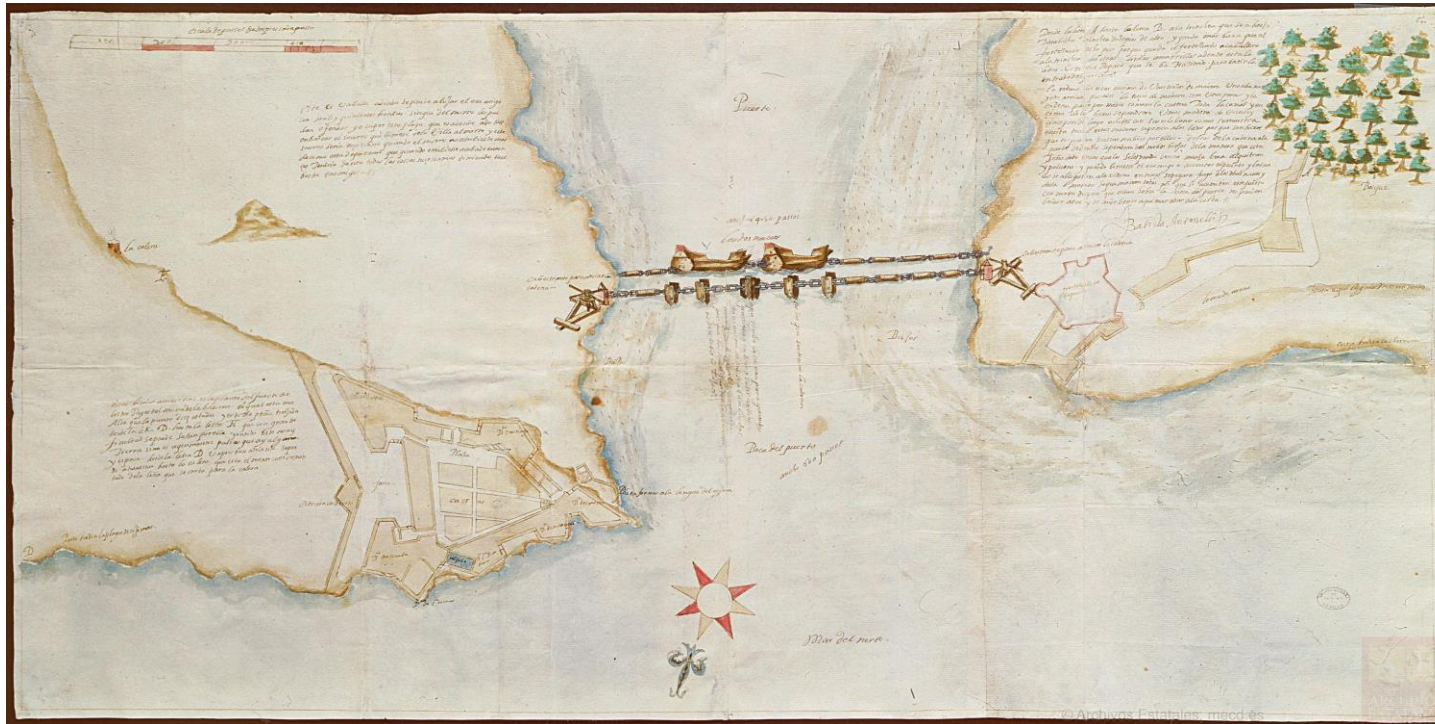
"Planta de la Ciudad de Cartagena de Yndias y sus fortificaciones, manifestándose por líneas amarillas la fortificación ó cerca que se podría hacer". By Bautista Antonelli, 1594. AGI/27.20//MP-PANAMA,10

Design of the City of Cartagena de Indias and the surrounding fortifications.

Google Earth link:

<https://earth.app.goo.gl/jn88g5>





Castillo del Morro y de San Salvador de la Punta (La Habana, Cuba), 1593. Archivo General de Indias, MP-SANTO\_DOMINGO, 13. By Bautista Antonelli.

A design of Castillo del Morro fortress in Havana, Cuba. Notice the chain that was used to close the entrance of the Havana bay in case of imminent enemy attacks. Similar chains were used in other cities, like Constantinople.

Google Earth link:

<https://earth.app.goo.gl/X9H5Nc>



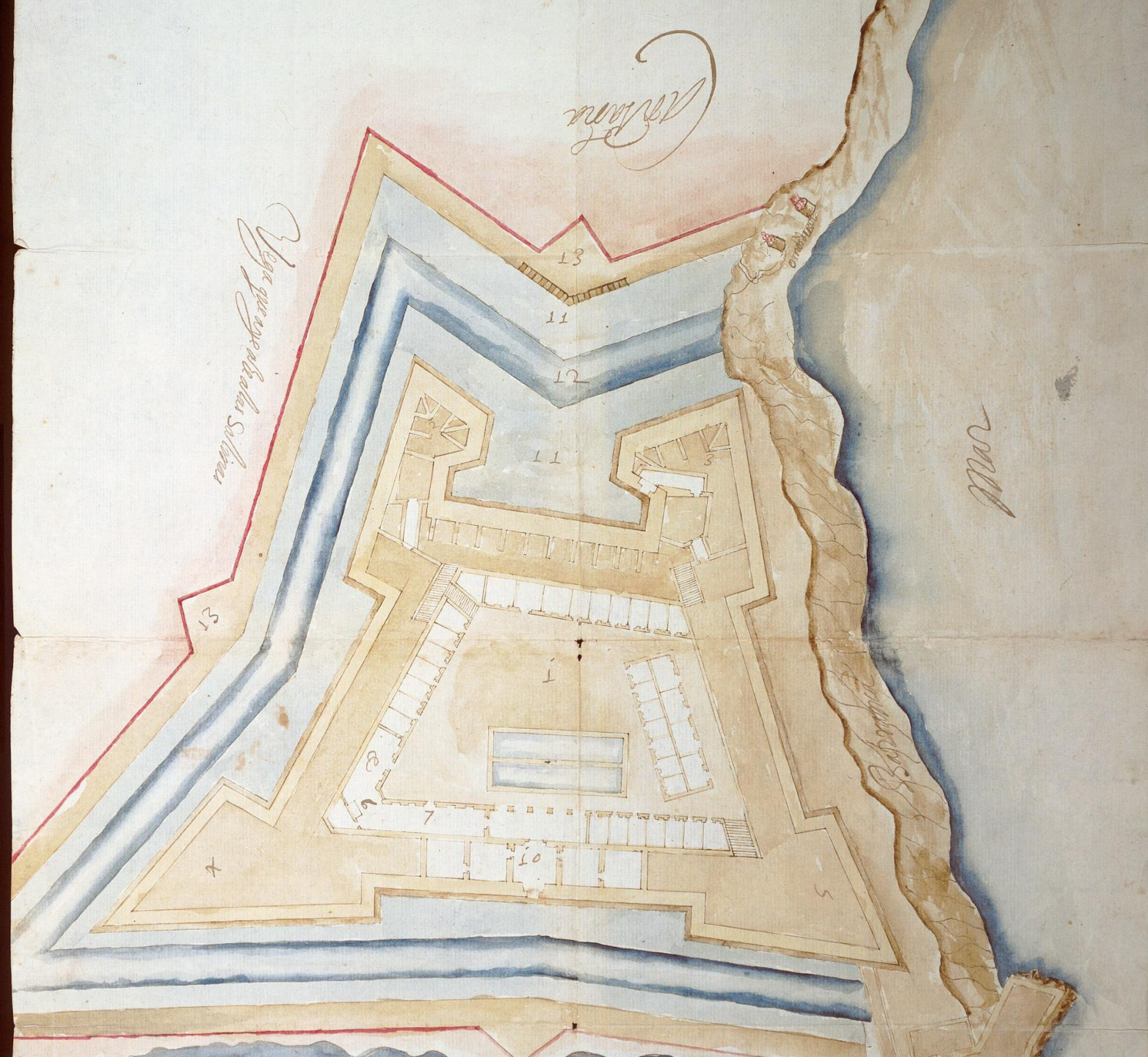
## **Cristobal Roda Antonelli, (Gatteo, 1560 – Cartagena, New Granada 1631)**

Planta del castillo de Santiago de Araya/Santiago de Araya Castle. (1622). Cristóbal de Roda. AGI, MP-Venezuela, 11

Design made by Cristobal Roda Antonelli. Cristóbal de Roda was the nephew of Juan Bautista Antonelli and was born in the town of Gatteo, Italy. He was appointed as military engineer and architect in 1594 by Philip II and sent to Havana, Cuba in 1594 to work with his uncle Bautista Antonelli.

Google Earth link:

<https://earth.app.goo.gl/M1y58K>



## Juan Bautista Antonelli (son), (Madrid 1585-Cartagena, New Granada. 1649)

- Juan Bautista Antonelli was the son of Bautista Antonelli and by the age of 19 was sent to Havana to work with his father. In 1609, he and his cousin Cristobal Roda started collaborate in the construction of the fortress of Cartagena de Indias. Soon after, he was appointed architect of the King Philip III. In the upcoming years and until his death he will be responsible of finishing his father and cousin projects in the Caribbean and building new fortifications: Here is a list of some:

- [Castillo del San Pedro de la Roca, Cuba](#)
- [Castillo de San Juan, Puerto Rico](#)
- Tower of La Chorrera, Cuba



# Other Innovations

According to primary sources located in the Archivo General de Indias, Spain during the sixteenth and seventeenth centuries the Spanish kings granted the following rights related to new innovations or *ingenios*:

- In 1539, a Royal Decree was issued in favor of Nicolás de Rodas, Greek, granting him half of what he can salvage from the bottom of the sea, provided 60 days have passed since the ship wreck. AGI/INDIFERENTE, 1962



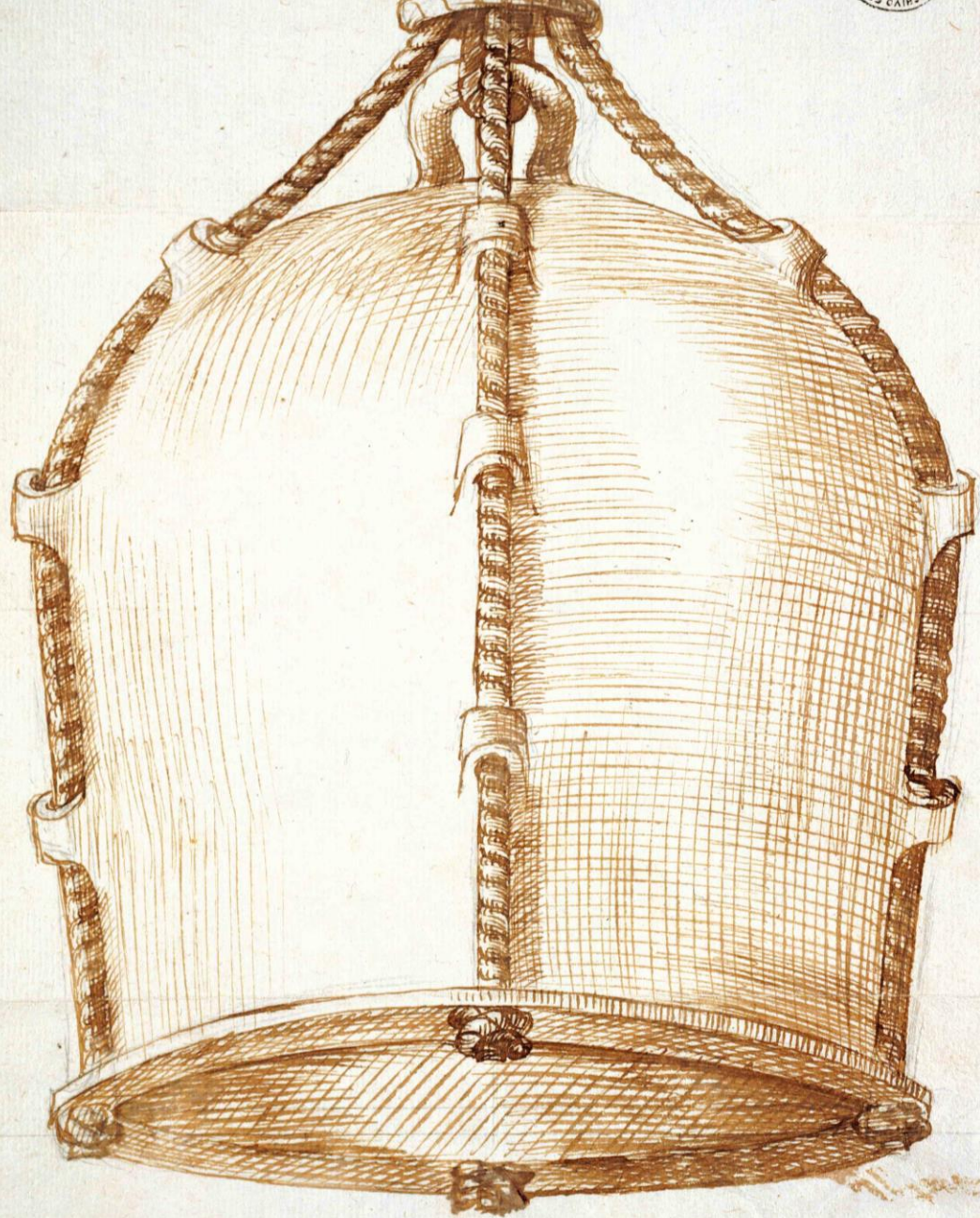


Por quanto hauiendo senos hecho Relacion por  
 parte de Jacome de fran. q̄ el auia descubierto cierto  
 secreto y nuevo modo de dar carena alas naos y Na  
 ueles de la mar. sin poner de Vaco pipas Votas ni o  
 tracos, y que era en gran bien de sus dueños, y de los  
 tratantes en ella. Por cedula fecha en diez y seys  
 de Octubre del año pasado de 1563 se mandamos dar  
 licencia para que por tiempo de diez años el y quien  
 supiere huuiere y no otra persona pudiese usar del  
 dicho secreto y nuevo modo de dar carena, societas  
 penas, y hauiendo senos despues hecho Re.º por  
 parte de vos Pablo Mathia que el dicho Jacome de  
 fran se auia ausentado de los Reynos, y q̄ el dicho  
 nuevo modo se auia descubierto vos. Por otra cedula  
 mas fecha en diez y nueve del mes de Junio del año pasado  
 de 1563 se mandamos dar licencia y permisión  
 para que por tiempo de diez años vos y no otra persona  
 alguna pudieses usar de la dicha imbincion y  
 nuevo modo de dar carena, alas dichas Naos en  
 estos nros Reynos y señorios, y en las mas Indias  
 del mar Oceano, con ciertas condiciones y declaracio  
 nes en la dicha nra cedula contenidas, despues de  
 lo qual, queriendo nos ser informado mas particular  
 mente de la Orden q̄ se tenia en dar carena alas dichas  
 naos, y de la q̄ era mas conueniente y necess. y si el  
 dicho arte era manifestado a todos, y quien y auia del  
 y q̄ personas lo pudiesen hacer con mas platica y expe  
 riencia, los nros Officiales de la casa de la contrata no

## Italian Networks in Seville

- In 1563, Pablo Matía and Andrea Barrasi, both Italians were granted a royal contract to establish their business in Seville. According to the manuscript, Jacome de Francisco, discovered a new way to careen the ships and naos from the Royal Navy and the Fleet of Indies. In the Veracruz, Mexico, Adrea Barrasi and Pablo Matia learned from Jacome de Francisco how to careen the ships using the new technique. After the death of Jacome, they both pledged the Spanish king Philip II for a royal contract. AGI/23.15.424//INDIFERENTE,425





*y Este es el palmo*

I 1 2 3 4 5

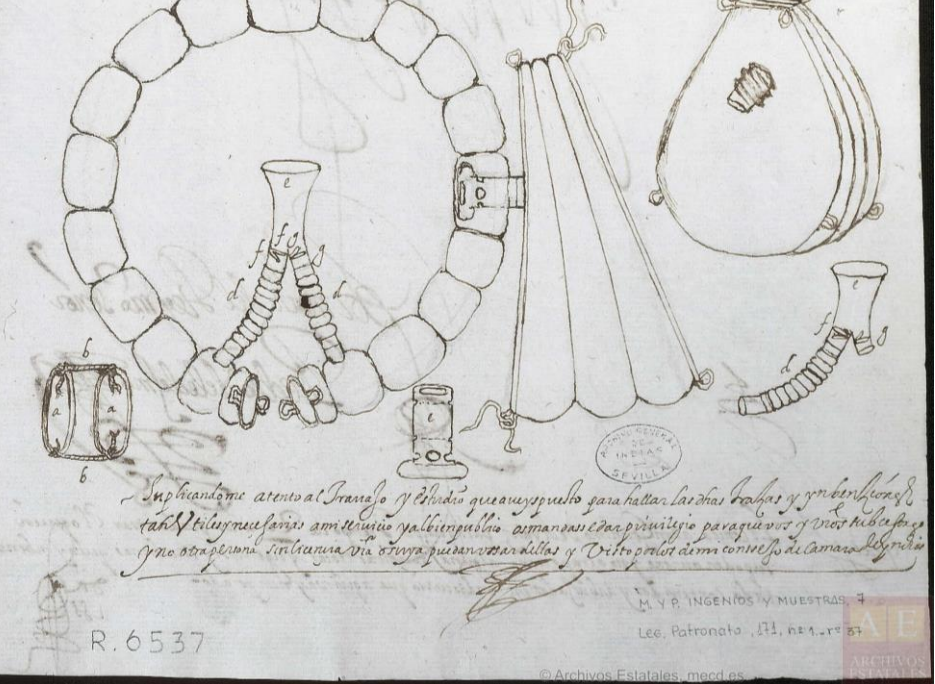
*todos estos son cinco palmos —*

## Pearl Fishers

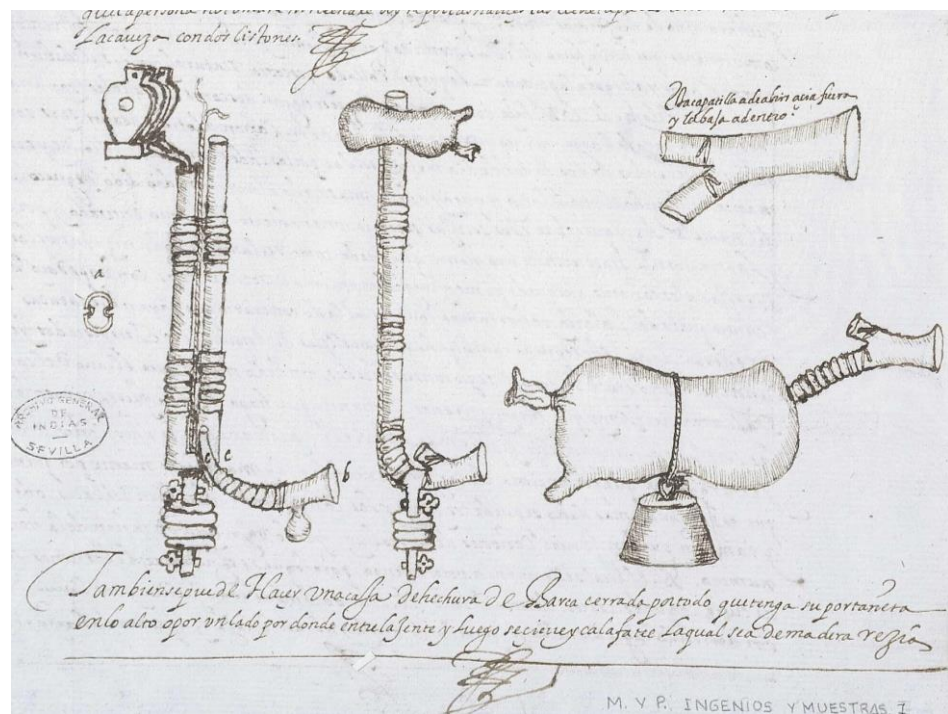
This image is part of a file approved in 1582 in favor of José Bono, a Sicilian native of Palermo, on the granting of patent privileges to use in Spain and America a glass or artifice he invented to fish pearls and all the other things that can be found at sea. The file includes the privileges issued by King Philip II.

Source:AGI/PATRONATO,260,N.1,R.10



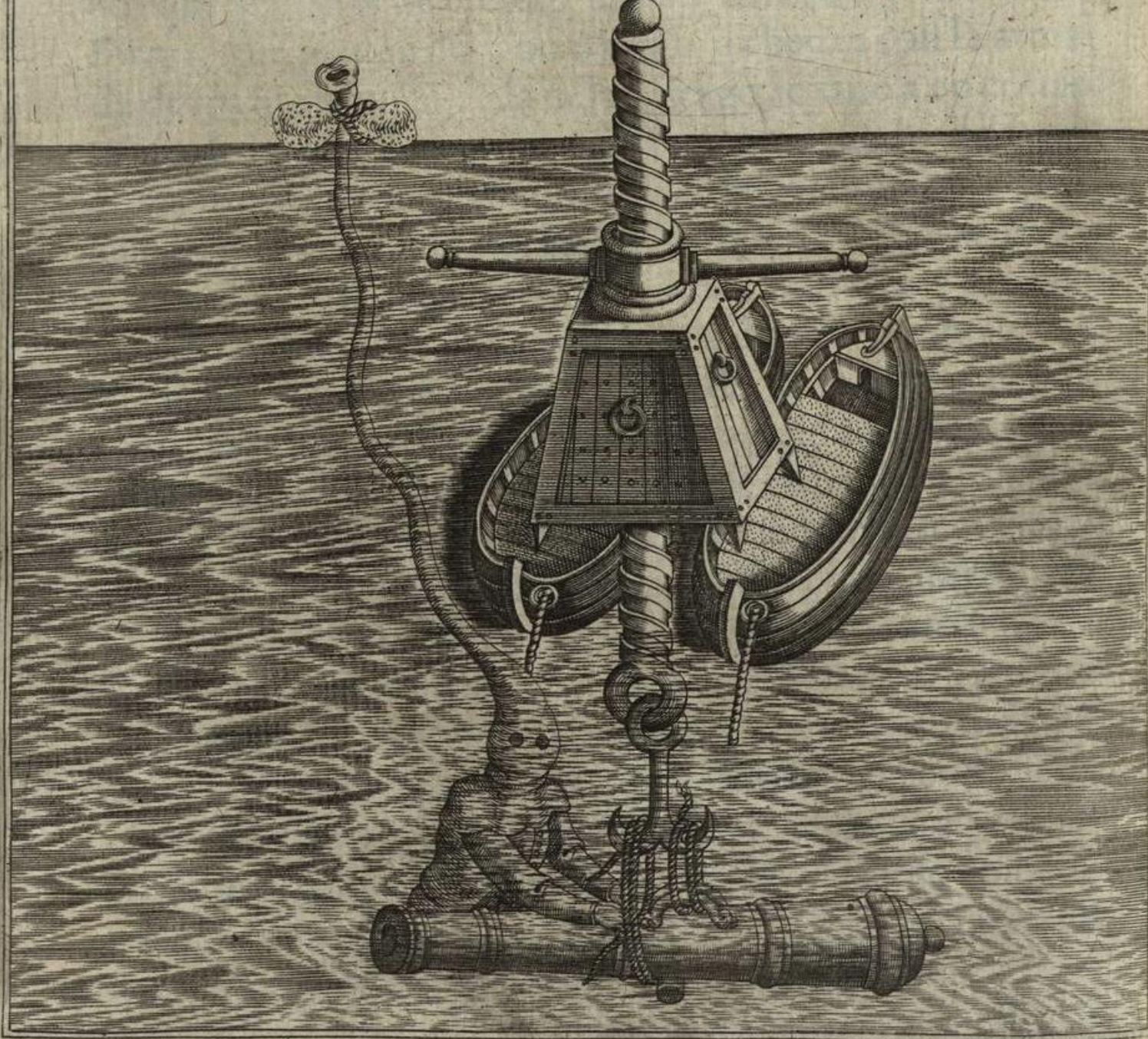


Drawings of two inventions by Jeronimo de Ayanz, commander of the Order of Calatrava, for diving and rescue of objects from the bottom of the sea. AGI/27.14//MP-INGENIOS,7



In 1605, Jeronimo de Ayanz was granted a patent for 20 years on the use of his innovation. He was prompted to travel to Isla Margarita, Venezuela and implement the innovation there.





Diego de Ufano, *Tratado de la Artillería/Treatise on Artillery* (1613). Image showing how to salvage cannons from the sea.



# Storymap Sample Project

<https://uploads.knightlab.com/storymapjs/7ef13bf4679881d849e2a0241910ac43/architects-of-the-king/index.html>



## Bibliography:

- The military revolution : military innovation and the rise of the west, 1500-1800, Geoffrey Parker 1966
- Before Columbus : exploration and colonization from the Mediterranean to the Atlantic, 1229-1492 Felipe Fernández-Armesto, 1987
- Pathfinders : a global history of exploration, by Felipe Fernández-Armesto, 2006
- Parrinello and Bertacchi, Geometric Proportioning in Sixteenth-Century Fortifications: The Design Proposals of Italian Militar Engineer Giovanni Battista Antonelli, Nexus Netw J (2015) 17:399-423



# Other resources:

- For more information about siege weapons and medieval war artifacts in the Royal Armouries Collection <https://collections.royalarmouries.org/object/rac-object-2703.html>
- A collection and timetable about military history, the source is in French but contains valuable images and information: <http://timeline.musee-armee.fr/static/html/#/>
- <http://bibliotecavirtualdefensa.es/BVMDefensa/i18n/estaticos/contenido.cmd?pagina=estaticos/presentacion> Virtual Library and Collection, mostly in Spanish
- <http://www.internetculturale.it/> Virtual Library



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