



## Section 5: Spanish Artillery (1745-1808)

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## SOJ-4(20) Spanish Ordnance 1745-65

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Without doubt the most efficient part of the Spanish Army was the Artillery and sundry technical services. Renounced for their fanatical bravery the gunners often fought too the last man protecting their Gribeauval pieces. Oman (1902) complimented the artillery as follows.

*"During the campaign the conduct of the corps seems on the whole to have been very good, compared with the other arms... We often hear of gunners cut down or bayoneted over the pieces, seldom a general bolt to the rear. For this reason the personnel of the batteries suffered terribly: every defeat meant the capture dozens of guns and the cutting up of the men who served them."<sup>255</sup>*

The close association of the Spanish and French ruling houses since 1700 gave a strong French influence to Spanish ordnance. Foundries for casting bronze cannon were formed at Seville (Est. 1662 by Juan Gerardo)<sup>256</sup> and Barcelona. The cast and forged iron [shot, shell and bombs] ammunition was made at Fargadelos and near Oviedo. The gunpowder was manufactured in Murcia, Granada, near Alcázar de San Juan in La Mancha, Manresa plus 170 powder mills in Catalonia and Aragon. Small arms are manufactured in Oviedo, Igualada, Ripoli, Plasencia and Helgoivar. Toledo made the swords and bayonets.<sup>257</sup>

In 1728 the 4- and 8-pdr were introduced.<sup>258</sup> By Royal Ordinance of 1728, pieces were proved with three shots, the breech was fixed so it would not recoil and the barrel elevated to 2-3 degrees. The 12-, 16-, 18- and 24-pdrs used for the first shot two thirds, the second three quarters and the third the whole weight of shot. The 4-, 6- and 8-pdrs were proved with charges of full weight of the ball three times. Mortars and *pedreros* were proved with a full load of gunpowder that fitted in the bore.<sup>259</sup>

The Royal Ordinance of 1743 like that of France in 1732, there would be five calibres of cannon (4-, 8-, 12-, 16- and 24-pdr) and two mortars (12-pouce and 14-pouce).<sup>260</sup> The artillery system similar to that of the Vallière system from Bourbon France with some British features such as the plainer cascable. However, these were still cast around a core and so were inferior to those cast solid produced in France from 1732.<sup>261</sup>

The Royal Ordinance of 1743 also specified the calibre would be defined in French *Livre de Paris*.<sup>262</sup>

The Spanish gun tubes retained the 17<sup>th</sup> Century bulbous multi-ringed muzzles, sculpturally ornament dolphins and individual names upon the scroll just behind the muzzle. Spanish cannon had the royal coat of arms in relief on the first reinforce and ornate dolphins.<sup>263</sup> The base ring would have where it was cast, the date and possibly the gun founder. The left trunnion would have a *peso* [P = weight] followed by the weight in *quintal* [qq or QQ] or *libras* [lb or lbs.]<sup>264</sup> The gun name in a scroll was on the chase.

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<sup>255</sup> Oman (1902) 95

<sup>256</sup> Salas (1831) 129

<sup>257</sup> Laborde (1809) 499

<sup>258</sup> Salas (1831) 123

<sup>259</sup> Salas (1831) 123-124

<sup>260</sup> Salas (1831) 124

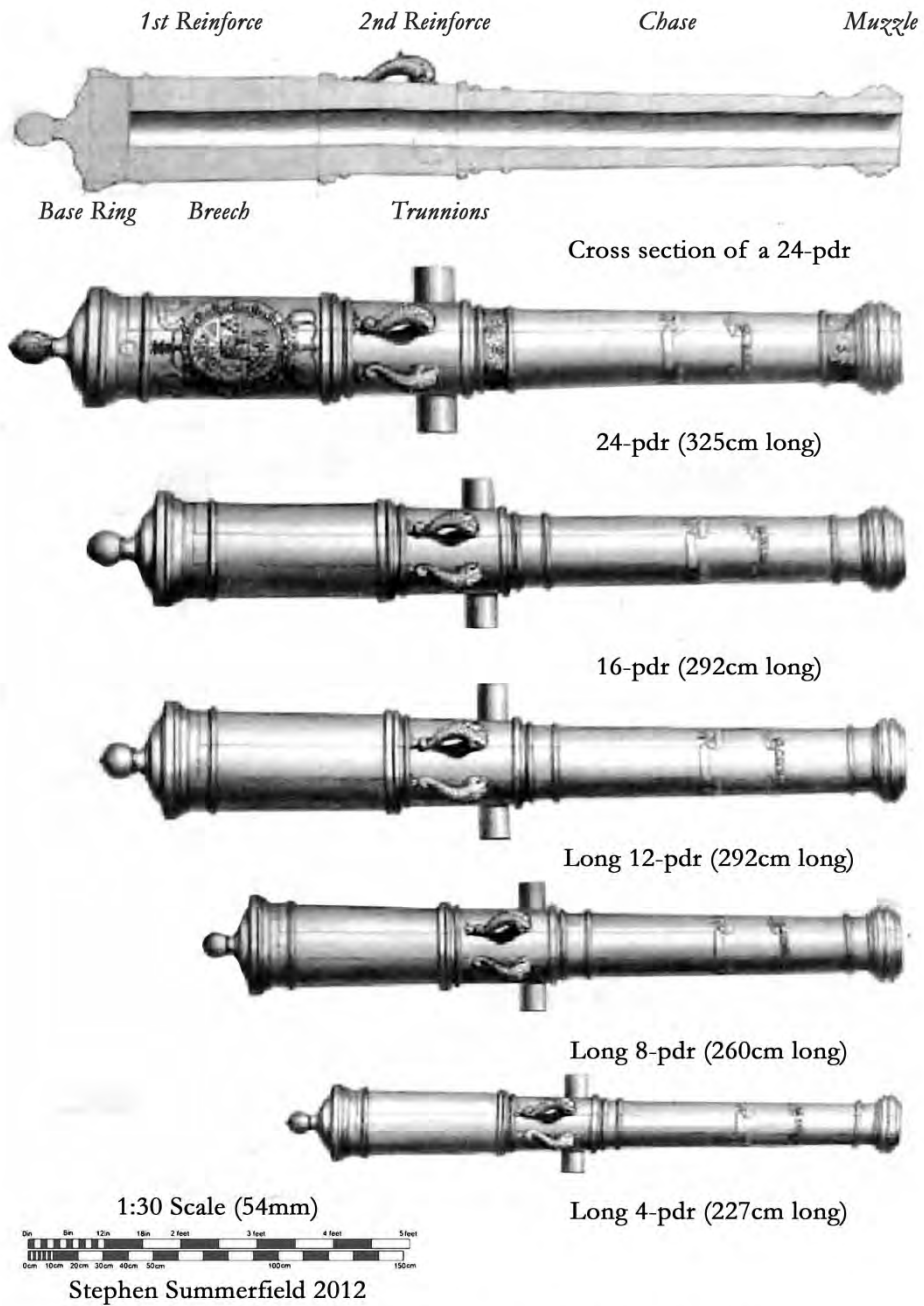
<sup>261</sup> Both Vallière and Jean Baptiste de Gribeauval of France had observed that the mould for the bore of long gun tubes tended to bend causing the finished tube to fire imperfectly or to be useless.

<sup>262</sup> Salas (1831) 124

<sup>263</sup> Spanish Gribeauval pieces survive captured in the Spanish-American War of 1898 can be still seen in the USA. Some of these are the earliest examples of that design dating back to 1769 and even older than the French who finally adopted the designs in 1774.

<sup>264</sup> Spanish *quintal* or *centena* (qq) is 100 *libras* = 46.0kg where 1 *libra* = 460g = 0.46kg

The Royal Ordinance of 19 October 1756 instructed the forming of four arsenals in Barcelona, Zaragoza, Seville and Coruña. The Saragossa Arsenal lasted only a short time.

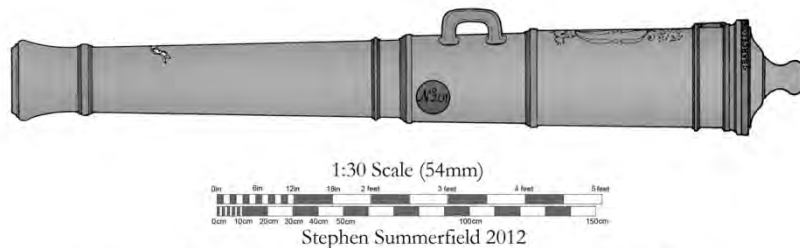


Spanish M1745 Bronze Guns [Morla (1803)]



## SOJ-4(21) Spanish Gribeauval System 1765-1808

The Spanish like the French were dissatisfied with the performance of their field artillery in Seven Years War. The Spanish Artillery attempted to keep pace with developments in ordnance.<sup>265</sup> In 1766, Jean Maritz II (1711-1790) was sent by King Louis XVI of France at the request of Carlos III of Spain to improve the foundries at Seville and Barcelona. The horizontal boring machines in Seville were installed in 1768 just 3km from the foundry and were driven by the waters of the River Guadaira. This permitted the bronze<sup>266</sup> gun barrel to be cast solid and then bored out but the external surfaces had to hand finished. In 1779 the Maritz simultaneous horizontal boring and finishing machines were installed. This permitted the bronze gun barrel to be bored out from solid and finished at the same time so reducing the completion time significantly, probably by half.<sup>267</sup>



Spanish 16-pdr named "Arion" cast in Barcelona on 29 Oct 1778  
was 137mm, 292.1cm long and 1955.8kg

Maritz II was rewarded with the rank and pension of *Marechal de Camp*. In 1769, he returned to France where he was involved with Gribeauval in the reorganisation of the French artillery system. In 1772, he returned to Barcelona and Seville Arsenals and retired to his estate of La Barolliere in 1774.<sup>268</sup> By 1780, the Seville and Barcelona Foundries were producing over 500 bronze and iron guns per year to the modern Gribeauval style designs.<sup>269</sup>

The Spanish Gribeauval gun tubes were without raised decoration and plain dolphins. This made production of gun tubes faster and simpler to cast let alone accurately bored. After 1768, the relief on the barrels and the markings were engraved on the surface.<sup>270</sup> The base ring would have where it was cast and the date. The cipher of the king would be on the breech [Carlos III (1759-1788), Carlos IV (1788-1807) or Ferdinand VII (1813-33)]. The left trunnion would have the weight. The gun name in a scroll was on the chase. The Seville Foundry ceased to have the name of the founder from the 1760s.

In 1778, the stringent proofing tests stipulated in 1728 were abolished. The cannons were mounted on their gun-carriages and proofed with five shots at zero elevation. The first two with two thirds the ball weight of gunpowder and the final three with half.<sup>271</sup>

<sup>265</sup> Esdaile (1988) 6

<sup>266</sup> Bronze is an alloy of about 89-93% copper, 10-5% tin with a small amounts of lead to improve machining and zinc as corrosion inhibitor. The copper came from Mexico and the tin from mines in Spain.

<sup>267</sup> Solas (1831) 130

<sup>268</sup> Kennard (1986) 108-109

<sup>269</sup> Esdaile (1988) 6-7

<sup>270</sup> Spanish Gribeauval pieces survive captured in the Spanish-American War of 1898 can be still seen in the USA. Some of these are the earliest examples of that design dating back to 1769 and even older than the French who finally adopted the designs in 1774

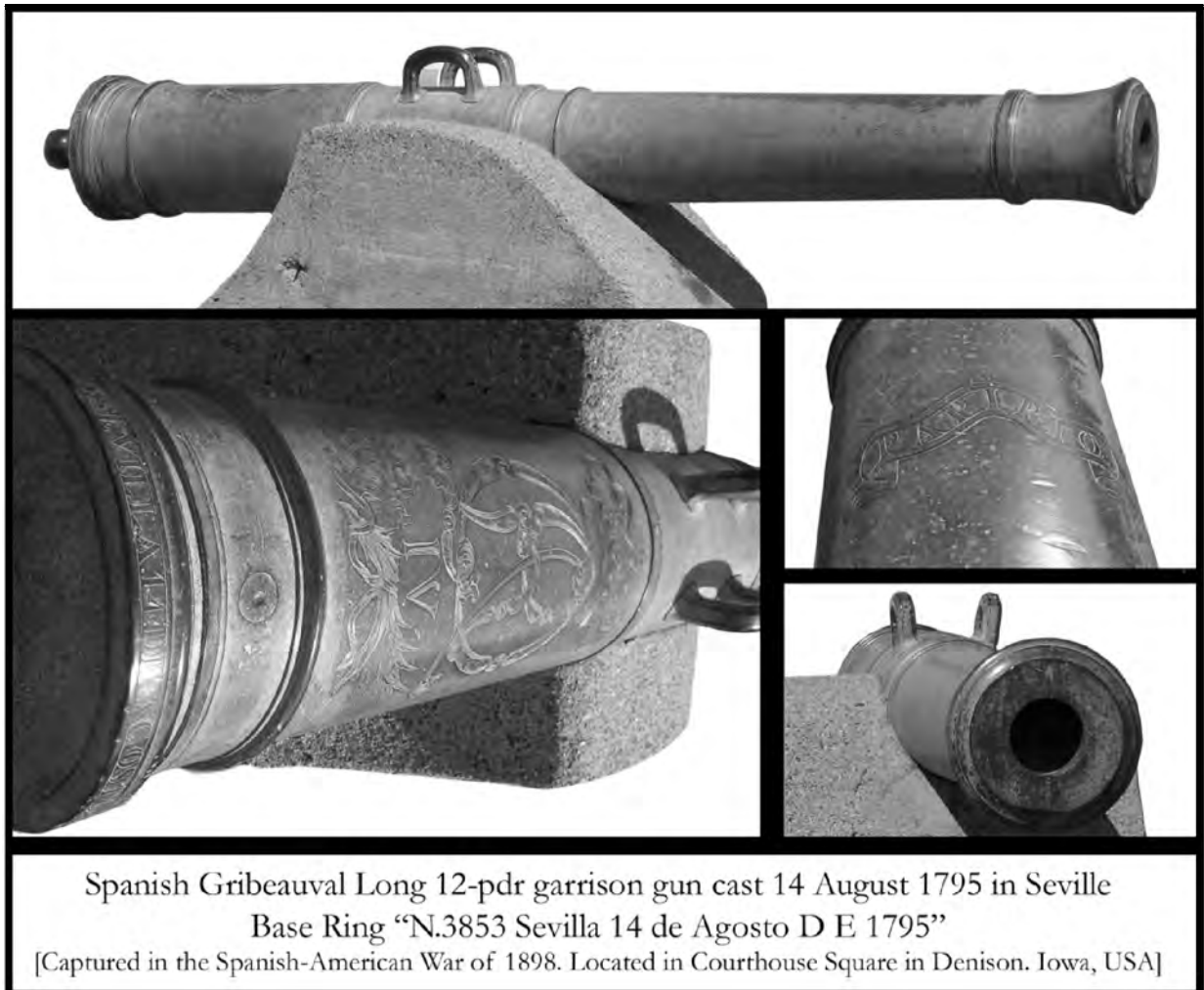
<sup>271</sup> Solas (1831) 125

**Table 6: Dimensions of Spanish roundshot.<sup>272</sup>**

	Calibres	Shot diameter	Windage	Weight of shot
24-pdr	6.58 <i>pulgadas</i> 152.8mm	6.37 <i>pulgadas</i> 148mm	4.8mm	25½ <i>libras</i> 11.7kg
16-pdr	5.76 <i>pulgadas</i> 133.7mm	5.56 <i>pulgadas</i> 129mm	4.7mm	17 <i>libras</i> 7.8kg
12-pdr	5.23 <i>pulgadas</i> 121.3mm	5.05 <i>pulgadas</i> 117.3mm	4.0mm	13 <i>libras</i> 6.0kg
8-pdr	4.57 <i>pulgadas</i> 106.1mm	4.40 <i>pulgadas</i> 102.1mm	4.0mm	9 <i>libras</i> <sup>273</sup> 4.1kg
4-pdr	3.62 <i>pulgadas</i> 84.1mm	3.50 <i>pulgadas</i> 81.1mm	3.0mm	4½ <i>libras</i> 2.1kg

### ***Long Gribeauval Siege and Garrison Guns***

The Long siege/garrison guns retained the dimension of their predecessors, the M1745 system but had no raised decoration and simple dolphins.

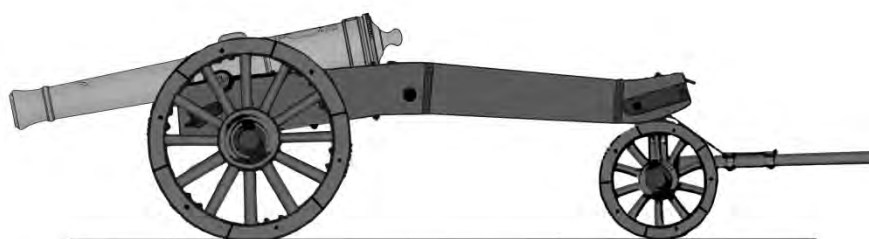


<sup>272</sup> Odriozola (1827) 78, 82, 98-99 & 102 and Morla (1816) I: 422.

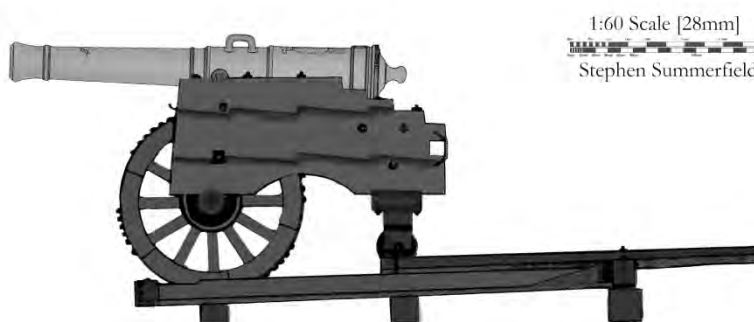
<sup>273</sup> Hence Adye and subsequent authors think the Spanish had 9-pdrs when they had 8-pdrs. It was 9-pdr in Spanish weights. [Adye (1813 rp 2010) 202]

Table 7: Dimensions of Spanish Gribeauval bronze siege ordnance.<sup>274</sup>

	Long 24-pdr	Long 16-pdr	9-pulgadas Howitzer <sup>275</sup>
<b>Calibre</b>	152.8mm <i>6.58 pulgadas</i>	133.7mm <i>5.76 pulgadas</i>	
<b>Shot diameter</b>	148mm <i>6.37 pulgadas</i>	129mm <i>5.56 pulgadas</i>	
<b>Windage</b>	4.8mm	4.7mm	
<b>Weight of shot</b>	11.7kg <i>25½ libras</i>	7.8kg <i>17 libras</i>	
<b>Tube length</b>	325cm 11.66 pies 22 cal	292cm 10.5 pies 22 cal	
<b>Weight</b>	2,960kg <i>6,435 libras</i>	2,001kg <i>4,350 libras</i>	1,242kg <i>2,700 libras</i>
<b>Siege gun-carriage weight</b>	1,067kg <i>2,320 libras</i>	883kg <i>1,920 libras</i>	989kg <i>2,150 libras</i>
<b>Total weight</b>	4,027kg <i>8,755 libras</i>	2,884kg <i>6,270 libras</i>	2,231kg <i>4,850 libras</i>
<b>Barrel weight ratio</b>	257:1	256:1	51:1



Spanish Gribeauval 16-pdr Limbered Siege Gun



Spanish Gribeauval 16-pdr on Garrison Carriage

<sup>274</sup> Morla (1816) I: 376-377 and weights from Salas (1832) 113-114. [It is interesting that Morla gives the dimensions of Spanish ordnance in French rather than Spanish measures. The author has converted them back in Spanish measure for consistency. Salas]

<sup>275</sup> French 8-pouce howitzer.

Table 8: Dimensions of Spanish Gribeauval bronze garrison ordnance.<sup>276</sup>

	Long 24-pdr	Long 12-pdr	Long 8-pdr	Long 4-pdr
<b>Calibre</b>	152.8mm <i>6.58 pulgadas</i>	121.3mm <i>5.23 pulgadas</i>	106.1mm <i>4.57 pulgadas</i>	3.62 <i>pulgadas</i> 84.1mm
<b>Shot diameter</b>	148mm <i>6.37 pulgadas</i>	117.3mm <i>5.05 pulgadas</i>	102.1mm <i>4.4 pulgadas</i>	81.1mm <i>3.5 pulgadas</i>
<b>Windage</b>	4.8mm	4.0mm	4.0mm	4.0mm
<b>Weight of shot</b>	11.7kg <i>25½ libras</i>	6.0kg <i>13 libras</i>	4.1kg <i>9 libras</i>	2.1kg <i>4½ libras</i>
<b>Tube length</b>	325cm 11.66 <i>pies</i> 22 <i>cal</i>	292cm 10.5 <i>pies</i> 24.7 <i>cal</i>	260cm 9.3 <i>pies</i> 25.5 <i>cal</i>	227cm 8.16 <i>pies</i> 28 <i>cal</i>
<b>Weight</b>	2960kg <i>6435 libras</i>	1656kg <i>3600 libras</i>	1196kg <i>2600 libras</i>	649kg <i>1410 libras</i>
<b>Garrison carriage weight</b>	929kg <i>2020 libras</i>	627kg <i>1363 libras</i>	627kg <i>1362 libras</i>	349kg <i>758 libras</i>
<b>Total Weight</b>	3889kg <i>8455 libras</i>	2283kg <i>4963 libras</i>	1823kg <i>2962 libras</i>	997kg <i>2168 libras</i>
<b>Barrel weight ratio</b>	257:1	277:1	292:1	309:1

### Spanish Mortars

Spanish Gribeauval mortars unlike their French equivalents had bronze beds rather than iron beds.

Table 9: Spanish shell, bomb and hand grenade dimensions.<sup>277</sup>

	Diameter	Metal thickness	Weight of shot
14- <i>pulgadas</i> Bomb	321mm <i>13.83 pulgadas</i>	58.1mm <i>1.75 pulgadas</i>	157 <i>libras</i>
10- <i>pulgadas</i> Bomb	228.3mm <i>9-83 pulgadas</i>	31.4mm <i>1.35 pulgadas</i>	66 <i>libras</i>
7- <i>pulgadas</i> [6.4in how]	158.6mm <i>6.83 pulgadas</i>	42.5mm <i>1.83 pulgadas</i>	22 <i>libras</i> 10.1kg
Hand grenades	73.7mm <i>3.17 pulgadas</i>	10.4mm <i>0.45 pulgadas</i>	2 <i>libras</i>



Left: Spanish 10-pouce mortar on a bronze bed,

<sup>276</sup> Morla (1816) I: 376-377 and weights from Salas (1832) 113-114.

<sup>277</sup> Morla (1816) I: 422



## Spanish Gribeauval Field Guns

Maritz II introduced the design of the Gribeauval System. Comparison of Table 29 and 30 show that the Spanish version were slightly heavier and had a windage of 4mm rather than 2mm for French Gribeauval. The ordnance produced enabled them to be lighter and a greater accuracy in calibre so were more mobile and accurate. The tangent sights were introduced in the 1780s.

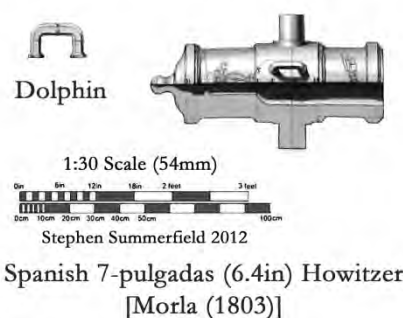
**Table 10: Dimensions of Spanish Gribeauval field guns.<sup>278</sup>**

	Short 12-pdr	Short 8-pdr	4-pdr	Mountain 4-pdr	7-pulgadas Howitzer
<b>Calibre</b>	121.3mm 5.23 <i>pulgadas</i>	106.1mm 4.57 <i>pulgadas</i>	3.62 <i>pulgadas</i> 84.1mm	3.62 <i>pulgadas</i> 84.1mm	7.19 <i>pulgadas</i> 167mm
<b>Windage</b>	4mm	4mm	4mm	4mm	4mm
<b>Shot Diameter</b>	5.05 <i>pulgadas</i> 117.3mm	4.4 <i>pulgadas</i> 102.1mm	3.5 <i>pulgadas</i> 81.1mm	3.5 <i>pulgadas</i> 81.1mm	7 <i>pulgadas</i> 163mm
<b>Bore length</b>	86.3 <i>pulgadas</i> 170cm	75.3 <i>pulgadas</i> 175cm	59.7 <i>pulgadas</i> 139cm	30.3 <i>pulgadas</i> 70cm	21.6 <i>pulgadas</i> 50cm
<b>Tube length</b>	91 <i>pulgadas</i> 211cm 18 calibres	79.3 <i>pulgadas</i> 184cm 18 calibres	63 <i>pulgadas</i> 146cm 18 calibres	32.5 <i>pulgadas</i> 76cm 9.3 calibres	33 <i>pulgadas</i> 79cm 5 calibres
<b>Tube Weight</b>	2100 <i>libras</i> 966kg	1382 <i>libras</i> 636kg	680 <i>libras</i> 313kg	175 <i>libras</i> 80.5kg	700 <i>libras</i> 322kg
<b>Carriage weight</b>	1676 <i>libras</i> 771kg	1362 <i>libras</i> 627kg	932 <i>libras</i> 429kg	532 <i>libras</i> 245kg	1559 <i>libras</i> 717kg
<b>Total weight</b>	3776 <i>libras</i> 1737kg	2744 <i>libras</i> 1262kg	1612 <i>libras</i> 742kg	707 <i>libras</i> 325kg	2259 <i>libras</i> 1039kg
<b>Wt. ratio</b>	158:1	152:1	151:1	44:1	32:1

The Mountain 4-pdr was not a Gribeauval design. It was a chambered howitzer of 85.7mm, 76.2cm long, 14.9cm wide at the muzzle and 16.8cm base ring according to surviving examples.<sup>279</sup>

The Spanish referred to the Gribeauval Howitzer as the 7-*pulgadas* and the British as the 7-in Howitzer. This was the same design as the French 6-*pouce* (6.4in) howitzer.

In 1808, Spain had 6,020 cannon, 745 howitzers, 949 mortars, and 152 Perrier mortars plus arsenals with 344,389 muskets, carbines and shotguns and 40,375 pistols, with his corresponding supplies of abundant ammunition.<sup>280</sup> A very large proportion of this fell into French hands within a few months of the start of the war. The French during the Peninsular War persisted in using the Gribeauval ordnance long after it had become obsolete in the rest of Europe due to the use of captured Spanish Gribeauval pieces and huge stocks of ammunition. The AnXI Ordnance supplemented the Gribeauval Ordnance in France from 1805 and by the end of 1809 had replaced it. Only the Regimental guns of the Young Guard and a few 12-pdrs were taken into Russia in 1812.



<sup>278</sup> Morla (1816) I: 376-380; Odriozola (1827) 98-99 & 102;

<sup>279</sup> Anon (1929) *West Point Museum Catalogue* has three examples of Spanish 4-pdr mountain howitzers captured in the Spanish-American War of 1898:

*West Point 52*: Named "GIROLA" cast on 12 March 1790 in Barcelona, Spain.

*West Point 61*: Cast July 1799 at Sevilla, Spain.

*West Point 62*: 4 Pdr. Bronze Mountain Howitzer

<sup>280</sup> Bueno (1982) 18



### *Painting*

The Spanish painted their ordnance in a blue grey and not as some authors think grey. The pigment was cobalt blue and when exposed to the weather for years it has a tendency to fade to a grey. The cobalt blue was derived from cobalt oxide mined in southern Spain that was sintered with silica (sand) at 1200 C. It was a very stable colour and was popular too in the Spanish Naval Regulations from 1772. The metalwork was painted black.

### *Ordnance Ranges*

**Table 11: Range of Spanish Bronze Gribeauval using a third the weight of shot in paces.<sup>281</sup>**

Spanish	Elevation (degrees)	First Graze (paces)	Extreme range (paces)
24-pdr	0	600	2300
	1	1000	2400
	2	1350	2500
12-pdr	0	550	2030
	1	950	2100
	2	1300	2200
8-pdr	0	500	1700
	1	850	1800
	2	1150	1900
4-pdr	0	450	1500
	1	750	1600
	2	1050	1700
6.4in howitzer	1	200	1200
	5	950	1700
	10	1500	1750
	30	1850	1870

<sup>281</sup> Adye (1813 rp 2010) 304 where 1 pace = 30 inches = 76.2cm.



## SOJ-4(22)

### The Spanish Royal Regiment of Artillery

The Royal Ordinance of 2 May 1710 created the “*Rgto Real de Artillería de España*” an Artillery General Staff [*Estado Mayor de Artillería*.] of three battalions. Each battalion each had eight fusilier companies (8x 53 men), one bombardier company (101 gunners) and one miner company (43 miners).

On 25 September 1717, the regiment was reduced to two battalions although the third battalion was not dissolved until 1721. In 1748, each battalion added a second bombardier company.

In 1762, Carlos III reformed the “*Real Cuerpo de Artillería*” from the 2 Bns and 5 provincial companies. The Royal Artillery Corps had 4 battalions established respectively in Barcelona, Seville, Corunna and Valencia. He also established the Royal School of Artillery in the Alcázar of Segovia.<sup>282</sup> The first director of the School was Count Félix Gazola. The education obtained was considered by Laborde as “very complete” implying that it was as good as France.<sup>283</sup>

In 1777, four volunteer artillery companies were raised in Segovia and were reorganised into the 5<sup>th</sup> Battalion. In 1785, the 6<sup>th</sup> Battalion was raised with seven companies in Seville.<sup>284</sup> In 1788, the Royal Regiment of Artillery had a staff, six battalions of 8 companies each and a company of cadets giving a total of 320 officers and 4,900 men.<sup>285</sup>

On 22 July 1802, Godoy disbanded the 6<sup>th</sup> battalion and formed the Royal Artillery Corps into five regiments, five artisan companies [*obreros de maestranza*], three garrison companies and four veteran artillery companies. Each regiment had two *brigade de division* [field artillery] of three *artillería a pié* [foot artillery] and one *artillería a caballo* [horse artillery] companies plus one *brigade de parquet* [park] of four *artillería a pié* [foot artillery] companies. Each company had 30 men in peacetime and 105 men during the war. Each battery had six guns with 68 draft horses and 17 further horses.

In 1803, Capitán-General Don Jose de Urrutia modified the staff and administration.

On 18 March 1806, the artillery was reduced to four artillery regiments stationed in Barcelona, Valencia, Sevilla and Coruna. A detachment of three *artillería a pié* [foot artillery] companies and an *artillería a caballo* [horse artillery] company from these regiments were stationed in Segovia. Each company formed a battery of six pieces so the forty batteries had in theory 240 pieces.<sup>286</sup>

- 1<sup>st</sup>-3<sup>rd</sup> Artillery Regiments had two battalions of four *artillería a pié* [foot] companies and one *artillería a caballo* [horse artillery] company;
- 4<sup>th</sup> Artillery Regiment had two battalions of five *artillería a pié* [foot] companies.
- 62 Veteran Artillery Companies;
- 74 Militia Companies without officials or sergeants;
- 5 Artisan Companies in Arsenal.

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<sup>282</sup> Literally Segovia Castle located in the old city of Segovia, Spain.

<sup>283</sup> Laborde (1809) IV: 498

<sup>284</sup> Muzás (2000) 102

<sup>285</sup> Esdaile (1988) 201.

<sup>286</sup> Bueno (1982) 13, Chartrand (1998) 37 and Nafziger (1992) 40

Table 12: Regiment of Artillery in May 1808 had 292 officers and 6,679 men.<sup>287</sup>

	Officers/Men	Horses	Notes
<b>Artillery Staff</b>			
Staff in Segovia	101 / 29		
<b>Four Artillery Regiments (</b>			
1 <sup>st</sup> (Barcelona) Regiment	19 / 1,143	131	Cataluña <sup>288</sup>
2 <sup>nd</sup> (Cartagena) Regiment	25 / 1,146	64	Cataluña <sup>289</sup>
3 <sup>rd</sup> (Seville) Regiment	36 / 1,078	122	Andalucía <sup>290</sup>
4 <sup>th</sup> (Coruna) Regiment	25 / 1,043	-	Galicia <sup>291</sup>
<b>Detachment with Romana's Division of the North</b>			
	10 / 306	-	Galicia
<b>Sixteen Garrison Companies (76 officers and men)</b>			
Algeciras	5 / 136	-	-
Alicante	5 / 113	-	
America	5 / 119	-	
Badajoz	4 / 57	-	
Ciudad Rodrigo	4 / 64	-	
Figueras	5 / 93	-	
Gijon	4 / 64	-	
Malaga	5 / 133	-	
Mallorca	6 / 200	-	
San Lucar de Barrameda	5 / 79	-	
San Sebastian	5 / 134	-	
Santander	4 / 66	-	
Tarragona	5 / 100	-	
Valencia	5 / 116	-	
Vigo	5 / 113	-	
Zaragoza	4 / 67	-	

The Artillery had 675 officers, namely:-

1 *estado mayor* [chief of staff], 12 *subinspectores comandantes de departamento*<sup>292</sup>, 5 *jefes de escuela* [school masters] with the rank of brigadier, 34 *coroneles* [colonels], 48 *tenientes coroneles* [Lt-Col], 5 *sargentos mayores* [majors] 155 *Capitánes* [captains], 199 *tenientes* [1<sup>st</sup> Lts] and 216 *subtenientes* [2<sup>nd</sup> Lts].

*Artilleria a pié* [foot artillery] Company [111 men.]

1 Capitán [captain], 1 *teniente* [1<sup>st</sup> Lt], 1 *subtenientes* [2<sup>nd</sup> Lt], 2 *tambores* [drummers], 1 *sargento primero* [1<sup>st</sup> sergeant], 5 *sargentos segundos* [2<sup>nd</sup> sergeants], 8 *cabos primeros* [corporals], 8 *cabos segundos* [lance corporals], 34 1<sup>st</sup> gunners, 50 2<sup>nd</sup> gunners.

In 1810, the 5<sup>th</sup> Regiment was formed in Majorca. The following year the five regiments were reduced to one battalion. In 1813, another six horse artillery squadrons were formed. In 1814, the five regiments were once again at a strength of two battalions and were once again of 1802 (1<sup>st</sup> Barcelona, 2<sup>nd</sup> Cartagena, 3<sup>rd</sup> Seville, 4<sup>th</sup> Corunna and 5<sup>th</sup> Segovia).<sup>293</sup>

<sup>287</sup> Arteché (1868) 558-559

<sup>288</sup> Included draft of 464 men from the *Provinciales de Soria, Burgos and Logroño*

<sup>289</sup> Included draft of 436 men from the *Provinciales de Ciudad-Real, Alcazar and Chinchilla*

<sup>290</sup> Included draft of 304 men from the *Provinciales de Sevilla and Bujalance*

<sup>291</sup> Included draft of 463 men from the *Provinciales de Santiago, Betanzos and Compostela*.

<sup>292</sup> Departmental Inspectors of 6 generals and 6 brigadiers. [Bueno (1982) 13]

<sup>293</sup> Muzás (2000) 103



## SOJ-4(23) Spanish Horse Artillery

Stephen Summerfield of Loughborough University

The first horse artillery raised by the Spanish Army was in Buenos Aires in 1778 by **Don Vicente María de Maturana y Altemir**<sup>294</sup> using 2-pdr cannon for service against the pampas Indians.

In 1792, now Colonel Don Vicente María de Maturana y Altemir who had returned from his South America service instructed the Seville Foundry to rebore some Gribeauval 4-pdrs to 8-pdr calibre. These were 32kg lighter due to the increased bore. The concept from the mid-18<sup>th</sup> century chambered guns such as the Russian M1757 Unicorn or the Prussian chambered M1754 3- and 6-pdrs. The M1792 Maturana 8-pdr gun-howitzers of 14 calibres were known as *cañón maniobrero de Maturana* [Maturana's mobile cannon] or *cañon aligerado* [lightened cannon]. Colonel Maturana designed the gun carriages and the ammunition limber probably based upon the Prussian M1768 ammunition limber was pulled by four horses.<sup>295</sup> They were among the first of the mid-19<sup>th</sup> century *obuses largos* [shell guns] but suffered from the problem that sometimes the shell-fuse could contact the charge and so explode inside the barrel.<sup>296</sup>

**Table 13: Gribeauval 4- and 8-pdr compared with the Mantura 8-pdr gun-howitzer.<sup>297</sup>**

	Gribeauval 4-pdr cannon	Mantura 8-pdr gun-howitzer <sup>298</sup>	Gribeauval 8-pdr cannon
<b>Calibre</b>	84mm	107mm	106mm
<b>Shot diameter</b>	82mm	104mm	104mm
<b>Windage</b>	2mm	2mm	2mm
<b>Weight of shot</b>	1.8kg	4.0kg	4.0kg
<b>Charge weight</b>	0.6kg	0.6kg	1.3kg
<b>Charge ratio</b>	1:3	1:7	1:3
<b>Total length</b>		160.8cm	
<b>Tube length</b>	146cm (18 cal)	146cm (14 cal)	184cm (18 cal)
<b>Bore length</b>		137.5cm	
<b>Outside diameter</b>		17.2-27cm	
<b>Minimum metal thickness</b>		3.4cm	
<b>Weight</b>	290kg	258kg	580kg
<b>Weight ratio</b>	145:1	65:1	145:1

In 1792, interestingly, two pieces mounted on new gun carriages served at the funeral of Conde de Lacy. This chambered gun-howitzer could fire canister, shot or shell a 4-pdr charge.

These M1778 Maturana 8-pdr gun-howitzers saw service certainly into 1809 when a new horse battery was formed in Seville from guns cast there.<sup>299</sup>

<sup>294</sup> **Vicente María de Maturana y Altemir (1754-1809)** *Teniente Coronel de Infantería, Capitán de Artillería, Caballero de Calatrava* (1787); *Mariscal de Campo* (1801). On 11 December 1808, he replaced Tomas de Morla as *Director General de Artillería*. [Salas (1831) 68]

<sup>295</sup> Salas (1831) 125 & 128; Calvo (2011) 22

<sup>296</sup> Interestingly Henry Joseph Paixhans, a French artillery officer designed a sabot system to prevent this accident from occurring in 1822.

<sup>297</sup> Calvo (2011) 22-23

<sup>298</sup> Madrid (1856) *Catálogo de los objetos que contiene el Real Museo Militar*, Madrid, pp375-376

<sup>299</sup> Salas (1831) 129

An example of a Maturana 8-pdr is Madrid 3366. The muzzle reads “MANIOBRERO DE A 8 P. B. G. M.” named LOYGORRI, right trunnion P. 760 L., second reinforce “COBRE DE RIOTINTO,” the breech it had the Ferdinand VII cipher surrounded by a laurel of palm leaves and surmounted by the royal crown and the base ring had “N. 7224. SEVILLA 31 DE JULIO DE 1809.”<sup>300</sup>

### ***Brigada de Artillería Volanta***

In 1795 Don José de Urrutia (*capitan general* of Catalonia) authorized the GL Don José Austran (*comandante general de Artillería* of Catalonia) to form of a brigade of *Artillería volante* (flying artillery) or *Artillería á caballo* (horse artillery) flying Artillery. However, peace treaty was signed with the French republic so it was not formed.<sup>301</sup> This was the same years as the *Artillerie Volanta* commanded by Colonel Maturana was demonstrated to Carlos IV in Aranjuez.

In 1796, Don Clemente Peñalosa y Zúñiga<sup>302</sup> published “*Memoria sobre la Artillería Volante ó de á caballo*” dedicated to Godoy extolling the virtues of horse artillery. As a result Godoy ordered the creation of the *Brigada de Artillería Volante* from officers and men were drawn from the Royal Artillery Corp. It was attached to the *Real Cuerpo de Guardias de Corps* [Garde du Corps] with.

***Brigada de Artillería Volanta*** had four Gribeauval 4-pdrs and four M1778 Maturana 8-pdr gun-howitzers: 1 *comandante* [Colonel Maturana], 1 captain, 3 lieutenants, 2 sergeants, 1 bugler, 4 corporals and 53 artillerymen.

In 1797 for the war against Portugal, another brigade was formed under the supervision of Don Francisco Vallejo (*comandante general de Artillería*). So for the 1801 war against Portugal, the *Artillerie Volanta* had two Brigades organised as follows.<sup>303</sup>

**Staff:** 1 *comandante* [Mariscal de Campo Maturana], 2 adjutants, 1 Brigade Sergeant, 2 Buglers, and 1 *Mayoral* [commander of the train]

**Each Brigade** of four Gribeauval 4-pdrs and four M1778 Maturana 8-pdr gun-howitzers: 1 Captain, 2 Lieutenants, 2 Sergeants, 4 Corporals, 8 *Artilleros-Postillones* [artillery team drivers], and 38 *Artilleros Volantes* in the First Brigade, and 37 in the Second Brigade.

When peace was signed, both brigades were reduced to half brigades with one in Seville and other one in Segovia. However, they both lacked any horses. It was disbanded in April 1803. The gunners were equipped only with machetes that were later adopted by the artillery in 1802.

### ***Artillería a Caballo***

In 1806, there were six *artillería a caballo* [horse artillery] companies. On 27 October 1808, a brigade of three *artillería a caballo* [horse artillery] batteries were formed from the *Campania de Artillería de Voluntarios de Madrid*, *Compañía de Artilleros Voluntarios Urbanos Naturales de Galicia* and the *Artilleros Voluntarios Distinguidos de Cádiz* that fought at Bailen equipped with 8-pdrs.<sup>304</sup> *Artillería a caballo* [horse artillery] Company [89 men.]

1 *Capitán* [captain], 1 *teniente* [1<sup>st</sup> Lt], 2 *subtenientes* [2<sup>nd</sup> Lt], 1 *trombeta* [trumpeter], 1 *sargento primero* [1<sup>st</sup> sergeant], 3 *sargentos segundos* [2<sup>nd</sup> sergeants], 4 *cabos primeros* [corporals], 4 *cabos segundos* [lance corporals], 30 senior gunners, 42 junior gunners.

In 1809, a horse artillery battery was formed in Seville using rebored Gribeauval 4-pdrs of the Maturana M1778 8-pdr gun-howitzer and served with the Army of La Mancha.<sup>305</sup>

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<sup>300</sup> Madrid (1856) *Catálogo de los objetos que contiene el Real Museo Militar*, Madrid, pp375-376

<sup>301</sup> Salas (1831) 129

<sup>302</sup> Interestingly he was *Arcediano Titular de la Santa Iglesia de Segovia* [Titular Archdeacon of the Holy Church of Segovia] and consulted Colonel Don Vicente María de Maturana y Altemir upon the technical aspects. [Pascual (Dec 2010) 1-2]

<sup>303</sup> Calvo (2011) 23; Salas (1831) 129

<sup>304</sup> Nafziger (1992) 40.

<sup>305</sup> Salas (1831) 129



## SOJ-04(24)

### Spanish Civilian Field Train

Stephen Summerfield of Loughborough University

The main handicap for the artillery was the severe lack of draft animals. This resulted in the Spanish rarely being able to mobilise more than one gun per thousand men where it was common practice to have three or four per thousand. In 1808, the Artillery had only 400 draft horses and would require at least another 3,000 to mobilise the 276 guns. As a result many batteries were reduced to 4 pieces rather than 8 for field artillery or 6 for horse artillery.<sup>306</sup>

The absence of a permanent artillery train forced the Spanish to rely upon the 18<sup>th</sup> century system of hiring drivers and draught animals at the start of each campaign. This was an economical system followed by all European countries until the 1790s. This meant that the drivers did not paid or the horses kept during times of peace or when the army was in winter quarters. However, the collecting of sufficient draft animals in Spain was an exceptionally slow process. This was shown by the mobilisation for war against Portugal.

This system became unworkable when Spain was once again plunged into war. Spanish agriculture relied upon the mule and the ox rather than the horse as in northern Europe. Therefore suitable horses were rare so the civilian contractors were able to charge very high rates for their hire. The drivers were outside military discipline and had a tendency to desert with their animals. The Spanish artillery is characterised by the large numbers of mules that were used by necessity for their field artillery. The heavy ordnance was moved by oxen.

The Spanish army depended upon contractors who provided the horses, mules and wagons driven by civilians or by requisition of mules or oxen and carts from the district. The mule was well suited to the arid climate of Spain. It has the patience, endurance and sure-footedness of the donkey combined with the strength and courage of the horse. A mule can endure heavy weights and are harder than a horse with harder hooves, water resistant coats and a natural resistance to disease and insects.<sup>307</sup>

### *Gribeauval Caisson*

Morla (1792) recommended that each piece should have 180-200 rounds. Therefore the 12-pdrs and howitzers had 3-4 caissons, 8-pdrs had 2-3 caissons and 4-pdrs had 1-2 caissons.<sup>308</sup> Other wagons were also likely to have been pressed into service and these would have been mule drawn.

**Table 14: Munitions carried by the Spanish Gribeauval Caisson.<sup>309</sup>**

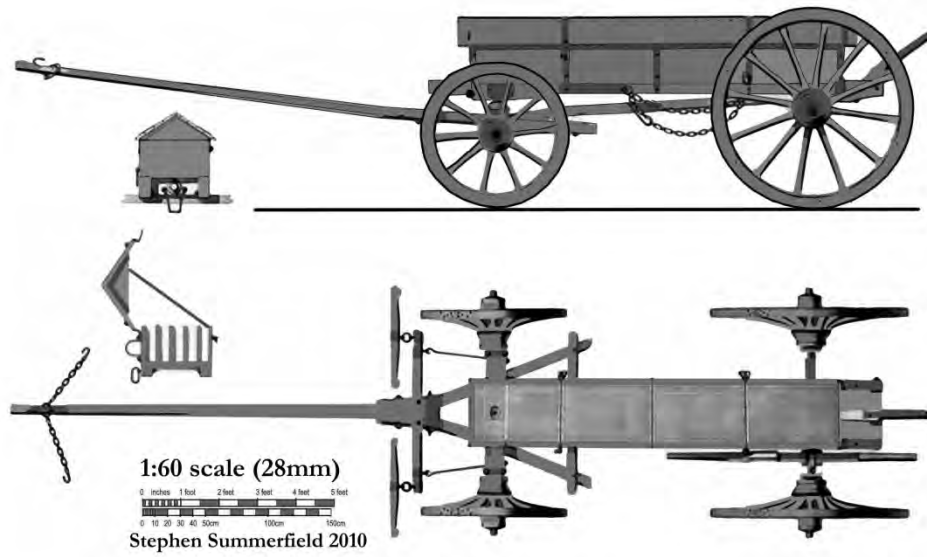
	Gribeauval Caisson	Coffret
12-pdr	49 ball and 16 canister	7 ball and 2 canister
8-pdr	70 ball and 20 canister	12 rounds and 3 canister
4-pdr	102 rounds and 38 canister	14 rounds and 4 canister
Howitzer	23 ball and 7 canister	9 ball and 3 canister
Infantry Caisson	13320 musket cartridges	

<sup>306</sup> Oman (1902) 94

<sup>307</sup> Tennant, R.J. (2010) "Wellington's Horses," *First Empire*, Issue 113, 7-20

<sup>308</sup> Odriozola (1827) 205-208

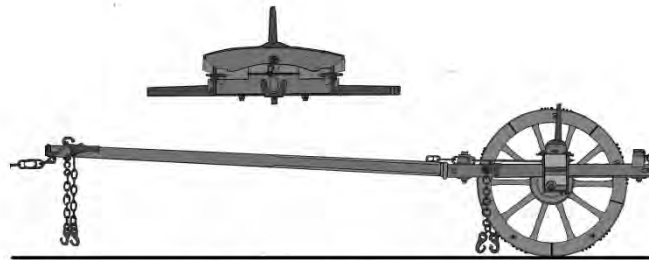
<sup>309</sup> Odriozola (1827) 206



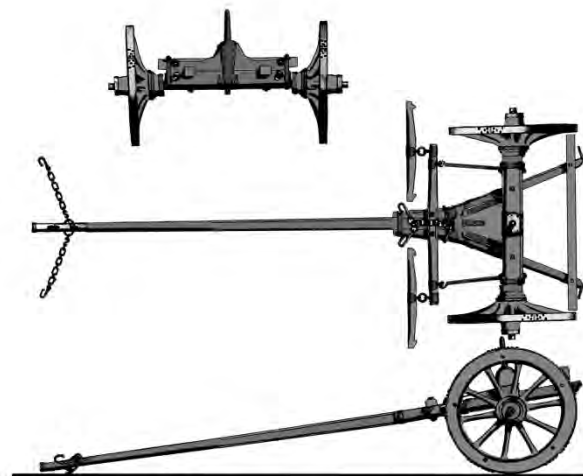
Spanish Gribauval Caisson

***Gribauval Limber***

The 8-pdr Limber was used for the 8-pdr, 12-pdr and 6.4in Howitzer and the 4-pdr limber was used for the 4-pdr only. Each piece had a *coffret* [ammunition box] on the carriage. Each time the gun was unlimber this was removed from the carriage and placed behind the piece or normally on the limber especially when attached by prolong rope.



Spanish Gribauval 8-pdr Limber



Spanish Gribauval 4-pdr Limber



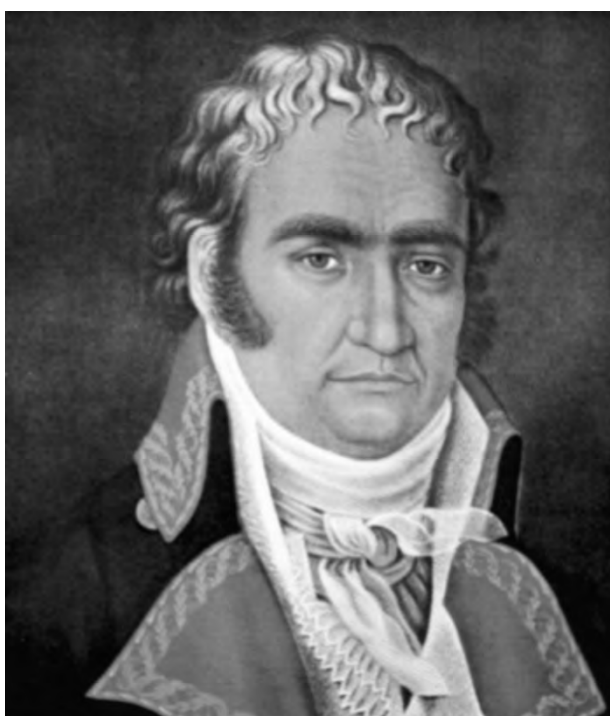


## Tomas de Morla (1747-1812)

Stephen Summerfield of Loughborough University

He was born in Jerez de la Frontera in 1748 to D. Tomás Morla, notary, and Doña María Pacheco y Valle. He studied at Santo Domingo College in Jerez de la Frontera. In 1764, he joined the newly opened School of Artillery in Segovia. In 1765, he was promoted to 2<sup>nd</sup> lieutenant in the Artillery.

In 1780, Lieutenant Tomas de Morla of the artillery participated in the unsuccessful siege of Gibraltar. He commanded the floating battery and later directed the construction of a mine at the foot of the Rock of Gibraltar. He was seriously wounded and when he recovered from his wounds, he was commissioned to



Tomas de Morla (1747-1812)

study visit the various Military Academies in Europe to discover the new advances ballistics and artillery. In 1784, Tomas de Morla (1747-1812) published the first edition of one of the most important textbooks on artillery in four volumes for the Segovia Artillery School that he set up.<sup>310</sup>

In 1792, he became founder at the Barcelona Foundry and this allowed him to put into practice his acquired knowledge. In 1793, hostilities between France and Spain began. Morla became quartermaster general for the army. In 1796, he is chosen as one of the generals tasked in re-organising the army. In 1800, he published three volumes treatise on gunpowder.<sup>311</sup> On 20 September 1800, he was governor of Cadiz and Captain-General of Andalusia. On 14 June 1808, he commanded the shore batteries and gun boats in Cadiz that caused the surrender of the French Squadron of Rear-Admiral Rosily [five ships of the line and a frigate with 4000 seaman] at Cadiz. In December 1808, he travelled to Madrid and despite the patriotic fury realised that defence of

the capital was impossible. He negotiated the surrender of Madrid to Napoleon who received him graciously. As a result, he was branded a traitor and his experience was a great loss to the Spanish cause. In December 1812, he died in Madrid in obscurity.

<sup>310</sup> Tomas de Molar (1784) *Trattado de Artilleria para el uso de la Academia de Caballeros Cadetes del Real Cuerpo de Artilleria*, Volume I-IV, Antonip Espinosa, Segovia. The second edition published posthumously in 1816 was translated by translated by the Saxon Artillery Officer Hoyer (1821-26) as the *Lehrbuch der Artillerie-Wissenschaft* into German. [Sanchez and Belmar (2000) 65]

<sup>311</sup> Tomas de Morla (1800) *Arte de Fabricar la Polvora*, Volume I-III, Impreta Real



## SOJ-4(26) Marines and Naval Artillery

Stephen Summerfield of Loughborough University

In 1779, the Spanish and French navy dominated the Channel for a time during the American War of Independence. At the peace treaty, she regained Minorca and Florida but not Gibraltar that withstood a siege for many years.<sup>312</sup> From 1789-1796, Antonio Valdes as Minster of the Navy authorised extensive shipbuilding. The Navy was divided into three departments of Cadiz, Cartagena and Ferrol each served by an arsenal In 1787, Spain had only 53,147 sailors but needed 89,350 to man its navy fully.<sup>313</sup> In 1792, 63618 sailors to man 216 vessels.<sup>314</sup> In 1798, the navy had increased to 16,420 marines, 64,363 sailors and 20,197 artificers.

Table 15: The Spanish Navy in 1793.<sup>315</sup>

	1793
Ships of the Line (54-112 gun)	70
Frigates (18-42 gun)	46
Corvettes (18-20 gun)	3
Xebecs (14-36 gun)	16
Bylanders (10-20 gun)	13
Brigantines (10-24 gun)	28
Ourques (20-40 gun)	12
Galleys and Galliot (3 gun)	6
Bomb vessels (10 gun)	3
Other boats	17

The four major home bases were Cartagena in the Mediterranean, La Carraca near Cadiz, El Ferrol in the northwest corner of Spain and Guarnizo near Santander on the northern coast. Spain also had major bases in Buenos Aires in South America, Havana in Cuba and Manila in the Philippines. Havana was the best developed naval port outside Europe and built 74 ships of the line in the 18<sup>th</sup> century including the 130 gun *Santísima Trinidad* built in 1769.<sup>316</sup>

From 1796-1802, the Spanish lost 57 ships captured and 19 destroyed in action to the Royal Navy In 1804-1808, the Spanish Navy lost a further 75 ships captured and 29 destroyed in action.<sup>317</sup> The remaining ships were held by the French in their ports including Cadiz. Spain had no navy of her own until 1825 when it started to be revived.<sup>318</sup>

The main fault of the Spanish Navy was the high proportion of soldiers. A Spanish 74-gun ship would have only 360 sailors to 112 marine infantry and 38 marine artillery. This is 30% soldiers to only 20% in the equivalent Royal Navy ship. Their marines were drawn from the infantry.

<sup>312</sup> Lavery (1989) 282

<sup>313</sup> Lavery (1989) 284

<sup>314</sup> In 1792, Cadiz had 17,300 sailors, Cartagena had 26,733 sailors and Ferrol had 19,585 sailors. [Pivka (1980) quoting Bradford (1814) *Sketches of Military Costume in Spain and Portugal*.]

<sup>315</sup> Laborde (1809) IV 482-483

<sup>316</sup> Lavery (1989) 283-284

<sup>317</sup> Von Pivka (1980) 235-238 & 257-261 and Atkins (2005) 295

<sup>318</sup> Lavery (1989) 285

### ***Infantería de Marina [Marine Infantry]***

The Marine Infantry [*Infantería de Marina*] consisted of 12 battalions of 6 companies with a total of 12,096 officers and men in 1798. The staff for each of the three departments composed of two commanders and an inspector with the rank of general plus a senior frigate captain. Each company had 2 captains, a lieutenant, an ensign and 168 men. The officers are taken from the navy.<sup>319</sup> On 2 May 1808, there were only four active battalions.

On 21 November, all 12 battalions were formerly mobilised. On 28 November, the Central Junta [*La Junta Gubernativa Central del Reino*] marine infantry would be henceforth “governed in everything according to the ordinances of other troops” and tactical formations.

### ***Real Cuerpo de Artillería de Marina [Naval Artillery]***

The Naval Artillery had 16 brigades distributed between the three departments [six at Cadiz, four at Cartagena and six at Ferrol.] The staffs at each of these places were composed of a captain-general, senior frigate captain and junior frigate captain. Each brigade had 2 *chefs* (captains), 1 lieutenant, 1 ensign, 24 NCOs, 16 bombardiers, 48 gunners, 64 assistants, 8 probationers and 2 drummers. In 1798, in addition there were 6 captains of fire ships, 8 captains of bomb vessels, 10 lieutenants of fire ships and 8 lieutenants of fire ships giving a total of 96 officers and 2,582 men.<sup>320</sup>

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<sup>319</sup> Laborde (1809) IV 482-483

<sup>320</sup> Laborde (1809) IV: 481=483

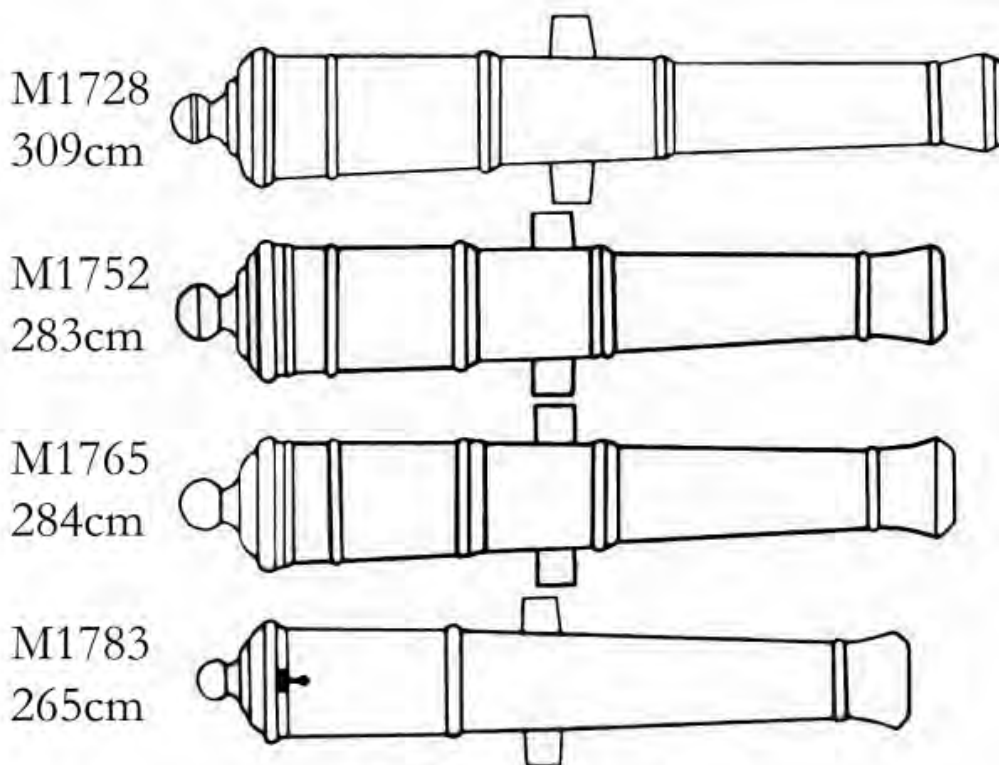


## SOJ-4(27)

### Spanish 18<sup>th</sup> Iron Ordnance

Stephen Summerfield of Loughborough University

The 18<sup>th</sup> century iron ordnance has the appearance of British Ordnance. These had belted cascable and trunnion set low in the British style but more pronounced mouldings. The translation of Muller (1757) *Treatise of Artillery* in the 1760s further influenced the Spanish designs of their iron ordnance.<sup>321</sup> The piece was divided into six parts from the base ring to the muzzle. There was two parts to the first reinforce, one part to the second reinforce and the remaining three remaining parts for the chase whereas the French were divided into 7 parts. This gives the characteristic silhouette for Spanish 18<sup>th</sup> century pieces.<sup>322</sup>



Spanish Iron Long 24-pdrs

From 1743, the calibres of Spanish naval guns were referred to by French *Livre de Paris*. This was confirmed in 1765. On 31 July 1765, Don José Martínez de Espinosa y Tacón, Commander General of Naval Artillery instructed that dimensions should be measured in French *Pied de Paris* or Spanish *Pie de Rey*. On 26 March 1783, Spanish naval artillery were measured in Spanish *Pie de Castile*.<sup>323</sup>

Iron ordnance was used by the Spanish Navy to arm their ships, in coast defence batteries and as garrison pieces for fortresses. **Errazabal** and **Larranaga** made forged iron guns in the second half of the 18<sup>th</sup> century.<sup>324</sup> Coast Artillery Batteries manned by the Naval Artillery used Iron cannon mounted on Naval gun carriages. The trucks were slightly smaller than the

<sup>321</sup> Peterson (1969) 62

<sup>322</sup> Peterson (1969) 60-62

<sup>323</sup> Anon (2010) "La Artillería de Marina entre 1800 y 1826 – Calibre" *Historia y Arqueología Marítima*, <http://www.histarmar.com.ar/InfHistorica/ArtilleriadeMarina/1-Calibre.htm> [Accessed 24 September 2011]

<sup>324</sup> Kennard (1986) 72 and 101

Table 16: Spanish M1783 Long Iron Naval and Garrison Guns.<sup>325</sup>

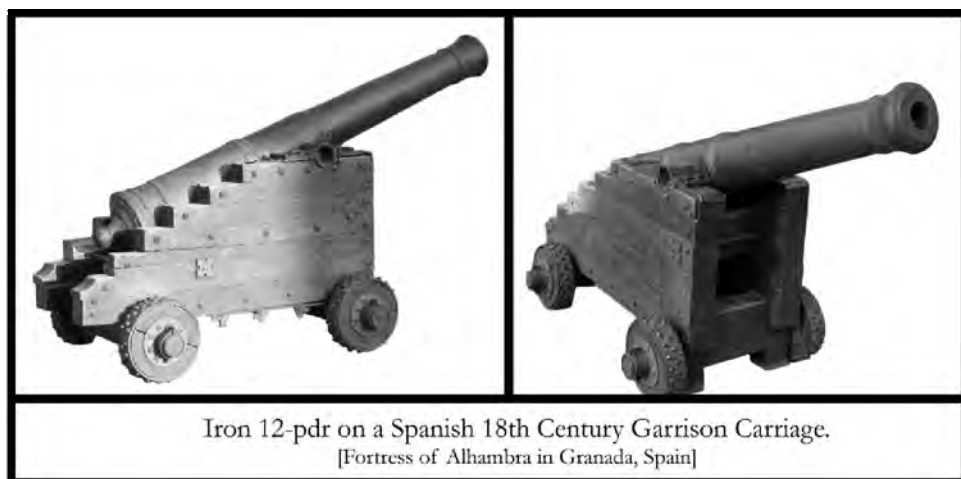
	36-pdr	24-pdr	18-pdr	12-pdr	8-pdr	6-pdr
<b>Calibre</b>	174mm	153mm	140mm	122mm	107mm	95mm
<b>Shot diameter</b>	169mm	148.5mm	136mm	118mm	104mm	91mm
<b>Windage</b>	5mm	4.5mm	4mm	4mm	3mm	4mm
<b>Weight of shot</b>	18kg	12kg	8.0kg	6.0kg	4.0kg	3.0kg
<b>Tube length</b>	265cm 9.5 <i>pies</i> 15.7 cal	265cm 9.5 <i>pies</i> 17.8 cal	251cm 9 <i>pies</i> 18.4 cal	223cm 8 <i>pies</i> 18.9 cal	195cm 7 <i>pies</i> 18.8 cal	184cm 6.6 <i>pies</i> 19.4 cal
<b>Weight</b>	3015kg 6554 <i>libra</i>	2300kg 5000 <i>libra</i>	1950kg 4240 <i>libra</i>	1380kg 3000 <i>libra</i>	989kg 2150 <i>libra</i>	760kg 1652 <i>libra</i>
<b>Weight ratio</b>	167:1	192:1	244:1	230:1	247:1	253:1

The Spanish garrison carriages for inland fortresses were taller than the British and French models with large Maltese Cross plated for the transverse bolt heads. These carriages were left unpainted and treated with turpentine then left to weather naturally.



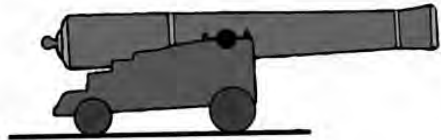
Spanish coast artillery battery c1806.

Notice the characteristic Maltese Cross plates for the transverse carriage bolts.

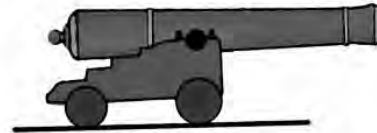


Iron 12-pdr on a Spanish 18th Century Garrison Carriage.  
[Fortress of Alhambra in Granada, Spain]

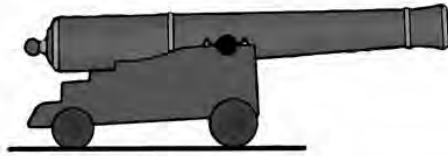
<sup>325</sup> Odriozola (1827) 106 and Adye (1813 rp 2010) 202.



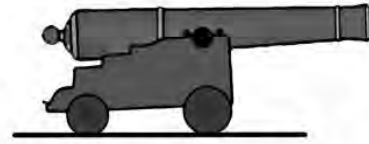
*Long 6-pdr*



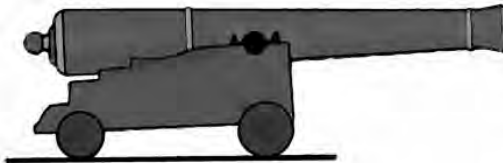
*Short 6-pdr*



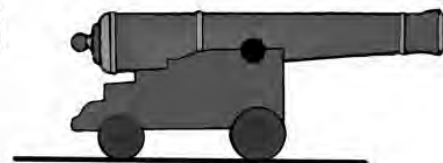
*Long 8-pdr*



*Short 8-pdr*

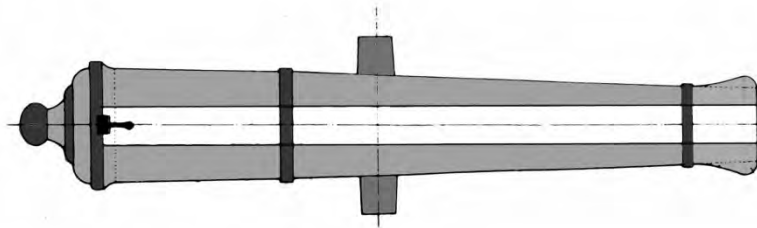


*Long 12-pdr*

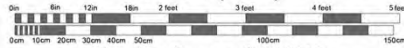


*Short 12-pdr*

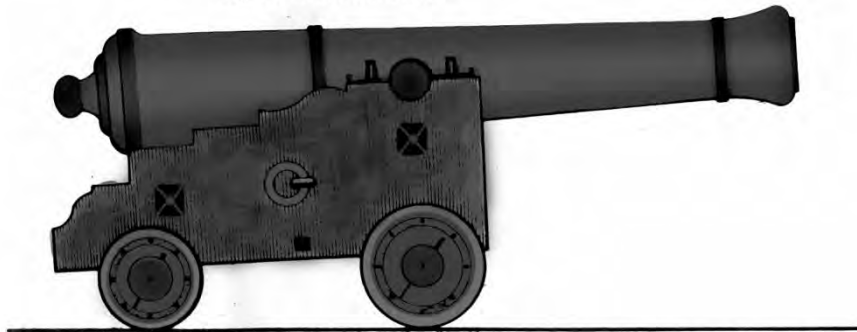
### Spanish M1783 Iron Naval Cannon



1:30 Scale (54mm)



Stephen Summerfield 2012



Spanish Late 18th Century Iron 24-pdr on Naval Carriage