

# The Defences of Macau

Forts, Ships and Weapons over 450 Years

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# INTRODUCTION

## The Arrival of the Portuguese in Asia

News of the Orient and its fabled riches inspired Europeans to explore the possibility of reaching it by ship. Towards the end of the fifteenth century Portuguese sailors rounded the Cape of Good Hope, and in 1510 they established themselves at Goa. The following year they captured Malacca, from where, in 1516, Rafael Perestrello, one of their more adventurous members, took passage on a junk to China. He was able to trade and his trip was so profitable that others were encouraged to follow. The next year a fleet of four Portuguese and four Malay ships set sail for China under Fernão Peres de Andrade. They anchored at Tamão (San Shan) at the mouth of the Pearl River. Andrade was allowed up to Canton (Guangzhou), the commercial port of South China, and the first steps of Sino-European maritime trade were made.

Establishing good relations with China was not a smooth process and there were setbacks. In 1520 the envoy Tomé Pires went to Peking (Beijing) but was treated with suspicion, and when the emperor died the embassy was sent back to Canton and relations broke down. Another embassy was sent in 1522 but they were met with force and few survived. Such incidents were fortunately rare and generally the Portuguese were able to face up to any threats of force.

Operating far from their home country, Portuguese ships relied on superior firepower to offset superior numbers. The king instructed the Portuguese fleet that sailed for the Indian Ocean in 1500: “You are not to come to close quarters with them if you can avoid it, but only with your artillery are you to compel them to strike sail . . . so that this war may be waged with greater safety, and so that less loss may result to the people of your ships.”<sup>1</sup> The ships that defeated the fleet of Calicut in 1501 were well armed:

Each of the caravels carried thirty men, and four heavy guns below, and above six falconets, and ten swivel-guns placed on the quarter deck and in the bows, and two of the falconets fired astern; the ships carried six guns below on the deck, and two smaller ones on the poop, and eight falconets above and several swivel-guns, and before the mast two smaller pieces which fired forwards; the ships of burden were much more equipped with artillery.<sup>2</sup>

The Portuguese may have had superiority at sea, but they came to realise that they could not establish a stronghold in China by force of arms, as they had done in India — the Chinese Empire was far too powerful. They had to rely on persuasion and diplomacy rather than conflict. It is a mark of their success that eventually the Chinese accepted their presence. Just why they did so is still a topic of debate today.

Some studies suggest that the Chinese respected the power of the Portuguese guns and decided that, rather than oppose them, they could use them to clear the pirates that were a menace in the coastal areas.<sup>3</sup> However, the pirates had been around for a long time and the Chinese appeared to tolerate them as they had the potential to destroy them if they wanted to. Indeed one of the Portuguese vessels, which was part of the 1522 mission, was blown up when a shot from a Chinese cannon hit a powder keg, and another was boarded and captured. In any event, the pirates continued to operate in the area despite the Portuguese.

Another more likely reason for accepting the Portuguese was trade. The Portuguese had also made contact with the Japanese, landing at the island of Tanegashima in 1543. At that time there was a hiatus in the trade between China and Japan and official contacts had been severed. Such trading as existed was controlled by pirates and, as this avoided customs duties, the authorities did not benefit. The balances between supply and demand in international trade are always complex, but there is no doubt that Japan was an important source of silver for the Chinese and they must have felt the effects of the breakdown.

The Portuguese provided a way around the problem, and as they were only arriving in small numbers they were not seen as a major threat to security. The Portuguese ships were powerful enough to repel any attacks by pirates and they were able to exploit the situation and set up a three-way trading system. They brought silver, ivory and wine to China and exchanged it for gold, raw silk, brocades etc. These they shipped to Japan where they traded them for silver and other products, which they took back to Goa. The round trip would generate profits for the Portuguese of at least 100 percent, and the Japanese and Chinese got the goods they wanted. The Chinese authorities collected customs dues so everyone was happy. It has also been suggested that the Portuguese supply of ambergris, an excretion of the sperm whale, was of significance.<sup>4</sup> Ambergris is a true aphrodisiac and was also used in medicines and as such was a product much desired by the emperor.

The Portuguese brought another commodity to the Far East — Christianity. Part of Portugal's mission was to convert the Chinese to Christianity and Macau was the ideal foothold from which to further this aim. The particular sect that was entrusted with this task was the Society of Jesus, or the Jesuits, a unique order whose members were highly educated. They adopted the strategy of offering learning to ingratiate themselves to their hosts. In China the subjects that were of most interest were cartography, mathematics, astronomy and artillery. Although the Chinese may not have welcomed a new religion, the court was receptive to these arts, particularly

the Jesuits' knowledge relating to the calendar. The Chinese are inclined to deny this as they feel that admitting that they needed anything from outsiders is demeaning. However, the knowledge gained helped to bolster the power of the emperor.

Although some Jesuits, most notably Matteo Ricci, Adam Schall, Ferdinand Verbiest, Antoine Thomas and Tomás Pereira, were very successful in ingratiating themselves with the senior Chinese Mandarins as well as the emperor himself, this was not the total extent of their mission. They also had a network of missionaries preaching to the lower classes and the fact that they were able to operate without severe prosecution was because of those in favour at court. Nevertheless the number of converts was probably fairly low.

## Firearms

Apart from the Jesuits' work on the calendar, another aspect of practical knowledge that is well known is the development of firearms. Much has been said about the fact that the Portuguese had advanced weapons and that this was a major factor in their being allowed to establish Macau. It is therefore worth considering the state of firearm development at the time.

Although the Chinese had invented gunpowder and cannon, they had not developed firearms at the same pace as the Europeans.<sup>5</sup> Kenneth Chase puts forward a theory that this was because of the differing circumstances in the two regions.<sup>6</sup> He argues that after China had been united under the Ming there was less incentive to continue firearm development, as their main enemies were the mounted nomadic tribes of the north and the primitive weapons then available were of little use against fast-moving cavalry. In Europe the settled nature of the various states meant that warfare was conducted against fortified towns or between armies composed largely of infantry. Cannon were of great use for battering down walls or killing static troops, hence the European states vied with each other to develop better arms.

Gunpowder and cannon arrived in Europe at the start of the fourteenth century and the use of artillery soon became commonplace in both battles and sieges. Thus, although it was the Chinese who discovered gunpowder and invented firearms, it was the Europeans who refined them, so that by the sixteenth century they were more advanced. As was shown by the 1522 incident, the Chinese did have cannon, but they were grateful for advice from the Jesuits in how to proportion them to fire better and how to aim them. These skills had become important to the emperor, as artillery was becoming useful in dealing with the rebel groups that had sprung up.

Apart from artillery, Europeans also developed handguns. Initially the Chinese models were copied. These are now referred to as "hand cannon", which were like miniature cannon mounted on a pole and ignited with a burning cord termed a match.<sup>7</sup> Later in the fifteenth century a mechanism was developed in Europe that held the match clamped in an arm that descended into the priming pan when a lever

or trigger was pulled. This is the “matchlock” which was used on handguns up until the end of the sixteenth century, and beyond in some countries. Indeed China was one country still using matchlocks in the middle of the nineteenth century.<sup>8</sup>

When the Portuguese arrived in China they were armed with matchlocks. These were new to the Chinese and, no doubt recognising the effectiveness of them, they were keen to obtain the technology for their own use. Although the handguns were powerful weapons, they were not too serious a threat as they were still fairly primitive. The Chinese could call on such greater numbers of troops that the Portuguese would have had no chance in a pitched battle.

The advent of firearms appears to have been totally new to the Japanese. Although they were possibly aware of China’s weapons they had never seen anything like the cannon and matchlock muskets of the Portuguese. It is a mark of their novelty that the Japanese matchlock is still referred to as “Tanegashima” after the island where the Portuguese landed. The Japanese craftsmen were soon set to work making matchlocks and they evolved a style of their own. Strangely they never developed other types of firearms and, having closed their doors to the outside world early in the seventeenth century, they continued to make and use matchlock firearms right up until Admiral Perry arrived in 1853. By that time the rest of the world had moved on and matchlocks were relics of the past.<sup>9</sup>

## Settlement at Macau

Clearly the Portuguese had much that was of interest to the Chinese and it is not possible to determine what specifically swung the balance and persuaded them to tolerate their presence. However they were not given free rein. The Chinese were no doubt aware of how the Portuguese had colonised India and other places and were wary of giving them too much freedom of access in their own territory. They also wanted to limit the influence of these newcomers on their own population, and confining them to one place made good sense. The relationship did not always proceed smoothly and there were setbacks but the Portuguese were finally allowed to settle in Macau in 1557.<sup>10</sup> The tiny peninsula was an ideal place as it was close to the trading areas of South China (Canton, present day Guangzhou, had been a trading port for many years) but remote enough to keep the Portuguese away from the majority of the Chinese population.

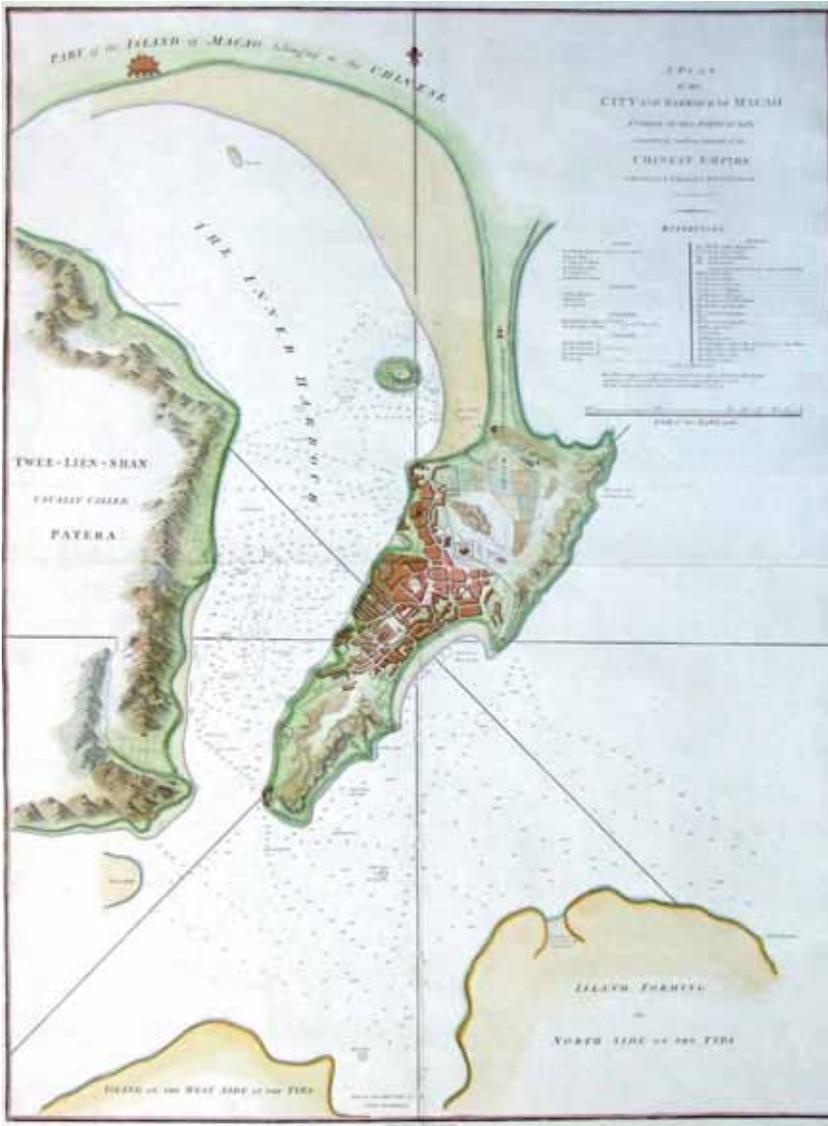
The Portuguese were to claim that Macau had been ceded to them in perpetuity, but the legal basis for the settlement is lost in the mist of time. Certainly there is no direct evidence that the Chinese ceded sovereignty and they did in some ways dictate what happened there. However, they allowed the Portuguese to remain and at no time made any serious effort to expel them. For their part the Portuguese paid ground rent and tried to placate the Mandarins as much as possible. Thus was born an at times uneasy relationship that lasted for nearly four and a half centuries until the territory was handed back to China in 1999.

## A Description of Macau

The territory of Macau is situated at the mouth of the Pearl River on the southwestern approaches. Macau is shown in relation to Guangzhou (Canton) and Hong Kong in *Figure 1*. Macau was almost an island being connected to the main delta region by a narrow strip of land that at extremes of tide could be flooded. The map of the territory dating from 1796, when there had been virtually no reclamation, indicates the original land area (*Figure 2*).<sup>11</sup>



(above)  
*Figure 1. Map of the Pearl River Delta showing Macau in relation to Hong Kong and Canton (Guangzhou).*



(below)  
*Figure 2. Map of Macau. Published 12 April 1796 by George Nicol.*

A description of the City of the Name of God in China, by António Bocarro, chronicler-in-chief of the State of India says:<sup>12</sup>

The peninsula is about a league round and four hundred paces across at its broadest part. The city is about half a league round, measuring fifty paces at its narrowest extremity and three hundred and fifty at its broadest, being washed by two seas on the east and west. It is one of the noblest cities in the East, on account of its rich and noble traffic in all kinds of wealth to all parts; it has all kinds of precious things in great abundance, and more and wealthier citizens than any other in this State.

This description of Macau dates from 1635 and shows that the layout would have been similar to that shown in eighteenth-century maps with the city occupying the central area. The hills on either side were steep and not suitable for urban development. The countryside to the north was occupied by villages and farms which no doubt provided much of the provisions needed to feed the inhabitants.

The southeastern coast is exposed to the sea and consists of a large bay, the Praya Grande, and a shore fronted by hills. The wealthier and more respectable citizens built mansions along the Praya Grande and it was here that the large trading companies built premises. The sweep of the bay provided a very attractive scene and many paintings of it were done to take back to Europe to show what Macau was like. One such painting dating from about 1873 is shown in *Figure 3*. As can be seen, the land behind the Praya Grande is relatively low-lying and was most suitable for the establishment of the first settlement. To the right of the bay the slopes of Guia Hill fall steeply to the sea. They were barren and unsuitable for building. Cacilhas Bay,

*Figure 3. Typical  
China trade painting  
of the Praya Grande ca.  
1873.*





*Figure 4. China trade painting of the Praya Pequena (Inner Harbour) ca. 1830.*

further north, was another low lying stretch but this was next to the countryside and remote from the main town. The Portuguese did not disturb the countryside until the nineteenth century, and when they did start to develop it the Chinese were quick to object.

The width of the territory behind the Praya Grande is only about 400 metres and the settlement spread right across to the northwestern shore. This shore faces the island of Lapa and the inlet between Macau and Lapa provides a sheltered harbour that is known as the Inner Harbour.<sup>13</sup> The small island in the Inner Harbour is called Green Island or Ilha Verde, and it is part of Macau. A painting of this side dating from about 1830 is shown in *Figure 4*. The harbour front was called the Praya Pequena, and it was along here that the docks developed with all their attendant services such as warehouses, stores and entertainment establishments. The dockside bustle meant that it developed into the Chinese area of the city contrasting with the more sedate environment of the Praya Grande.

In the south of the peninsula is a hill, again with rough slopes that went down to the sea. On the side of the Inner Harbour the last accessible point was the A Ma Temple and this can be seen on the extreme right of *Figure 4*. The Portuguese extended the access and built a battery to defend the entrance. Although *Figure*

4 shows what appear to be large ships in the Inner Harbour, the shallow depth of water prevented the bigger ships from entering. Indeed the Portuguese partly filled the entrance so that access was more easily controlled and enemies such as the Dutch were kept out. In the north, just outside the city wall, was the village of Patane, which at that time was not considered to be part of the city. The Inner Harbour was busy with the traffic of Chinese junks that brought merchandise to the territory and ferried goods from the larger ships moored offshore. Even today, when the fishing is stopped to allow stocks to replenish, the harbour is filled with fishing junks.

Religious buildings were another feature of Macau. The Jesuits, who arrived first, played a major role in the running of the city, and their seminary, built on the side of the Monte Hill, was a large complex dominating the centre of the town. It included the church of São Paulo that remains only as a façade, the main part having been destroyed by fire. Other orders, such as the Dominicans, Franciscans and the Augustinians arrived later and established monasteries and convents and built churches.<sup>14</sup> Today many of the landmarks of Macau are these churches, and they stand testimony to the religious zeal of the early settlers.

Another religious feature of Macau is the “hermitages”.<sup>15</sup> This term was used for a number of establishments that were for the worship of particular saints. The most prominent is that on Penha Hill which was established as a shrine for Nossa Senhora da Penha de França, the protectress of navigators. Later this expanded to become a complex including a church and the bishop’s residence. In contrast the hermitage of Nossa Senhora da Guia remains as a small chapel within the Guia Fort. Most forts had such chapels as a comfort to their defenders and that at the Barra Fort dedicated to São Tiago, the patron saint of the army, is another that has survived.

By the middle of the seventeenth century the city of Macau had developed into the basic form that was to remain little changed until the late nineteenth century. Its heart spanned between the Praya Grande and the Inner Harbour and it was confined by the defensive walls and the rugged hills on either side. The walls and the forts are early features and they are the subject of the next chapter.

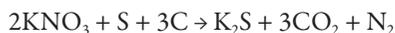
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## APPENDIX II

# GUNPOWDER PRODUCTION

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It is now generally accepted that the Chinese were the first to appreciate that a mixture of saltpetre, sulphur and charcoal produced a powder that burnt with unusual ferocity. Most substances burn by using the oxygen in the air to combine with fuel such as wood or coal in a process that is slow, as the supply of oxygen is relatively sparse. Saltpetre, or to give it its chemical name, potassium nitrate, provides a copious supply of oxygen. Ignition of gunpowder by the application of heat initially sets fire to the sulphur, which in turn sets fire to the charcoal. The whole process takes place very rapidly. The chemical reaction converts the ingredients to potassium sulphide, carbon dioxide gas and nitrogen gas.



The reaction converts a small volume of solids into a large volume of gas. It does this very quickly so that the expansion of the gas has an explosive nature.

The speed of the reaction is dependent on the proportions of the ingredients. The early Chinese mixtures probably used quite small proportions of saltpetre and consequently they would have burnt quite slowly. This would explain how its use first developed as a fire lance, with the powder taking five minutes or so to burn. Also as the combustion was not very explosive there was little danger to the soldier holding the fire lance. By the early sixteenth century the proportion of saltpetre had risen to about 50 percent and this gave gunpowder enough power to fire projectiles. By the time Macau was established the proportion used in Europe had risen to about 66 percent. The optimum proportions to give a powerful explosion are 75 percent saltpetre, 15 percent charcoal and 10 percent sulphur.

A problem with early gunpowder was its durability. The ingredients are ground to a powder and manually mixed, but when the powder is transported or just left in store there is a tendency for the ingredients to separate and the powder becomes spoilt. Another problem is dampness and that is exacerbated by the fact that charcoal tends to attract water. When the moisture content of gunpowder rises above about one percent, it begins to lose its explosive power. One solution that was sometimes used was to transport the ingredients separately and just incorporate, or mix, them when needed. However, the solution that solved most of the problem was paradoxically moisture.

It was found that adding a little liquid, while incorporating, meant that the fine powder was made into a paste that could be formed into pellets, which when dried presented a smaller surface area to the air and kept the ingredients together. This “corned” powder was also found to be more powerful and some estimated it was 30 percent or more stronger. The size of the granules could be varied and the larger sizes were used for cannon with the smaller grains being for muskets and priming. This development took place in Europe in the late fifteenth century and with only minor improvements remained standard for the next three hundred years.

In China there seems to have been less incentive to develop better powders. The reasons for this are not clear, but there was less need as most of China’s wars were fought either against internal rebels or against neighbours whose firearms were quite rudimentary. They must have been aware of the qualities of the European powders from their meetings with the Portuguese and other traders. However, it appears that the secrets of production were not passed on or the Chinese disdained to take notice. When Lord Macartney made his embassy to the Emperor Ch’ien-lung in 1793–1794 he was accompanied by Dr. Gillan who observed:<sup>1</sup>

There is no particular manufactory for making gunpowder in any part of the Empire. They have but few fire-arms and trust more to their sabres and bows and arrows than to their muskets, of which they seem not to understand well the advantages or management. They have, however, among their troops a few companies of soldiers armed with muskets; of these every soldier makes his own powder. There seems to be no general rule for the proportions of the ingredients, which are saltpetre, sulphur and charcoal, as in Europe. Their charcoal is very ill prepared and they have no choice in the kind of wood from which they prepare it. The most general proportions are two parts of nitre to one part of roll sulphur and one part of charcoal, so that 100 lb. weight of Chinese powder would consist of the following ingredients and proportions:

Nitre	50 lb.
Roll Sulphur	25 lb.
Charcoal	<u>25 lb.</u>
Total	100 lb.

It is easy to be conceived, however, that in a country where there is no particular manufactory or established proportions, but where every individual makes his own, the rates of ingredients will vary a good deal in different places. The nitre, sulphur and charcoal, when reduced separately to fine powder, are thrown into wooden vessels, then moistened with a little water and afterwards mixed as intimately as possible by continued trituration with wooden rods or pestles. After the mixture is completed it is taken out of the troughs and dried in the sun. They never granulate it as we do in Europe, but use it in the form of fine powder or black dust, such as it comes out of the trough, and is dried by the sunbeams, although the specimens I saw of it were sensibly

moist and in general very ill prepared. When they use it they first put the charge into the piece, and then ram it down with moist earth or sand; they then rest the piece on the ground by means of a fork attached to it and prime it; they have a long projecting match from, and sometimes a train of powder communicating with, the touch-hole. They set fire to this match or train and then run off to a little distance, till the discharge takes place. The report is not near so loud as an equal quantity of European gunpowder would give, and the smoke is extremely thick and black, as might be expected from so large a proportion of charcoal and sulphur.

As can be seen, the proportion of saltpetre (nitre) is less than the optimum and the powder was not corned (granulated), hence it is not surprising that the report was not as loud. Cardwell, reporting about armed junks in the 1930s, notes that they used coarse native powder.<sup>2</sup> No doubt that also was not as strong as Western military powders.

In Macau there are some references to there being a powder mill in the same area as the cannon foundry but there is little detail about its production. Avalo states that<sup>3</sup> “About half a musket shot from there (Penha Fort) stands a powder mill, where they make gunpowder.”<sup>4</sup> Also Boccaro reports in relation to the Monte Fort that “Storehouses for munitions are hollowed out of the wall, there being sufficient supplies for any campaign but not for a protracted siege of over two years, on account of the vast quantity of gunpowder consumed by this heavy artillery; albeit there are many materials available locally for the making thereof, which is in progress.”<sup>5</sup>

The location of the mill being close to the gun foundry would not have been ideal for such a dangerous operation. The mill must have been quite small and reliant on hand methods, as if they were like the normal European mills, which were quite large undertakings, they would have been remarked upon by more observers. For similar reasons it is unlikely that it would have been in operation for long. Certainly the Portuguese generally imported their powder and as early as 1717 Macau asked for gunpowder to be sent from Goa where there was a major gunpowder mill that continued to supply Macau for many years.

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# NOTES

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## CHAPTER 1

- 1 Geoffrey Parker, *The Dreadnought Revolution of Tudor England*, *The Mariner's Mirror* 82, 1996, p. 276.
- 2 Gaspar Correa, *The Three Voyages of Vasco da Gama and His Viceroyalty*, translated by Henry E. J. Stanley, Burt Franklin, New York, 1963 (1869), p. 367.
- 3 Jin Guo Ping and Wu Zhiliang, *The Chinese Imperial Court and the Origins of Macao*, Macau No. 14/2003 and No. 15/2003.
- 4 Jin Guo Ping and Wu Zhilang, *The Chinese Imperial Court*, report instances of the trade and Fei Chengkang, *Macao 400 Years*, The Publishing House of Shanghai Academy of Social Sciences, 1996, reports that the dramatist Tang Xianzu ridiculed the Ming government for spending huge sums of money on ambergris.
- 5 According to Joseph Needham, in *Gunpowder as the Fourth Power, East and West*, Hong Kong University Press, Hong Kong, 1985, the Chinese were the first to discover the mixture of sulphur, saltpetre and charcoal that makes gunpowder. They did this around 850 A.D. and gradually developed weapons to make use of it. The first were probably simple bombs and grenades although fire-lances were also an early invention with one being illustrated on a Buddhist banner in around 950 A.D. The fire-lance was not a gun as it did not expel a projectile but merely sent out fire in much the same way as a fire-thrower. Gradually it was realised that the fire-lance could send out particles and that if the projectile filled the bore it would be propelled with great force. Thus the gun or cannon was developed. This happened around 1280 and the idea spread to Europe about 1310.
- 6 Kenneth Chase, *Firearms: A Global History to 1700*, Cambridge University Press, Cambridge, 2003.
- 7 In practice the “match” was a cord impregnated with saltpetre so that it burnt evenly without going out.
- 8 There are many reports relating to the First Opium War that indicate the use of matchlocks by the Chinese.
- 9 See Chapter 10 for a description of small arms development.
- 10 The name of the city is potentially confusing. In 1583 the Portuguese gave it the names “Porto de nome de Deos” and “Porto de Amacao”. Later it was called “Cidade do nome de Deos do porto de Macao” and then “Cidade do santo nome de Deos de Macao”. The Chinese called the port Gaou-mun and the city Gaou-king. Auo-mun is the local pronunciation of Gauo-mun and is still used today. It has been suggested that the term “Macao” was a Westernisation of “A Ma”, the name of the temple situated at the mouth of the Inner Harbour.
- 11 This map was published 12 April 1796 by George Nicol.
- 12 *Descrição de Macau, em 1635 por António Bocarro*. Manuscript titled *Book of the Plans of all the Fortresses, Cities and Towns of East India, with description of the altitude they are in, and of all they contain; Artillery, Garrison, men-at-arms, and vassals; income and expenditure; anchorage and shoals of their roadsteads; Kings of their hinterland, and power thereof; the state of peace or war they keep; and everything which is subject to the Crown of Spain. Dedicated to the Most Serene Majesty King Philip IV of the Spain, and III of Portugal, our King and Lord*. A translation is included in Major C. R. Boxer, *Macao Three Hundred Years Ago*, Macau, Imprensa Nacional, 1942.

- 13 Lapa or Lappa Island is also referred to as Priests Island. This is because an area was granted to the Jesuits in 1644 as a burial place for Father João Rodrigues, who had provided good services to the emperor, and other orders later acquired land there.
- 14 It is somewhat confusing that the Portuguese use the same word for monastery as for convent and it is usually translated as “convent”. In fact there was only one establishment for females, the convent of Santa Clara; the rest were for males.
- 15 The term “hermitage” is a translation of the Portuguese word *ermida*. It is slightly confusing as a hermitage is usually taken to mean the abode of a hermit, whereas in Macau terms it is used to denote a shrine or a chapel to a particular saint to which people go to give thanks.

## CHAPTER 2

- 1 C. R. Boxer, *Portuguese Society in the Tropics, The Municipal Councils of Goa, Macao, Babia and Luanda 1510–1800*, The University of Wisconsin Press, Madison and Milwaukee, 1965, p. 43.
- 2 Pinhal is probably a foreign pronunciation for Ping-hae, sometimes called Harlem Bay. It is on the South China coast a short distance from Canton.
- 3 Matelieff’s report of 1607 is noted by Anders Ljungstedt, *An Historical Sketch of the Portuguese Settlements in China and of the Roman Catholic Church and Mission in China & Description of the City of Canton*, Boston, 1836, republished Viking Hong Kong Publications, 1992, p. 18.
- 4 These instructions are quoted in C. R. Boxer, *Fidalgos in the Far East 1550–1770 Fact and Fancy in the History of Macao*, The Hague, 1948, Chapter V.
- 5 *Diary of Richard Cocks, Cape-Merchant in the English Factory in Japan 1615–1622*, edited by Edward Maunde Thompson, printed for the Hakluyt Society, London, 1883, p. 327.
- 6 Fei Chengkang, *Macau 400 Year*, The Publishing House of Shanghai Academy of Social Sciences, 1996.
- 7 Monte is the name given to the central hill in Macau. The Jesuit seminary and its church were dedicated to St. Paul and the fort was originally named the Fortress of São Paulo do Monte. Today the fort is simply called the Monte Fort.
- 8 Some authors use the spelling Reyerszoon.
- 9 For a full description see C. R. Boxer, *Fidalgos in the Far East*, Chapter V.
- 10 Bulwark is a translation of the Portuguese term that is often used to describe the smaller fortifications. They were in effect small forts with platforms for mounting cannon with protective parapets.
- 11 Anders Ljungstedt, *An Historical Sketch*, p. 59.
- 12 *Diary of Richard Cocks*, p. 332.
- 13 The inscription on the monument states that it was erected in 1864 but there must have been some delay in completing it as it was not completed until 1871.
- 14 *Descrição de Macau, em 1638 por Marco D’Avalo*, printed in 1645 in the Dutch collection of voyages and travels *Begin ende Voortganch van de Vereenighde Nederlantsche geochtrouyeerde Oost-Indische Compagnie*, Amsterdam, 1645, 2 vols. A translation is included in Major C. R. Boxer, *Macau Three Hundred Years Ago*, Macau, Imprensa Nacional, 1942.
- 15 *Ibid.*, p. 90.
- 16 For a full description see C. R. Boxer, *Fidalgos in the Far East*, Chapter VI.
- 17 *Descrição de Macau, em 1635 por António Bocarro*. Manuscript titled *Book of the Plans of all the Fortresses, Cities and Towns of East India, with description of the altitude they are in, and of all they contain; Artillery, Garrison, men-at-arms, and vassals; income and expenditure; anchorage and shoals of their roadsteads; Kings of their hinterland, and power thereof; the state of peace or war they keep; and everything which is subject to the Crown of Spain. Dedicated to the Most Serene Majesty King Philip IV of the Spain, and III of Portugal, our King and Lord*. A translation is included in Major C. R. Boxer, *Macau Three Hundred Years Ago*.
- 18 “Lapa” is also spelt “Lappa” in some sources.

- 19 C. A. Montalto de Jesus, *Historic Macao, International Traits in China Old and New*, 2nd Edition, Macao, 1926, p. 41.
- 20 *Descrição de Macau, em 1637 por Peter Mundy*, journal printed in *The Travels of Peter Mundy (1608–1667)*, 5 vols., London, 1907–1936, Vol. III, pp. 159–316. Reproduced in Major C. R. Boxer, *Macao Three Hundred Years Ago*.
- 21 C. A. Montalto de Jesus, *Historic Macao*, p. 41.
- 22 William Hunter, *Bits of Old China*, Kelly & Walsh Ltd., Kong Kong, 1911.
- 23 Emperor Wan Lee of the Ming dynasty.
- 24 A Ming period gate still exists at the old Nantou Fort in the Shenzhen Special Economic Zone just north of Hong Kong. The Macau border gate was probably of similar design.
- 25 The present location of the painting is unknown and this copy is taken from an illustration in the *Ta-Ssi-Yang-Kuo*, Lisboa, 1899–1901, Vol. 1, p. 177.
- 26 Macau waters at the time were a good source of oysters and many oyster shells were burnt for the lime.
- 27 Manuel A. Ribeiro Rodrigues, *400 Years of Organisation and Military Uniforms in Macau*, Instituto Cultural de Macau, 1999. A list of Bocarro's equipment is given on p. 188 and it includes that required for the manufacture of gunpowder as well as for preparing cartridges for cannon and muskets.
- 28 *A Narrative of the Journey made at his Majesty's orders by Antonio Fialho Ferreira from this Kingdom to the City of Macao in China: and of the most joyful proclamation of H. M. The King Our Lord Dom Joao IV whom God preserve in the said City and southern parts*, Lisboa, Na Officina de Domingos Lopes Rosa, Anno de 1643.
- 29 The cannon is preserved in the White Tower, Tower of London. At one time it bore a plaque stating that it had been CAPTURED IN CHINA A.D.1841. The plaque has now been removed.
- 30 The forts were Monte, Guia, São Tiago and São Francisco and the bulwarks were Penha, Bom Parto, São Jerónimo, São João and São Pedro.

### CHAPTER 3

- 1 For a description of Chinese building techniques see Ronald G. Knapp, *The Chinese House*, Oxford University Press, Hong Kong, 1990.
- 2 Chunam was until recently used in Hong Kong as a coating on slopes to resist erosion. The Public Works Department, Civil Engineering Office and Highways Office's General Specification for Civil Engineering Works, 1977 Edition, gives the following details:
- 6.28 Chunam Surfacing
- (a) Chunam for surfacing shall be composed of one part of cement, three parts of hydrated lime and twenty parts of approved non-organic soil by weight. The materials shall be well-mixed, well compacted, sprinkled with water and finished to a uniform final surface.
- 3 H. A. Dias de Carvalho, *Memoria dos trabalhos que se emprenderam para edificação do Hospital Militar do São Januário*, Typographia Mercantil, Macau, 1873, p. 2.
- 4 *The Diary of Henry Townsend of Elmley Lovett*, ed. J. W. Willis Bundi, Worchestshire Historical Society, London, 1920, p. 134.
- 5 A section of wall has been preserved and can be seen at the entrance to the Macau Museum.
- 6 The sphere and the cross are the symbols of the monarchy.
- 7 *Descrição de Macau, em 1635 por António Bocarro*. Manuscript titled *Book of the Plans of all the Fortresses, Cities and Towns of East India, with description of the altitude they are in, and of all they contain; Artillery, Garrison, men-at-arms, and vassals; income and expenditure; anchorage and shoals of their roadsteads; Kings of their hinterland, and power thereof; the state of peace or war they keep; and everything which is subject to the Crown of Spain. Dedicated to the Most Serene Majesty King Philip IV of the Spain, and III of Portugal, our King and Lord*. A translation is included in Major C. R. Boxer, *Macao Three Hundred Years Ago*.

- 8 An interesting indication that it was originally built, at least in part, by the Jesuits, and connected with their Collegial Church of Madre de Deus.
- 9 Printed in 1645 in the Dutch collection of voyages and travels *Begin ende Voortgangh van de Vereenighde Nederlantsche geochtroyeerde Oost-Indische Compagnie* (Amsterdam, 1645. 2 vols). A translation is included in Major C. R. Boxer, *Macau Three Hundred Years Ago*.
- 10 *Sic.* for Dom Francisco Mascarenhas.
- 11 Thirty-four guns firing shot weighing 24 lbs. in the Van Dam Mss (p. 665).
- 12 A plan included in the report of 24/12/1775 by Lieutenant Carlos Julião shows a layout that is closer to being a square; however, it is unlikely that changes of any significance would have been made after that date and it must be assumed that it is not exact.
- 13 The centre of the fort has been excavated in recent years to provide the location for the Macau Museum and access can also be gained through the museum.
- 14 See the report of the archaeological investigations reported in *A Museum in an Historic Site: The Monte Fortress of St. Paul*, Museu de Macau, 1998, p. 134.
- 15 Jorge Graça, *Fortifications of Macau, Their Design and History*, Direcção dos Serviços de Turismo de Macau, Macau, 1969.
- 16 See the report of the archaeological investigations reported in *A Museum in an Historic Site: The Monte Fortress of St. Paul*, p. 133.
- 17 The Dutch translation of this list is printed on pp. 65–70 of the *Dagh-Register gehouden int Casteel Batavia* (Gravenhage, 1899) under the date of 3 March 1637
- 18 J. Lima Carmona and J. F. Marques Pereira, *Ta-Ssi-Yang-Kuo*, Lisboa, 1899–1901, Vol. II No. 7, April 1900, pp. 416–421.
- 19 At the time when cannon usually fired spherical cast iron balls the calibre was usually described by the weight of shot. Obviously given this it was possible to calculate the diameter of the bore.
- 20 J. Lima Carmona and J. F. Marques Pereira, *Ta-Ssi-Yang-Kuo*, p. 423.
- 21 Anders Ljungstedt, *An Historical Sketch of the Portuguese Settlements in China and of the Roman Catholic Church and Mission in China & Descriptions of the City of Canton*, Viking Hong Kong Publications, 1992, p. 19. Originally published 1836.
- 22 António Bocarro, *op. cit.*
- 23 The particulars given above agree with those in the intercepted list of 1636; see note 14.
- 24 Marco D'Avalo, *op. cit.*
- 25 Presumably Kai-kian, the eastern point of Taipa Island.
- 26 The map was published in 1840 but relied on Heywood's survey of 1804. The map was possibly published at that time because of the First Opium War.
- 27 The view was drawn by Duche de Vancy, engraved by J. Heath and published in London by G. G. & I. Robinson in 1798.
- 28 J. Lima Carmona and J. F. Marques Pereira, *Ta-Ssi-Yang-Kuo*, p. 423.
- 29 *Ibid.*, p. 425.
- 30 See note 15 of Chapter 1.
- 31 Jorge Graça, *Fortifications of Macau, Their Design and History*.
- 32 The intercepted list agrees in giving the weight of shot as seven pounds, and adds the guns weighed twenty-four quintals each.
- 33 The intercepted list of 1636 gives the particulars of the cannon in this battery in full. The date of the construction of this battery is uncertain, but it was in existence at the time of the Dutch attack in 1622. It was dismantled in 1892, and later pulled down altogether.
- 34 J. Lima Carmona and J. F. Marques Pereira, *Ta-Ssi-Yang-Kuo*, p. 423. The drawing by Second Lieutenant Filgueiras in 186? is reproduced on p. 426.
- 35 J. Lima Carmona and J. F. Marques Pereira, *Ta-Ssi-Yang-Kuo*, p. 426.

- 36 The report by Supico is in Arq. da Adm. Civil, Proc. 228, série 7, 21-6-1876. It is quoted in M. Teixeira, *Os Militares em Macau*, Macau, Imprensa Nacional, 1984, p. 96.
- 37 The swivel gun referred to was named the *Nossa Senhora da Vitória*, and was so called because it was a trophy captured from the Dutch on the memorable 24 June 1622.
- 38 Lindsay and May Ride, *The Voices of Macao Stones*, Hong Kong University Press, Hong Kong, 1999, p. 79.
- 39 In one reference it is referred to as São Pedro, almost certainly a mistake arising through confusion with the battery on the Praya Grande. Others have referred to it as São Januário, probably mistakenly from the name of the hospital built close by.
- 40 The story of the building of the city wall by D. Francisco Mascarenhas, the demand of the Chinese that it should be razed, his refusal to do so and the resultant disputes with the Senate, resulting in a mutiny against his authority, are all related in detail in the Papéis de D. Francisco Mascarenhas preserved in the Biblioteca Pública of Évora (Código CXV1/2-5). It seems that in the end the Portuguese bribed the local Chinese authorities to allow them to rebuild the section of the wall demolished in 1625.
- 41 This is either a mistake or the name São Pedro was later transferred to the bastion in the centre of the Praya Grande.
- 42 J. Dyer Ball, *Macao: The Holy City; The Gem of the Orient Earth*, The China Baptist Publication Society, Canton, 1905, p. 3.
- 43 Dyer Ball appears to be mistaken in the name of the gate.

## CHAPTER 4

- 1 His Chinese name was Zheng Chenggong.
- 2 One li is approximately 500 metres.
- 3 The Boca Tigris (the Tiger's Mouth) was a narrowing of the Pearl River about halfway to Canton. It was here that forts were built by the Chinese to defend the approaches to Canton.
- 4 Report quoted by Manuel A. Ribeiro Rodrigues, *400 Years of Organisation and Military Uniforms in Macau*, Instituto Cultural de Macau, 1999, p. 195.
- 5 Quoted in *A Museum in an Historic Site: The Monte Fortress of St. Paul*, Museu de Macau, 1999, p. 99.
- 6 Parish's report is reproduced in Jack Cranme-Byng, *The Defences of Macao in 1794: A British Assessment*, *Journal Southeast Asian History*, Vol. 5, No. 2, September 1964.
- 7 An orillon is a protrusion on a battery which allows fire to be directed sideways in its defence.
- 8 William C. Hunter, *Bits of Old China*, London, 1855.
- 9 Quoted from Anders Ljungstedt, *An Historical Sketch of the Portuguese Settlements in China and of the Roman Catholic Church and Mission in China & Description of the City of Canton*, James Munroe & Co., Boston 1836. Republished 1992 by Viking Hong Kong Publications, p. 88.
- 10 For further details see Luís Gonzaga Gomes, *The Destruction of the Fleet of Kam-Pau-Sai*, *Review of Culture*, English Edition, No. 3, Instituto Cultural de Macau, 1987.
- 11 Luís Gonzaga Gomes, *ibid.*, p. 119.
- 12 Anders Ljungstedt, *An Historical Sketch*, p. 91.
- 13 Hosea Ballou Morse, *The Chronicles of the East India Company Trading to China 1635–1834*, Oxford at the Clarendon Press, 1926.
- 14 Lintin is an island at the mouth of the Pearl River. It became a base for opium smuggling where the British and other ships would anchor and offload their cargo to the smaller Chinese boats that took it to various points along the coast and up the tributaries of the Pearl River.
- 15 W. W. Wood, *Sketches of China*, Carey and Lea, Philadelphia, 1830, p. 252.
- 16 William C. Hunter, *Bits of Old China*, London, 1855.

## CHAPTER 5

- 1 John Oucetlony, *The Chinese War: An Account of All the Operations of the British Forces from the Commencement to the Treaty of Nanking*, Saunders & Otley, London, 1844, p. 77.
- 2 Usually spelt Casa Branca (White House), this was the base of the Mandarin responsible for Macau. It was situated to the northwest of Macau about a mile from the border.
- 3 J. Elliot Bingham R.N., *Narrative of the Expedition to China from the Commencement of the War to Its Termination in 1842*, Henry Colburn, London, 1843, p. 426.
- 4 The word *Faitiões* derives from the Chinese “*fai teang*” meaning fast boat
- 5 A *lorcha* was a locally made boat that included both European and Chinese elements. For a more detailed description see Chapter 8.
- 6 The throne of Portugal was occupied by Queen Dona Maria II at the time; however, her husband Dom Fernando (Prince Ferdinand of Saxe-Coburg-Gotha) was very popular and was regarded as the king.
- 7 The statue was inaugurated on *Dia da Cidade* (City Day), 24 June 1940.
- 8 It was in front of what is now the Lisboa Hotel at the end of the bridge to Taipa.
- 9 Because Mesquita had committed suicide his remains should not have been buried in consecrated ground; however in this case it appears that an exception was made.
- 10 The term “Cross Gate” is used by Fei Chengkang in *Macao 400 Years*, The Publishing House of Shanghai Academy of Social Sciences, 1996. The term may just be a translation of the Chinese name for the area as it does not appear in European texts.
- 11 The author recalls visiting the fort in the 1970s when there was no high-rise development and the border gate could be clearly seen. It was on the direct axis of the guns mounted there.
- 12 A military headquarters’ order, No. 19 of 17 February 1852 notes that the fort was garrisoned then.
- 13 The marine and customs police took over the buildings in 1905.
- 14 The Governor’s Palace had originally been built here in 1769, but was rebuilt in 1859. The building served both as governor’s residence and government offices. The arched *porte-cochère* with a colonnaded veranda above was added in 1872.
- 15 Reported in *Ta-Ssi-Yang-Kuo*, Lima Carmona, “As fortalezas de Macau”, Vol. 1 No. 4, January 1900.
- 16 P. Manuel Teixeira, *Os Militares em Macau*, Macau, 1984, p. 125.
- 17 Many of the guns were disposed of in 1872, some being scrapped and others sold and some details are provided in P. Manuel Teixeira, *Os Militares em Macau*, p. 140.
- 18 Luís Gonzaga Gomes, “Páginas da História de Macau”, *Notícias de Macau*, 1966, pp. 433–438.

## CHAPTER 6

- 1 The estimate for the cost of constructing the porch was included in the *Boletim Oficial* in September 1916.
- 2 The report by Lemos is quoted in M. Teixeira, *Os Militares em Macau*, Macau, Imprensa Nacional, 1984, p. 452.
- 3 Richard J. Garrett, “Taipa Fort Cannon — More Details”, *The Journal of the Hong Kong Branch of The Royal Asiatic Society*, Vol. 45, 2005.
- 4 M. Teixeira, *Os Militares em Macau*, p. 338.
- 5 This is the level of the main gun platform as shown on government maps.
- 6 The government council was a body that fulfilled the role of the governor until Governor Pedro Alexandrino da Cunha arrived in May 1850.
- 7 Casa Branca or White House was the residence of the main Mandarin of Heung Shan County, sited about 1.6 kilometres to the northwest of the border.

- 8 The report is reproduced in “As fortalezas de Macau III”, *Ta-Ssi-Yang-Kuo* Serie 1, Vol. II, No. 7, April 1900, p. 433.
- 9 Jorge Graça, *The Fortifications of Macau*, Imprensa Nacional de Macau, 2nd Edition, 1984. Graça refers to the guns as Armstrongs, however they are more likely to be Hotchkiss QF guns as they are known to have existed in Macau. They may indeed have been made by Armstrong’s firm as the surviving guns are marked Sir W. G. Armstrong Whitworth & Co.
- 10 For a description of the cannon see Chapter 9.
- 11 This is the level of the main gun platform as shown on government maps.
- 12 The garrison is referred to in the military headquarters’ order No. 19 of 17 February 1852.
- 13 This is referred to by Firmino da Costa in his report on the state of the defences of Macau in 1886–87 reproduced in “As fortalezas de Macau III”, *Ta-Ssi-Yang-Kuo* Serie 1, Vol. II, No. 7, April 1900, p. 433.
- 14 Jorge Graça notes in *The Fortifications of Macau* that the remnants of the wooden swivel for the mount were present before the modern renovation.
- 15 The remaining guns from the battery are parked at the Police Training School on Coloane.
- 16 The navy’s version was slightly different in that Honrai was spelt “Honrae” by them.
- 17 The report by Lemos is quoted in M. Teixeira, *Os Militares em Macau*, p. 453.

## CHAPTER 7

- 1 *Boletim Official*, 31 March 1914.
- 2 The battle of 9 April was remembered for many years in Macau with a minute’s silence and a military parade. One such parade is announced in the *Boletim Official* of 8 April 1924.
- 3 Notice of the reclamation, including a plan showing the proposed layout of the docks, was included in the *Boletim Official* of 11 October 1923.
- 4 The Secretaria Militar published a notice for this in the *Boletim Official* No. 22 dated 23 May 1903.
- 5 Vickers was a major arms supplier and it is known from its archives that it supplied guns to the Portuguese government.
- 6 What is now Taipa was once two islands called Taipa Grande and Taipa Pequena, or big and little Taipa. They are now joined by reclamation and Taipa is also joined with Coloane to form one large island.
- 7 Minnie Leola Crawford, *Seven Weeks in the Orient: By an American Girl*, Chicago, H. D. Berrett, 1914.
- 8 Before the barracks were built there had been a guard post sited here.
- 9 *Boletim Official* for 1 September 1923.
- 10 *Boletim Official* for 31 December 1940, a supplement giving details of the expenditure budgeted for 1941.
- 11 *Regulamento para a Instrução das Forças Militares da Provincia de Macau*, 1920.
- 12 The death rate for 1941 was in excess of 16,000 compared to a pre-war rate of about 4,000.
- 13 Personal conversation with the author.
- 14 The 25-pounder field gun was introduced in 1939 and last saw action in Oman on 19 July 1972.
- 15 BESA derives from the manufacturer the BSA Company. They were a Czech design, hence the 7.92 mm calibre. The larger 15 mm calibre guns were produced specifically for armoured cars.
- 16 The letter dated 29 January 1967 is reproduced in an illustrated pamphlet *Opposing the Sanguinary Atrocities Perpetuated by the Portuguese Imperialists in Macao*, *Macau Daily News*, 1967.

## CHAPTER 8

- 1 C. A. Montalto de Jesus, *Historic Macao, International Traits in China Old and New*, 2nd Edition, Macao, 1926.
- 2 For a fuller description of the arms see William Gilkerson, *Borders Away II, Firearms of the Age of Fighting Sail*, Andrew Mowbray, 1993.
- 3 Other photographs show the breech of this cannon and it is clearly a muzzle loader. The Portuguese navy bought Armstrong guns of both 5-inch and 7-inch calibre; this one appears to be of the smaller size.
- 4 These are Kropatschek M1886 rifles, which are described in detail in Appendix IV, E6.
- 5 In the years 1843–1845.
- 6 In the years 1850–1851, 1859–1862 and 1869–1871.
- 7 In the years 1850–1851.
- 8 In the years 1855–1858.
- 9 In the years 1867–1871.
- 10 In the years 1872–1873.
- 11 In the years 1873–1880 and 1887–1891.
- 12 In the years 1880–1888.
- 13 In the years 1887–1891.
- 14 In the years 1890–1897.
- 15 In the years 1892–1898.
- 16 In the years 1898–1900.
- 17 The Portuguese term is *lança-canhoneira*.
- 18 In the periods 1900–1901, 1904–1905, 1912–1913, 1927–1928 and 1930–1933.
- 19 In the years 1904–1905 and 1909–1910.
- 20 In the period from July of 1925 to September of 1927.
- 21 Aleko E. Lilius, *I Sailed with Chinese Pirates*, J. W. Arrowsmith, 1930.
- 22 Robert Cardwell, “Pirate-Fighters of the South China Sea”, *National Geographic Magazine*, Vol. 86, No. 6, 1946, p. 787 et seq.
- 23 *Fairey 17* is named “Santa Cruz”.
- 24 This was close to what are now the “Museum Houses”.
- 25 At that time the only way to get to Taipa from Macau was by boat.
- 26 As described elsewhere the Americans also targeted other sites.
- 27 *Macau Magazine*, Special 1996 Edition, 2nd World War in Macau.

## CHAPTER 9

- 1 At first the missiles were mixed into the gunpowder and the arm was termed an erupter, throwing out a series of unaimed projectiles.
- 2 Wei Guozhong, *Heilongjiang Achengxian Panlachengzi chutu di tong huochong*, Wenwu, 1973.
- 3 The earliest illustration of a cannon in European sources is in a manuscript by Walter de Milemete dating from the 1326. The manuscript *De Nobilitatibus Sapientis et Prudentis Regum* was a book of instruction for the young King Edward III.
- 4 Walter de Milemete’s illustration shows a vase-shaped gun. The length is inferred from its size relative to the soldier who is firing it.
- 5 W. Tittmann, “The Guns of Archbishop Baldwin of Trier 1331/32 and the Milemete Manuscripts of 1326/37: Some Critical Comments”, *Journal of the Ordnance Society*, Vol. 17, 2005.
- 6 Loshult is in Skåne in the south of Sweden.

- 7 Peter Vemming Hansen, “Casting and firing a replica of the Loshult gun”, *Journal of the Ordnance Society*, Vol. 14, 2002.
- 8 Mons Meg dates from 1449. It is 4.04 m long with a bore of 48 cm.
- 9 Nicholas Hall, “Building and firing a replica Mary Rose port piece”, *Royal Armouries Yearbook*, Vol. 3, 1998, Leeds, 1999, p. 57 et seq.
- 10 Jin Guo Ping and Wu Zhiliang, “Os Três Mosqueteiros Marítimos Vistos pelos Chineses”, *Revista de Cultura*, International Edition 11, July 2004.
- 11 V. D. Majendie, *The Arms and Ammunition of the British Service 1872*, reprint by Ken Trotman Publishing, Godmanchester, 2008, p. 54.
- 12 Alexander Hamilton, *A New Account of the East Indies Giving an Exact Description of the Situation, Product, Manufactures, Laws, Customs, Religion, Trade, etc. of All the Countries and Islands, which lie between the Cape of Good Hope, and the Island of Japan...*, London, 1747.
- 13 Sjeff Pijls, “Smoothbore Guns and Ship Design”, *Ordnance Society Newsletter*, No. 73, January 2006.
- 14 H. L. Blackmore, *The Armouries of the Tower of London. I Ordnance*, Her Majesty’s Stationery Office, London, 1976, No. 179.
- 15 C. R. Boxer, *Expedições Militares Portuguesas em Auxilio dos Mings contra os Manchus 1621–1647*.
- 16 Alvaro Semedo S.J., *The History of That Great and Renowned Monarchy of China*, London, 1655.
- 17 H. L. Blackmore, *The Armouries of the Tower of London. I Ordnance*, Nos. 180 and 181.
- 18 This cannon was retrieved from the wreck of the carrack Nossa Senhora de Atalaia do Pinheiro. It was part of the consignment of 200 cannon sent as a gift to King João IV.
- 19 The cannon was exhibited in the exhibition Exposição de Armaria Portuguesa in Macau in 1993.
- 20 Robert Cardwell, “Pirate-Fighters of the South China Sea”, *National Geographic Magazine*, Vol. 89, No. 6, 1946, p. 787.
- 21 A photograph from Jorge Graça’s collection is reproduced by Manuel Teixeira in *Os Militares em Macau*, Edição do Comando Territorial Independente de Macau, 1975.
- 22 Robert Cardwell, “Pirate-Fighters of the South China Sea”, p. 787 et seq.
- 23 Joseph Needham, *Science and Civilisation in China*, Vol. 5, Part 7, Cambridge University Press, 1986, pp. 263–275.
- 24 U.S. War Department specifications for contractors, 1798; quoted by Major James E. Hicks, *Notes on United States Ordnance*, Mount Vernon, N.Y., 1940, Vol. II, p. 16.
- 25 Mealed powder was a type of gunpowder.
- 26 In England Sir William Wynter, master of the Ordnance for the Navy from 1569 to 1589, had laid down requirements for arming the Royal Navy, which reduced the number of different calibres to just six.
- 27 For a full description of the French developments see Ken Alder, *Engineering the Revolution, Arms and Enlightenment in France, 1763–1815*, Princetown University Press, Princetown, N.J., 1997.
- 28 A larger 15-inch calibre Dahlgren gun is preserved in Hong Kong’s Museum of Coastal Defence.
- 29 The theory proves that in cylinders the strain at any point in the metal varies inversely as the square of its distance from the axis of the cylinder.
- 30 Both had apparently been working on the same thing and each claimed he was the first to publish. In fact Blakely won but only by three weeks.
- 31 V. D. Majendie, *The Arms and Ammunition of the British Service 1872*, reprint by Ken Trotman Publishing, Godmanchester, 2008, p. 92.
- 32 In the case of the Macau gun it was made at the Novelty Iron Works in Hong Kong and this may have come about as an investor in Blakely’s business had been John Dent, a famous British China trader.
- 33 The Blakely was specifically referred to in the order of 1892 that decommissioned the fort.
- 34 A list of 1894 refers to Armstrong guns of 95 mm and 176 mm calibre.
- 35 The term “breech loader” strictly refers to a gun where the projectile is loaded separately from its cased charge.

- 36 The British had adopted both 3-pounders and 6-pounders. A British 6-pounder, previously used as the noonday gun, is now preserved at the Hong Kong Marine Police Headquarters.
- 37 The British forces bought large numbers of Hotchkiss QF guns, hence a British origin for this gun is not surprising.
- 38 This company name was introduced in 1887 after the death of Hotchkiss on 14 February 1885. There was also an English company named the Hotchkiss Ordnance Co. Ltd. although, as the 6-pounder shows, Hotchkiss guns had been made at Armstrong's Elswick works since 1884.
- 39 The instructions read "Place gun at extreme depression. Remove air plugs and fill both cylinders. Quantity of liquid about 1 quart of oil."
- 40 The firm of Sir W. G. Armstrong Whitworth & Co. was formed in 1897 by a merger of Sir William Armstrong's and Joseph Whitworth's firms. It lasted until 1927 when it merged with Vickers to become Vickers Armstrong.
- 41 A number of gun barrels were excavated in Hong Kong during the reconstruction of the Police Headquarters and among these are a number of the 4.7-inch QF Mark I barrels.
- 42 The last use of a 25-pounder was in July 1972 in Oman operated by members of the SAS. That gun still exists and is dated 1943.
- 43 Provincia de Macau, Secretaria Militar 1.a Repartição, Manual do Material de Guerra Regulamentar e do Material dos Serviços Auxiliares.
- 44 The spelling in the manual is "Nordenfeld" but the more usual spelling is "Nordenfelt".
- 45 The report by Firmino da Costa is quoted in J. Lima Carmona and J. F. Marques Pereira, "As fortalezas de Macau III", *Ta-Ssi-Yang-Kuo*, Lisboa, Vol. II, No. 7, April 1900, p. 432.

## CHAPTER 10

- 1 Gaspar Correa, *The Three Voyages of Vasco da Gama and His Viceroyalty*, translated by Henry E. J. Stanley, Burt Franklin, New York, 1963 (1869), p. 330.
- 2 Rainer Daehnhardt, *The Bewitched Gun: The Introduction of the Firearm in the Far East by the Portuguese*, Texto Editora, LDA, 1994.
- 3 Reproduced in Major C. R. Boxer, *Macau Three Hundred Years Ago*, Macau Imprensa Nacional, 1942, p. 97, from *Narrative of the Journey made at his Majesty's Orders by Antonio Fialho Ferreira from this Kingdom to the City of Macao in China: and of the most joyful proclamation of H. M. The King Our Lord Dom Joao IV whom God preserve in the said City and southern parts*. Pamphlet by him noted Lisboa. Na Officina de Domingos Lopes Rosa, Anno de 1643.
- 4 Examples of matchlocks used by emperors can be seen in the Palace Museum, Beijing.
- 5 W. E. Flewett, "Leonardo, The Goldsmith, and the 'Playthings of Princes'", *The Journal of the Arms and Armour Society*, 1998, Vol. XVI, p. 14 et seq.
- 6 Rainer Daehnhardt, "First Steps towards an Introduction into the Study of Early Gunmaking in the Portuguese World, 1450–1650", *Bulletin of the Portuguese Academy of Antique Arms*, Vol. 1, No. 1, July 1997.
- 7 The sear was the element of the lock that engaged a notch on the cock keeping it in the cocked position. Pulling the trigger releases the sear and the cock falls forward under the pressure of the mainspring, firing the gun.
- 8 On firing, the flint strikes the steel, which is pushed back opening the pan cover and the resulting sparks fall into the priming charge in the pan. This ignites and the fire passes through the touch hole and ignites the main charge, thus firing the gun.
- 9 John Oucertlony, *The Chinese War: An Account of All the Operations of the British Forces from the Commencement to the Treaty of Nanking*, Saunders & Otley, London, 1844, p. 153.

- 10 Ibid., p. 156.
- 11 Enfield is the name of the location in England where a government factory was established to produce military small arms.
- 12 In the case of the Museum's rifle the presence of Liege proof marks show that it was in fact made in Belgium. That some were made there is known and they are likely to have been shipped to England before being sold on to the Portuguese.
- 13 The rifles are on display in the offices of the Macau Security Forces Management Bureau at the São Francisco Barracks, unfortunately not accessible to the public.
- 14 D. W. Bailey, *British Military Longarms 1715–1865*, Arms & Armour Press, London, 1986, p. 128.
- 15 The report by Lemos is quoted in M. Teixeira, *Os Militares em Macau*, Imprensa Nacional, Macau, 1984, p. 451.
- 16 Jacob Snider was an American and this spelling of his name is the correct one although often “Snyder” is used.
- 17 A request for this trial was made by Guedes to the War Office in a note dated 20 July 1880. (Arq. Hist. Militar, 3<sup>a</sup> Divisão, 7<sup>a</sup> Secção, Cx. 1582, Proc. Guedes Dias, Doc. 6/3.) For a full description of the system see Jaimie A. Regalado, “The Castro Guedes Rifle System”, *Bulletin of the Portuguese Academy of Antique Arms*, Volume II, No. 1, May 2001.
- 18 The sale was announced in the *Boletim Oficial* on 1 March 1907. It also included cartridges for Winchester and Colt firearms.
- 19 Apart from the details of these arms, the documents which detail the movement of ammunition in 1906 includes rifle cartridges Mauser — cal. 11 and Winchester — cal. 10.5. Also carbine cartridges Remington — cal. 13 and Weterly — cal. 13, and pistol and revolver cartridges Winchester — cal. 8, Jorge Esterhoff — cal. 11 and 8, Francesas — cal. 8. In this context the names refer to the cartridge manufacturer rather than the firearm maker.
- 20 Richard J. Garrett, “Revolvers before 1818 (Including a Description of a Pair of Flintlock Revolvers by Polinson)”, *The Journal of the Arms & Armour Society*, Vol. XV, No. 5.
- 21 The picture comes from Robert Cardwell, “Pirate-Fighters of the South China Sea”, *National Geographic Magazine*, Vol. 86, No. 6, 1946, p. 787 et seq.
- 22 Ibid.

## APPENDIX II

- 1 *An Embassy to China, Being the journal kept by Lord Macartney during his embassy to the Emperor Ch'ien-lung 1793–1794*, edited with an Introduction and Notes by J. L. Cranmer-Byng, Longmans, London, 1962, p. 301.
- 2 Robert Cardwell, “Pirate-Fighters of the South China Sea”, *National Geographic Magazine*, Vol. 89, No. 6, 1946, p. 787.
- 3 Descrição de Macau, em 1638 por Marco D'Avalo, printed in 1645 in the Dutch collection of voyages and travels *Begin ende Voortganch van de Vereenighde Nederlantsche geochtroyeerde Oost-Indische Compagnie* (Amsterdam, 1645, 2 vols). A translation is included in Major C. R. Boxer, *Macau Three Hundred Years Ago*, Macau, Imprensa Nacional, 1942.
- 4 The site of this gunpowder mill is the present Rua do Chunambeiro, as the name implies.
- 5 *Descrição de Macau, em 1635 por António Bocarro*. Manuscript titled *Book of the Plans of all the Fortresses, Cities and Towns of East India, with description of the altitude they are in, and of all they contain; Artillery, Garrison, men-at-arms, and vassals; income and expenditure; anchorage and shoals of their roadsteads; Kings of their hinterland, and power thereof; the state of peace or war they keep; and everything which is subject to the Crown of Spain. Dedicated to the Most Serene Majesty King Philip IV*

*of the Spain, and III of Portugal, our King and Lord.* A translation is included in Major C. R. Boxer, *Macau Three Hundred Years Ago*.

### APPENDIX III

- 1 *Descrição de Macau, em 1635 por António Bocarro.* Manuscript titled *Book of the Plans of all the Fortresses, Cities and Towns of East India, with description of the altitude they are in, and of all they contain; Artillery, Garrison, men-at-arms, and vassals; income and expenditure; anchorage and shoals of their roadsteads; Kings of their hinterland, and power thereof; the state of peace or war they keep; and everything which is subject to the Crown of Spain. Dedicated to the Most Serene Majesty King Philip IV of the Spain, and III of Portugal, our King and Lord.* A translation is included in Major C. R. Boxer, *Macau Three Hundred Years Ago*, Macau Imprensa Nacional, 1942.
- 2 *Descrição de Macau, em 1638 por Marco D'Avalo.* Printed in 1645 in the Dutch collection of voyages and travels *Begin ende Voortganch van de Vereenighde Nederlantsche geochtroyeerde Oost-Indische Compagnie* (Amsterdam, 1645, 2 vols). A translation is included in Major C. R. Boxer, *Macau Three Hundred Years Ago*.
- 3 The text of this publication is reproduced in “As fortalezas de Macau III”, *Ta-Ssi-Yang-Kuo* Serie 1, Vol. II, No. 7, April 1900, p. 416 et seq.
- 4 This table is from an unreferenced document and is reproduced in “As fortalezas de Macau III”, *Ta-Ssi-Yang-Kuo* Serie 1, Vol. II, No. 7, April 1900, p. 423.
- 5 This list is doubly interesting as the author went on to become the hero of the Battle of Passaleão. The list is reproduced in “As fortalezas de Macau III”, *Ta-Ssi-Yang-Kuo* Serie 1, Vol. II, No. 7, April 1900, p. 425.
- 6 This list is extracted from data given in “As fortalezas de Macau III”, *Ta-Ssi-Yang-Kuo* Serie 1, Vol. II, No. 7, April 1900, p. 426 et seq.
- 7 This list is extracted from data given in “As fortalezas de Macau III”, *Ta-Ssi-Yang-Kuo* Serie 1, Vol. II, No. 7, April 1900, p. 431 et seq.
- 8 This list is reproduced in “As fortalezas de Macau III”, *Ta-Ssi-Yang-Kuo* Serie 1, Vol. II, No. 7, April 1900, p. 434.

### APPENDIX IV

- 1 Socket bayonets were also used with some early percussion arms, but generally they had fallen from use by the middle of the nineteenth century.
- 2 I.G.Mod. 71/84 rifles were made at Spandau, Oberndorff, Erfurt, Danzig and Amberg. The most common are Spandau and Amberg.
- 3 Literally the characters mean Country Army.
- 4 The rampant horse mark is of course a pun on the name Colt, which is also the name of a young horse.

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