A 16th century Iron Breech-Loading Swivel-Gun

Michael Stroud

Early in May 2000, the Mediterranean gave up another of its jealously kept treasures. While pleasure diving off Malta's southern coast, Michael Spiteri, a technical staff member of the Museums Department Archaeology Section discovered a rare and unusual gun. Lying there on the seabed was a sixteenth century, breech-loading swivel-gun. Seafarers of various nations used small swivel-guns of this type extensively on ships, for many centuries. However, not that many have survived and at the time it was found, this was the first officially recorded discovery in Maltese waters of an early, breech-loading gun. Certainly not as sensational as the Riace Bronzes, this fascinating relic is nonetheless of considerable importance even by international standards. (Plate 1)

Before examining this intriguing gun too closely to establish its approximate date of manufacture or possible provenance, it would be easier to proceed by first placing it in its right perspective as a particular gun-type in the overall evolution and development of firearms. In this regard, it would certainly be useful to those unfamiliar with firearms, to understand the basic difference between the terms, *Muzzle-loading* and *Breech-loading* guns. To start with, the terms *muzzle* and *breech* refer to specific parts of the *barrel* of a gun, the muzzle being its forward or front end, while the breech is the rear or back end.

During its long period of use, the particular type of swivel gun we are dealing with would normally be classed in a category on its own (Figure 1). The general term for this gun in Spanish speaking countries was *'Falcion Pedrero'* or simply *'Pedrero'*. In Italian it would be *'Peterara'*, or, as it was also known *'Pezza di Braga'*. *'Perrier'* would be the French term, with *'Sling'* or *'Murtherer'* in English. In other words a *'Stone-firing Gun'*. This was to identify it from another category of swivel guns, which were not breech-loaders. Recent English publications refer to this type of gun as a *'Breech-loading Petarara'*, or simply as a *'Breech-loading Swivel Gun'*.

After consultation with the Conservation Department of the Royal Armouries, in Leeds, the delicate task of carefully removing marine concretions that encased the gun was undertaken. (Plate 2) Pending a more complete conservation programme, a purpose-built holding tank at the Maritime Museum ensured the gun's stable condition. A preliminary examination revealed that this swivel gun is of wrought iron, i.e. hammered, built-up construction and its early style suggests mid-sixteenth century manufacture. However, old styles died hard and more precise scientific dating is required. The gun is around 1.840 mm. long overall. The barrel section is approximately 1.110 mm. long,

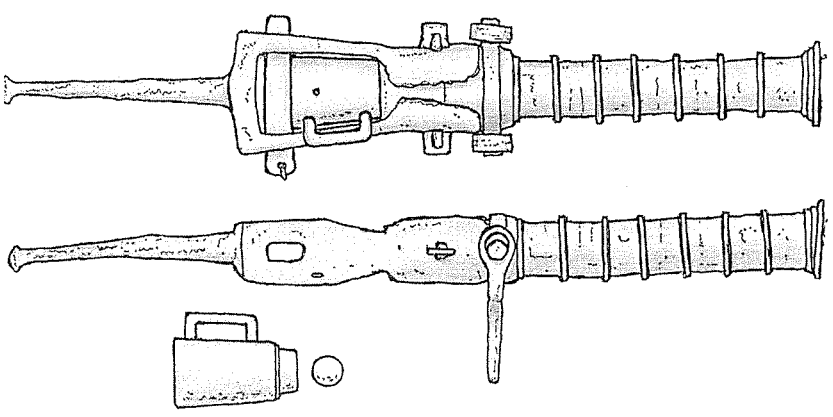

Figure 1: Breech-Loading Iron Swivel gun - European, first half of 16th century

with a bore of 40 mm. (Plate 3) The gun is of quite plain form with a slender, round barrel tapering slightly towards the muzzle end where it flares out in a rather unusual, archaic style muzzle-reinforce. Unlike the rounded muzzle mouldings normally encountered on swivel guns, this muzzle-reinforce is octagonally faceted in the style typical of early fifteenth century artillery or the muzzles of primitive arquebuses and muskets.

The barrel's breech end shows traces of what could have been simple, crude mouldings where the barrel-breech widens to meet the powder chamber trough. The trunnions, i.e. the cylindrical pivots projecting from the side, are constructed as one with the barrel, simply protruding from the barrel wall, 865 mm. from the muzzle. The sturdy iron swivel, supporting the gun at the trunnions, and which gives this particular type of gun its name, is still in place. (Plate 4)

The powder chamber holder or trough, which extends rearwards from the barrel breech, is here constructed as an integral part of the gun. This trough is roughly rectangular in plan, approximately 260 mm. long by 170 mm. wide, widening slightly towards the rear. The inner front part of the chamber trough is tapered at the breech opening to take the shaped mouth of the powder chamber. There is a rectangular hole cut in the bottom of the trough, which served to expel any accumulation of black powder residue. Further back at its rear the trough is pierced on either side with a rectangular slot approximately 60 mm. long, by 25 mm. wide. Into these slots a substantial iron wedge was inserted and hammered in to force the powder chamber forward into the breech of the barrel and hold it firmly in position for firing. The powder chamber and its locking wedge are unfortunately missing. From the center of the rear face of the chamber holder, which is roughly rectangular in shape, extends the long iron tiller or handle with which the gun was manoeuvred for aiming and was held firmly in position for firing. The tiller retains the usual knob at its end. There would normally be a mark on the top face of the rear of the chamber holder that matched identical marks on this particular breech-loader's set of chambers.

Understandably, the gun has suffered considerably through the effects of being submerged in the sea for some four hundred years. This resulted in extensive corrosion in varying degrees over the entire surface. Unfortunately, certain areas are affected by more noticeable metal loss. However, it has nonetheless survived remarkably well overall, and appears to be reasonably sound structurally. The more serious, immediately visible damage is at the forward section of the barrel where the corrosion has caused a fairly large hole in the barrel wall. Further investigation will determine the full extent of the damage.

The evolution of the breech-loader in the history of firearms is certainly intriguing. The earliest guns appear to have been mainly muzzle-loaders, i.e. loaded from the front. Putting a charge of powder down the bore from the muzzle, followed by a wad, then inserting the shot and following this by another wad, and ramming each element home was certainly time-consuming business. After firing, muzzle-loading guns had to be withdrawn each time from their position in the loophole or gun-port, then they were mopped out, re-loaded and re-positioned. Gunners in action usually had to reload while standing exposed to enemy fire. Meanwhile, the enemy had ample time to reform between shots. The difficulty of loading a gun at the muzzle in the narrow space of a fortification, or even more so, on the crammed decks of early fighting ships, must have been the prime motive for the development of early breech-loaders. It soon became clear that it was easier and quicker to load a gun from the breech than from the muzzle.

There seems little doubt that the first breech-loaders made their appearance during the first half of the fourteenth century. There are numerous references from this period to guns in use with separate powder chambers that were removed for loading. Many medieval and Renaissance cannon were

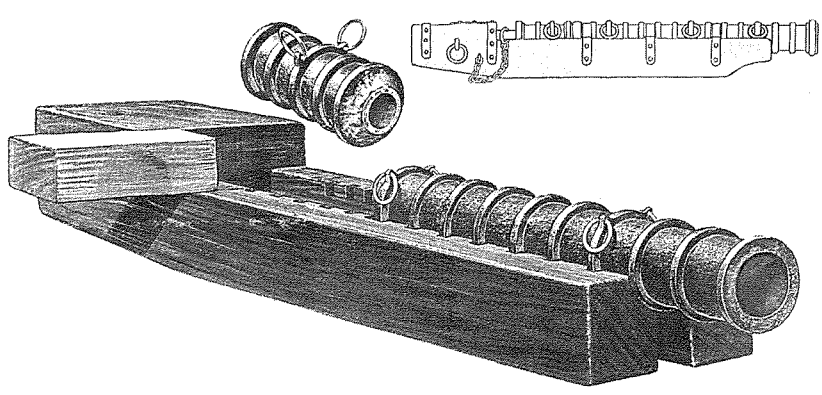

Figure 2: Wrought iron Breech-Loading Perrier c. 1400

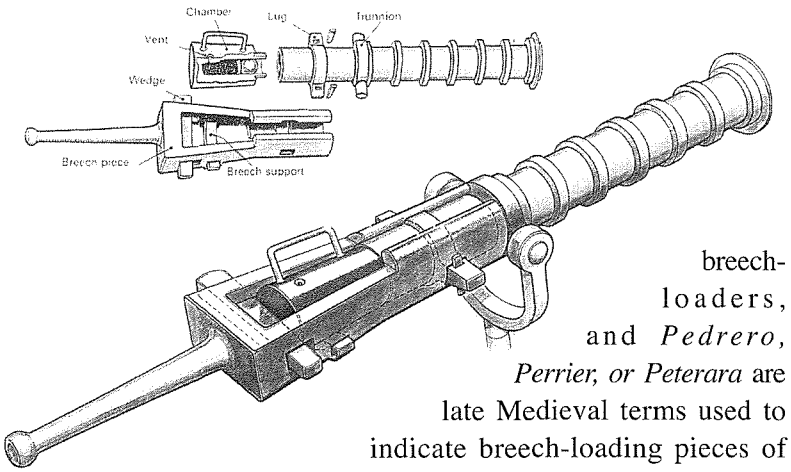

Figure 3: Breech-Loading Petarara c. 1470

breech-loaders, and *Pedrero, Perrier, or Peterara* are late Medieval terms used to indicate breech-loading pieces of artillery designed to throw stone missiles, Two types of early breech-loaders were developed. The first earlier version, was no more than a wrought iron tube, or barrel open at both ends, laid in a heavy wooden bed and lashed down firmly. The separate, pre-loaded powder chamber was placed against the rear barrel opening, and then held firmly in position by driving wooden wedges between the base of the chamber and the upstanding block of wood forming the rear end of the bed. A typical example complete with its wooden bed was recovered from the Mary Rose wreck, and an actual wrought iron chamber still retaining its iron lifting-ring, is exhibited at the Palace Armoury in Valletta. Unfortunately, the provenance of this rare item is unknown. (Plate 5)

In the second, later type of breech-loader, the earlier basic design was improved when metal arms were extended rearwards from the barrel as an integral part of the construction. These arms were formed into an open-topped trough into which the removable chamber fitted more surely. Provision was also made for a strong metal wedge to be inserted behind the chamber to force the chamber mouth tightly against the breech opening.

This system of construction made for a more rigid, certain connection between chamber and gun, and hammering home the locking wedge no longer forced the barrel forward as often happened with the earlier breech-loader. However, although the all-metal variety proved to be quite sound and efficient, probably due to early technical difficulties it was only produced in limited sizes. Nonetheless, both types were extensively used contemporarily both on land and at sea. Before the wheeled gun carriage came into general use, the heavy, wooden-bedded breech-loader proved useful as a fixed-position gun when put to siege use, or fired from a ship in a broadside. On the other hand, when mounted on a swivel, with a long iron tiller to maneuver it, the lighter, all-metal breech-loader was indispensable as a very handy, quick-firing, anti-personnel weapon, especially in close combat. In both cases, by providing the gun with a number of spare chambers, pre-loaded before the start of battle, a fairly rapid fire could be kept up by removing the fired chamber and replacing it with a loaded one. Doubtless a slow but steady fire could then be kept up by reloading the chambers as they were removed. Except for the inherent weakness of the gun, and that a gas-tight fit could not be obtained for the chamber so that some of the force of the exploding powder escaped, they were ingenious, considering that muzzle loading cannon little different in concept from the earliest guns, were to continue in use until the 1860's. The wrought iron breech-loading swivel

gun was used extensively virtually unchanged, from the rails of ships and the crenellations of castles and forts for many centuries. In fact, it would appear these swivel guns were still in use in ships as late as the later part of the 16th century, as examples of these guns were raised from ships known to have been wrecked around that date.

The Spanish Pedrero, Italian Peterara, French Perrier and the English Sling are often encountered in sixteenth century ordnance inventory lists and stone-throwing, breech-loaders produced in all dimensions, including a few monsters, were used extensively by various nations. However, although the breech-loader idea was ingenious the system was undoubtedly an unsatisfactory one. There was no efficient method of obturation, i.e. of preventing the violent backward leak of hot gases from the exploding charge through the juncture of the chamber and the barrel. Soon, wheeled gun carriages replaced the old cumbersome gun beds and efficient, bronze, muzzle-loading cannon proved safer than the old wrought iron gun. Also, a quicker, more efficient method of muzzle-loading was introduced. Consequently, heavy breech-loaders were rarely made after the second half of the 16th century. However, the old term *Pedrero, Peterara Perrier* and *Sling* continued to apply to the lighter, versatile breech-loading swivel gun, which remained popular for another century or so. In fact, most

English publications still refer to this type of swivel gun as a *Breech-loading Peterara.*

The majority of breech-loading swivel guns were of wrought iron construction, however there are also examples where a wrought iron breech-trough was fixed to a bronze barrel. However, these are rare. Apparently, quite a number of breech-loading swivel guns were cast completely in bronze as these are frequently encountered on underwater wrecks, with some fine examples found in various museums. The bronze variety is usually termed simply *Bronze Breech-Loading Swivel Gun,* to distinguish them from the wrought iron guns.

Having mentioned previously the basic principle behind the early breech-loading system, it would certainly interest even the least mechanically minded person to learn a little more on the actual loading procedure. The breech-loading swivel gun was loaded by means of a separate powder chamber with a handle, much like a large beer mug. The chamber might be of iron or bronze and had a priming vent at its base. Three re-loadable chambers were usually supplied with each gun, and each chamber would be stamped with the gun's own identity mark. The chamber mouth narrowed to engage with the tapered opening of the barrel-breech. After being loaded with the powder charge, the chamber was sealed with a wooden plug or some other strong wad. The handle was positioned so that when the chamber was rotated in the trough and the handle rested on the trough-frame, the priming vent presented itself centrally on top. The chamber was held firmly in position by a strong iron wedge called a *Leichet,* which was secured to the gun by a short chain against accidental loss.

The first step in the loading procedure was for the gunner to knock out the wedge locking the chamber in place and to remove the chamber from the breech-trough. The chamber was handed to an assistant for re-loading. The gunner cleared the breech opening from smoldering waste from the previous shot and inserted a wad into the breech opening. The projectile was next inserted into the barrel. Depending on the nature of the target, the shot could be a solid stone or iron ball, or else a quantity of scrap iron shot or fractured pieces of flint. The ball was usually wrapped in a cloth patch and loose shot would be pre-packed in cloth or paper bag. After the

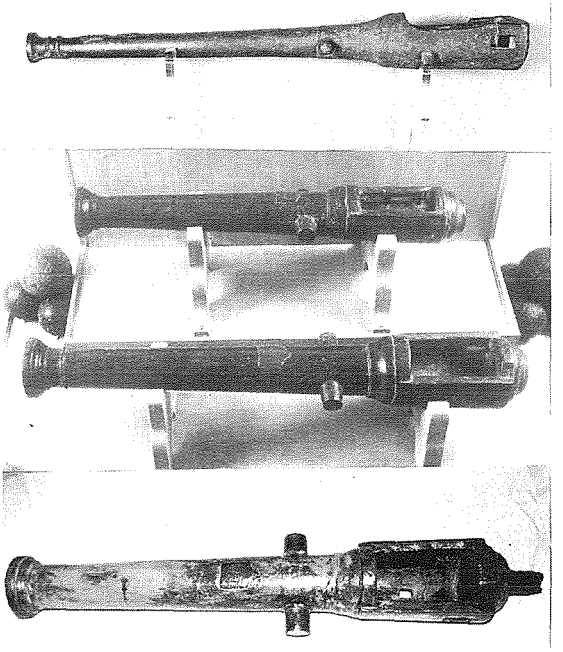

Figure 4: Various Breech-Loading Swivel Guns. 16thC

powder chamber was placed in the trough and pushed forward so that the chamber mouth engaged the breech, the wedge was inserted in the slots and hammered home, forcing the chamber mouth into the breech opening. The chamber often had a lug protruding from its base, positioned to engage with the underside of the wedge, thus ensuring a rigid lock. The gunner then primed the chamber vent and the gun was ready for firing. The priming was ignited in the normal way by the glowing match of the gunner's linstock.

Because their recoil was relatively slight, these swivel guns were commonly fixed to the sides or bulwarks of ships and discharged from there during boarding operations. These swivel guns were most effective when used as close-range, anti-personnel weapons, and were quite lethal when loaded with scrap iron shot or fractured flints. They were used in attack to break up the troop concentrations on an enemy's deck, and when mounted on the superstructure fore and aft they could be used defensively to bring cross-fire down on enemy boarders in the ship's own waist. A skilled gunner could probably reload one of these guns in around a minute or so, making it possible to fire off a number of shots in fairly rapid succession. Doubtless, in the hands of a competent gun team, a slow but steady fire could then be kept up by reloading the chambers as they were removed. These weapons made up for their poor range by a rate of fire remarkable for the period and breech-loading pedreros were used with little or no modification from the 15th to the 18th century.

(See plates in colour section)

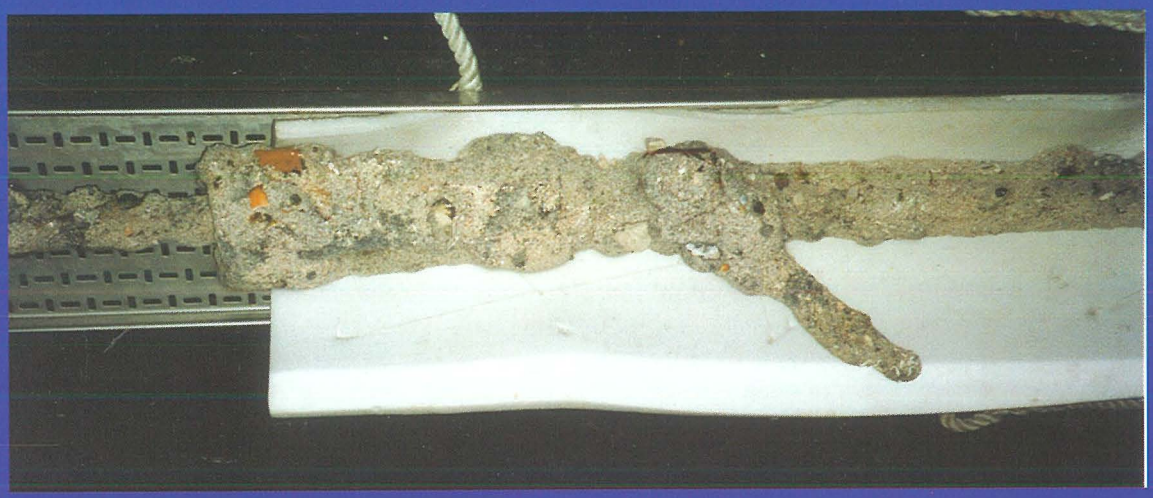

Plate 1. The breech-loading swivel-gun as recovered from the sea bed still completely encased in marine concretions.

Plate 2. Removing concretions from the Swivel-Gun

Plate 3. The breech-loading swivel-gun being lowered into the purpose built holding tank at the Maritime Museum.

Plate 4. Details of the breech-loading swivel-gun taken at the maritime Museum showing swivel.

Plate 5. Wrought iron chamber of breech-loading Perrier c.1500 at the Palace Armoury, Valletta. Provenance unknown