New Vanguard

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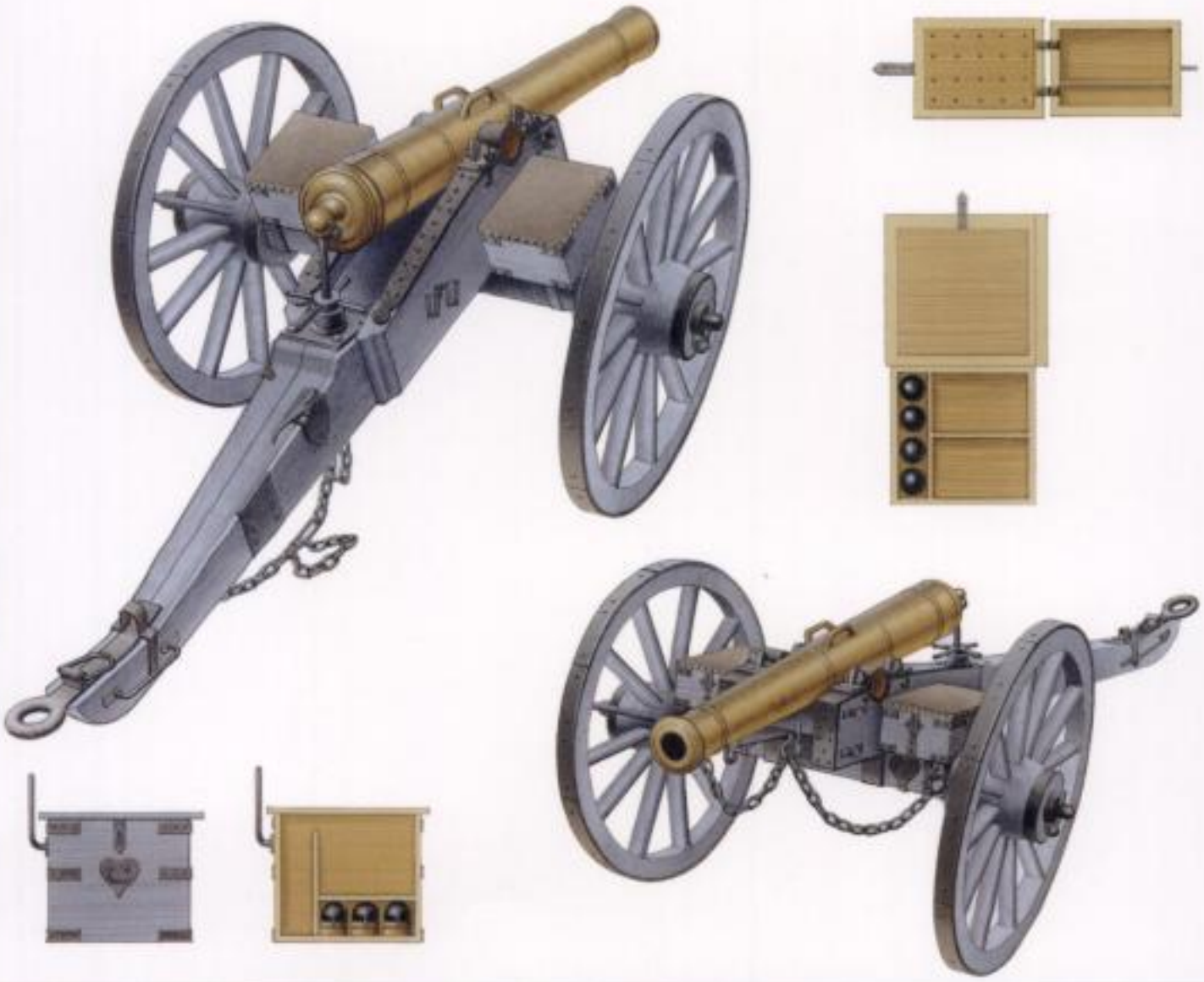
British Napoleonic Artillery 1793–1815 (1)

Field Artillery



Chris Henry • Illustrated by Brian Delf

New Vanguard • 60

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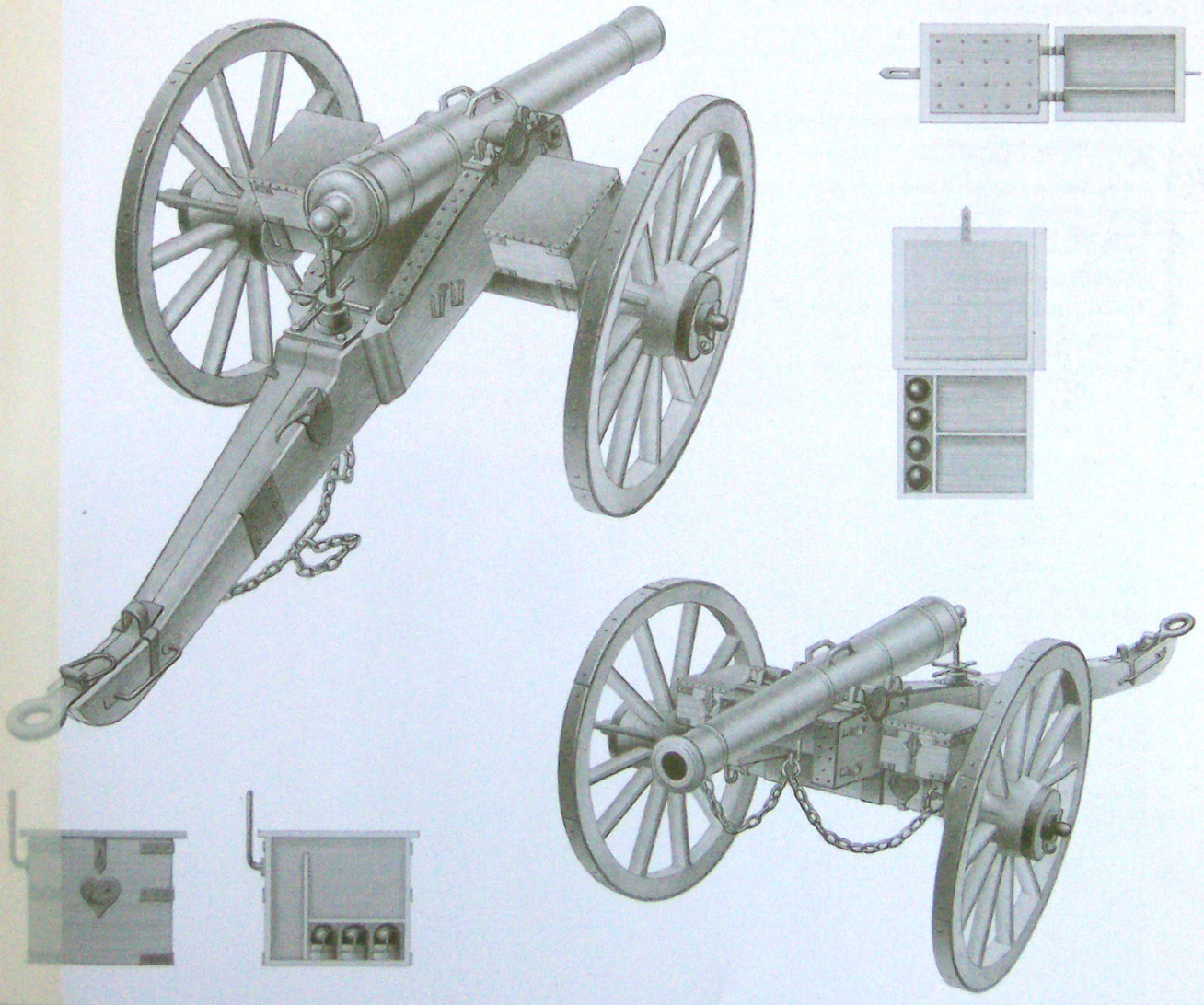

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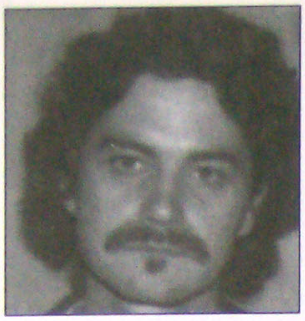

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BRIAN DELF began his career working in a London art studio producing artwork for advertising and commercial publications. Since 1972, he has worked as a freelance illustrator on a variety of subjects including natural history, architecture and technical cutaways. Some of his recently illustrated books have been published in over 30 countries. Brian lives and works in Oxfordshire.

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BRITISH NAPOLEONIC ARTILLERY 1793–1815 (1) FIELD ARTILLERY

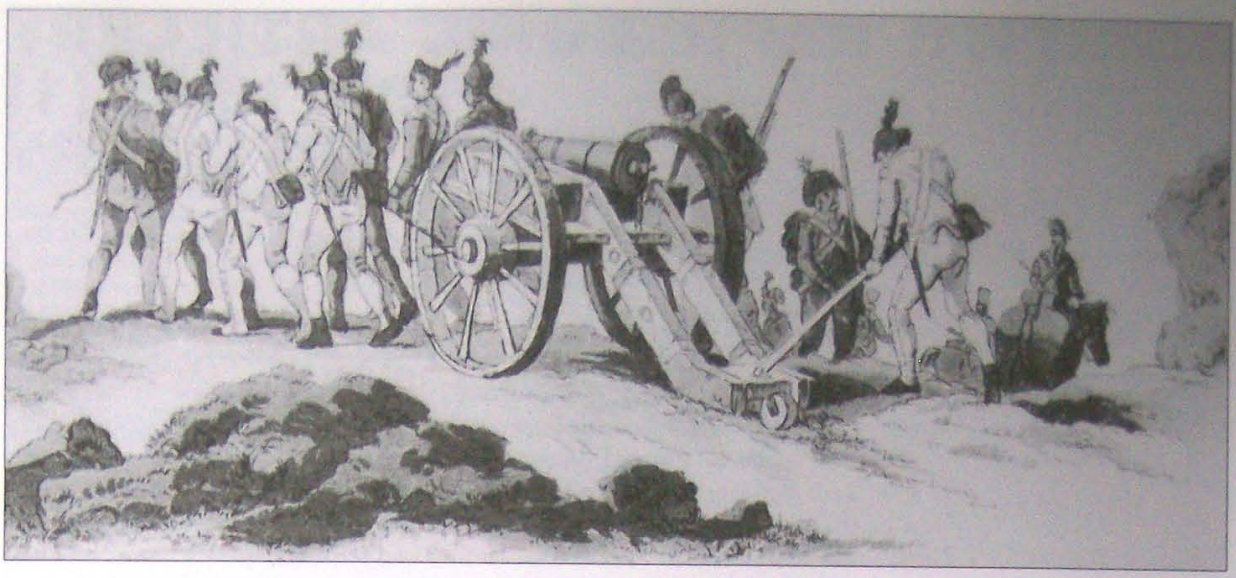
INTRODUCTION

The great age of Napoleon's battles was the high point in the life of the smooth-bore muzzle-loading gun. Bronze smooth-bore guns had been powerful battlefield weapons since the 15th century and the guns used between 1793 and 1815 were not that different from those refined during the 16th century, though incremental improvements in the carriage design and in the barrel and projectile had led to the gun becoming more efficient, and a standardised form of production was in use.

Compared with the infantry's standard weapon, the musket, the artillery piece was a longer range, power weapon which could wreak havoc upon an opposing enemy's ranks. Only other guns could really silence it at long range.

During the Napoleonic period there was intensive design and manufacturing activity relating to the British Army's artillery weapons. Many of the artillery officers engaged during the American War of Independence were responsible for the design and development of the artillery arm in the late 18th century. Names such as William Congreve the Elder, Thomas Blomefield and Thomas Desaguliers became synonymous with development of artillery weapons.

The 6-pounder, cast by Francis Kinman, with a representative crew in the uniforms of the Royal Artillery of 1813–15. (Courtesy RAHT)



An image of a Royal Artillery artillery foot detachment on the move with a double bracket carriage. The small wheel illustrated at the end of the trail is not normally shown on carriage drawings and one wonders how accurate the artist was, although the sketching is to a very high standard. By W.H. Pyne in 1802. (Courtesy Trustees of the National Army Museum)

During this period the supply and manufacture of the Army's artillery weapons was controlled by the Board of Ordnance. This board was composed of six principal individuals of whom the head was the Master-General of the Ordnance, an immensely powerful military and political figure and one on whom any general in the field had to rely when expecting supplies. During the late 18th and early 19th centuries the Masters-General were:

Charles Duke of Richmond (1784–95)
Charles Marquis Cornwallis (1795–1801)
John Earl of Chatham (1801–06 & 1807–10)
Francis Earl of Moira (1806–07)
Henry Earl of Mulgrave (1810–16)

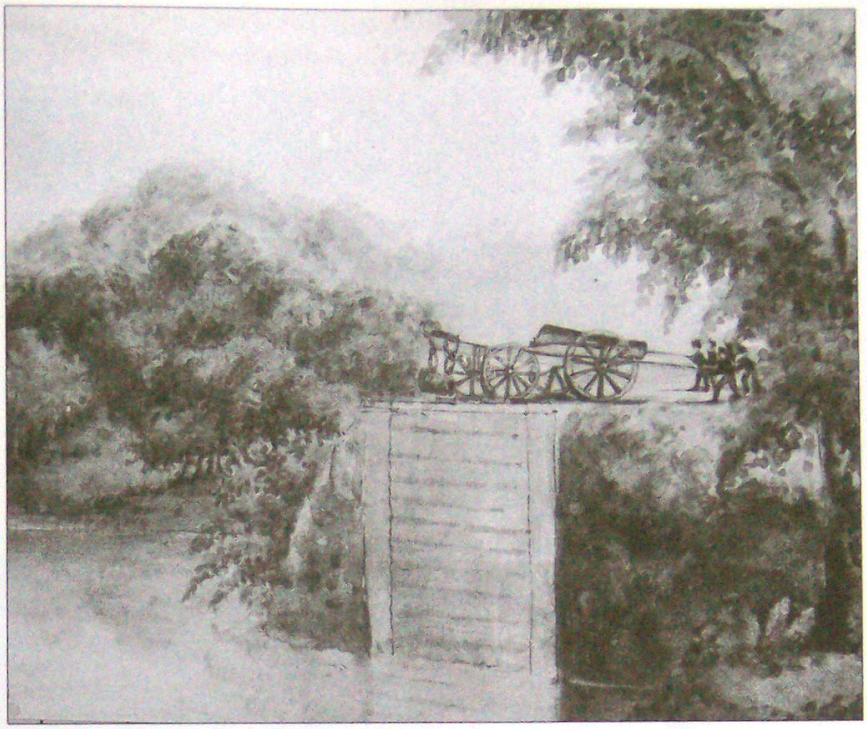
The Duke of Wellington became the Master-General after the Napoleonic Wars.

The nature of warfare during the Napoleonic period dictated that guns heavier than the 12-pounder were seldom used on the battlefield and therefore the main weapons in use with the British Army were the 3-, 6-, and 9-pounder types. Howitzers, commonly 5½-inch designs, were also regularly employed. French armies of the period used the 4-, 8- and 12-pounder guns laid down by Jean Baptiste Gribeauval, the great French artillerist and moderniser. Many European armies followed suit and based their systems on the French model.

Mortars were also occasionally used in the field and rockets of course make their appearance during this period and were certainly used to increase battlefield firepower. However, the subject of rockets is so specialised that we will not deal with their use in this volume. Larger guns were used in siege warfare and were added to a siege train, which would also often include mortars and howitzers.

ORGANISATION

Surprisingly few original publications exist which deal specifically with British artillery organisation of the Napoleonic Wars. Some of these are



The cadets of the Royal Artillery were taught to deal with any eventuality by a programme of drawing and what were known as repository exercises. These exercises taught gunners how to move and lift weights with ropes and tackle using what was available to them. This beautiful illustration (the original is in colour) demonstrates one such exercise using a pontoon cart and gun carriage to lower and raise a gun barrel up and down a riverbank. (Courtesy RAHT)

contradictory but what is clear is that, during this period, the tactical use of artillery had begun to change quite dramatically. The innovations of Napoleon Bonaparte, himself a gunner, led to other countries experimenting with the use of artillery.

At the beginning of the period artillery was divided up into battalion guns, horse artillery and artillery of the park. Battalion guns could be 3- or light 6-pounders and were normally attached, as their name suggests, to a battalion of infantry. The horse artillery was formed in 1793 to provide a type of mobile artillery unit that was to follow the cavalry to give them more firepower or to move quickly to where more firepower was needed. Artillery of the park was the name given to the heavier types of guns such as the 12-pounder. As the name suggests, the guns were less mobile and were used to occupy specific positions of advantage from which their greater hitting power could be brought to bear. By 1800 these three separate entities had changed so that artillery had become divided into foot artillery, horse artillery and artillery of the park. Spreading pairs of guns about infantry regiments had become a thing of the past and the artillery had become far more centralised.

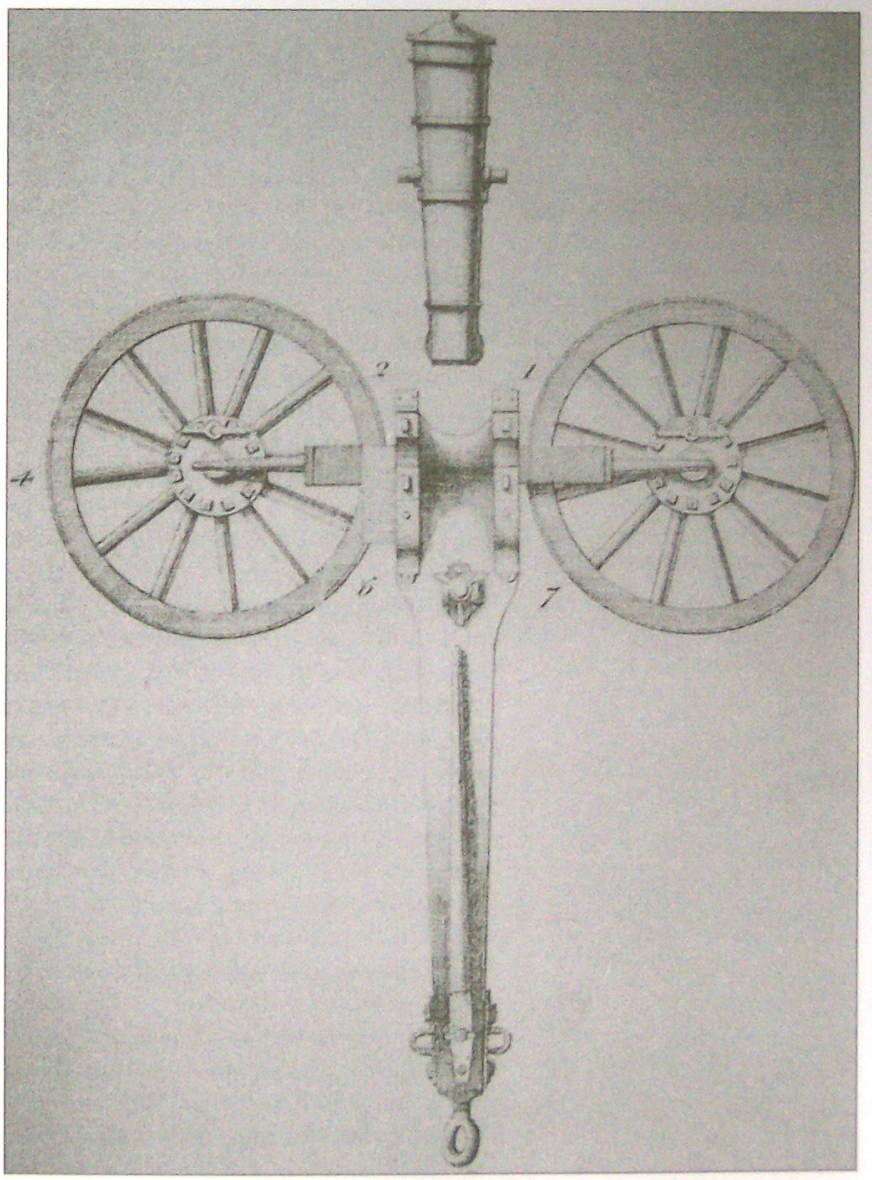
Normally foot artillery was organised in 'brigades' of between six and 12 guns; the word battery now so commonly associated with an artillery unit of this sort of size was a later creation. The unit could be further broken down into sub-units called 'divisions' consisting of two guns. A single crew with its gun and limber was known as a sub-division. In the Royal Horse Artillery the tactical unit equivalent to the brigade was the 'troop', with an establishment of six guns. Brigade and troop strengths varied on campaign and were often less than the official establishment. The British Army of the Peninsular War was chronically short of artillery, for example, and in particular heavier guns such as the 12-pounder were very scarce.

In 1798 the compliment of three artillery brigades was as follows:

12-pounder	6-pounder	howitzer
4 guns	4 guns	4 howitzers
8 ammunition wagons	4 ammunition wagons	8 ammunition wagons
1 forge cart	1 forge cart	1 forge cart
1 store wagon	1 store wagon	1 store wagon
1 spare wagon	1 spare wagon	1 spare wagon
1 food wagon	1 food wagon	1 food wagon
2 wagons musket ammunition	2 wagons musket ammunition	2 wagons musket ammunition

This table describes the order of marching if the guns are meant to support three different columns. However, by the time of the Peninsular War, brigades were mostly six guns strong, horse artillery troops having five 6-pounders and one 5½-inch howitzer. Early 19th-century sources state that a brigade of foot artillery consisted of an artillery company, drivers and horses, six guns and six ammunition wagons, a wheel carriage, a mobile forge, two store wagons and two spare ammunition wagons.

The previous practice of using civilians to drive the horses died out in 1794 when the Corps of Drivers of the Royal Artillery was created. A 'section' of drivers consisted of 90 men plus craftsmen, which was then combined so that a 'troop' of drivers was made up of five sections. These large units were split up and allocated to gun brigades as needed. Even though these men were part of the army the problems of control still existed, as they were not actually part of the Royal Artillery, but formed a separate Corps. This led to some command difficulties when in the field. Munitions were transported by the Field Train Department, whose job it was to ensure



An Indian version of the 3-pounder gun and carriage exploded to show the component parts. Although 'Royal' and Indian guns were supposed to be the same the carriages were different with altered hubs, trail spike and fittings. (Courtesy RAHT)

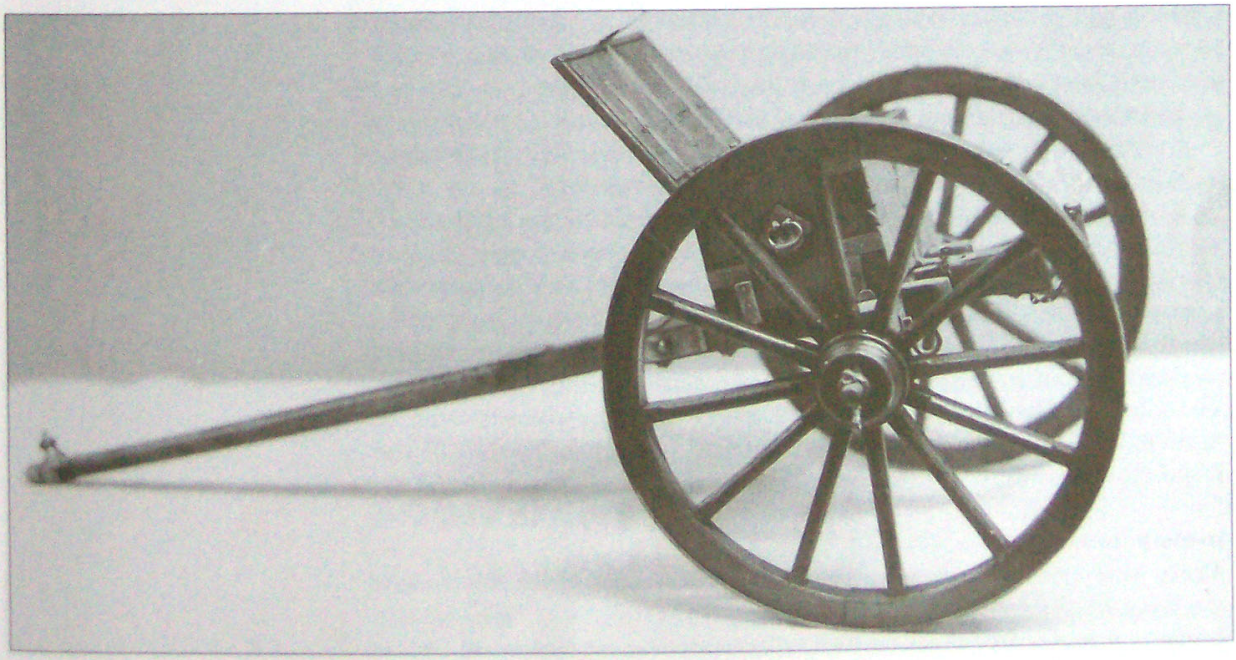
that all artillery units were kept supplied with ammunition. Members of the Field Train wore Royal Artillery uniform.

Men

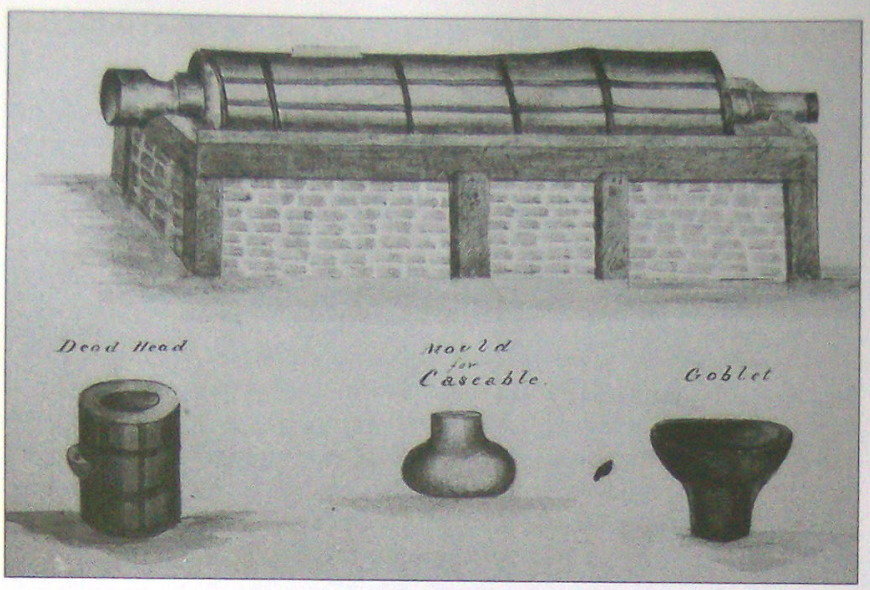
The cultural home of the Royal Regiment of Artillery was Woolwich in London. Since the mid-18th century officers had been trained at the Royal Military Academy by now on the Woolwich Arsenal site. The engineers and gunners were trained together and were given lessons in drawing, fencing, dancing and the military arts. In fact, two successive Drawing Masters at Woolwich were the Sandby brothers, Thomas and Paul, famous for their English landscape watercolours. It is no surprise therefore that gunner officers were able to draw so capably, landscape drawing being an integral part of surveying. Cadets as young as 12 years old were taken into the Academy at Woolwich but they were often not liked either by the commanders or by the local populace, one particular officer calling them 'scabby sheep'. In 1806 training for the gunners transferred to a new military academy about two miles away near Shooter's Hill and then colloquially known as 'the shop'. Along with the Royal Engineers the officers of the Royal Artillery were the only scientifically trained men in the British Army and as such they achieved a relatively high degree of professionalism. Officers did not buy their commissions and were instead promoted strictly by seniority, which could cause some dissatisfaction since the average service required to attain a colonelcy in the Royal Artillery was 36 years.

The Royal Horse Artillery was a different matter. Its members were expected to be able to ride and use a sword. After its establishment in 1793 the Horse Artillery quickly became known as an elite unit, which was expected to deliver artillery fire quickly, and at the point needed.

The men of the artillery were really all volunteers, which meant that they had joined for a variety of reasons. Many joined because they thirsted after adventure but a good percentage were running away from



The carriages of the Honourable East India Company were quite different from 'Royal' designs. This exquisite model was an exact copy of the limber for the 12-pounder gun as used by the Bengal Horse Artillery. (Courtesy RAHT)



A gun mould before the central core has been removed and the dead head and cascable mould attached. The brick mount may well be a device to hold a fire for drying the mould. From a cadet's notebook at the Royal Military Academy. (Courtesy RAHT)

something: the law, unwanted marriages, debt. As Wellington stated:

> Some of our men enlist from having got bastard children – some for minor offences – many more for drink; but you could hardly conceive such a set brought together, and it really is wonderful that we should have made them the fine fellows that they are.

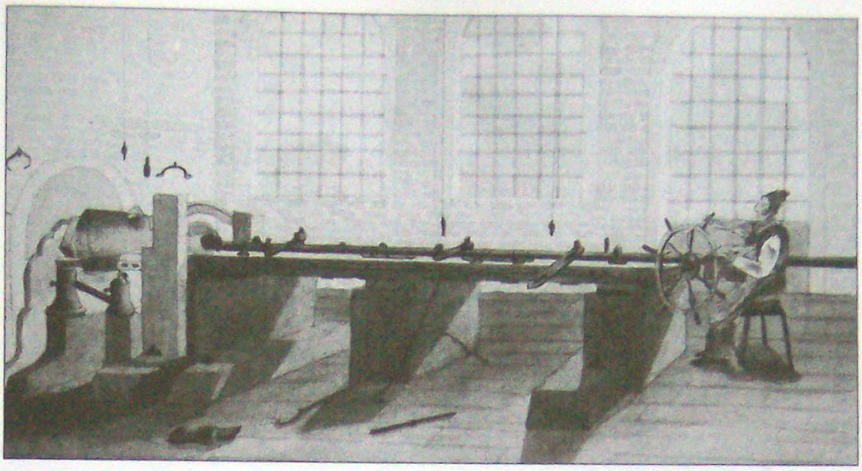
Discipline was as harsh in the artillery as in any other branch of the army and much has been made of the punishments during Wellington's time with sentences of 300–500 strokes of the lash being common for relatively minor misdemeanours. Punishment was not always uniformly administered. Officers often believed the strictest of discipline was necessary to ensure that their men performed difficult executions in battle. A further thought is that the gunners would inevitably have some very desperate men in the ranks and severe discipline might well genuinely have been needed to keep these people in check.

Men were paid about 1 shilling (£0.05) a day with sergeants and corporals getting more. The sergeants of the Royal Horse Artillery got 2 shillings and 4 pence (£0.12), one of the highest rates.

The men generally lived under canvas in the field or were billeted in inns. Alcohol was a way of life in the army. It has been suggested that excessive drinking was due to boredom and the lack of facilities accorded them. This may well be true but there are many occasions when troops were drunk even in the thick of battle, Cavalie Mercer referred to a drunken Belgian artillery unit at the Battle of Waterloo. The Corps of Drivers came in for particular criticism when it came to morale, being described as a 'nest of infamy' by William Swabey of the Royal Horse Artillery.

Indian artillery

There were several campaigns in India in this period which allow us to see the differences between British and Indian artillery. At this time the territory governed by the East India Company was administered by the



A gun-boring machine at Woolwich Arsenal. The operator revolves the wheel driving the cutting head into the gun thus cutting the bore. (Courtesy RAHT)

three presidencies of Madras, Bombay and Bengal which each had its own armed forces and artillery units. By 1802 there were 21 European-manned artillery companies and 30 companies with Indian personnel. In general foot artillery accompanied the guns on foot and oxen drew the guns. However, the need for fast-moving units to accompany cavalry became acute. In 1800 orders were given that the Bengal artillery should form an experimental horse artillery unit.

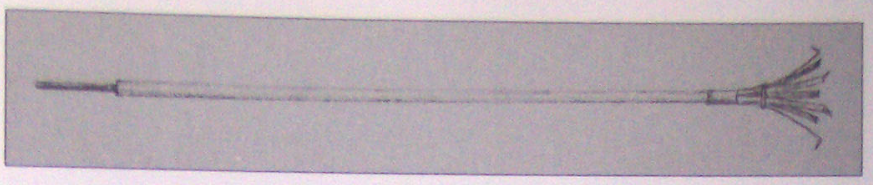
The Bengal horse artillery unit was sent to Egypt to support Sir Ralph Abercrombie's force sent as a counter to Napoleon's forces there. The Bengal artillery was troubled with transport problems from the moment it set foot in the country. As is normally the case in these situations improvisation was necessary. Most of the horses died from lack of water and camels were drafted in to try to make up the shortfall. The unit returned to India in 1801 without seeing action.

Indian gun barrels and 'Royal' patterns were very similar but there the similarity of 'British' and 'Indian' equipment ended. For example, Bengal brigades were each armed with a variety of weapons, typically two 12-pounders, two 6-pounders and two 3-pounders, although in 1809 the establishment was stated as two 12-pounders, two 5½-inch howitzers and two 6-pounders. Gun carriages were still the old-fashioned double bracket design, but in 1810 it was decided to copy the Gribeauval designs of the French Army and the deep cranked design of this carriage was married to a limber design where the limber hook was mounted high up on the limber platform. This made the whole equipment quite unstable. Bengal horse teams normally numbered six horses and were all ridden. The reason for this is thought to be that a ridden horse has more tractive power than an unridden horse. Bengal artillery units favoured a central pole system on the limber. Details of the carriages and equipment have come down to us through drawings produced by the East India Company in the 1820s.

EQUIPMENT

Manufacture

The Royal Brass Foundry at Woolwich Arsenal manufactured most of the bronze guns required by the Board of Ordnance. This system was the



The searcher, the tool used for seeking out flaws in the metal of the gun bore. There is a ring near the base of the splayed head known as the reliever. This expanded or contracted the head when the tool was in use. (Courtesy RAHT)

result of a disaster at a private contractor's works in Moorfields in 1716. A civilian contractor for the Board of Ordnance, Mathew Bagley, had killed himself whilst pouring bronze guns into a damp mould. This would have been forgivable but for the fact that he also managed to kill or injure several government dignitaries who were also present, including a future Colonel of the Royal Artillery, Albert Borgard, who was maimed during the incident. After this the Board decided to employ a Swiss, Andreas Schalch, to work in England and cast the guns it needed.

Schalch was eventually succeeded by Jan and Peter Verbruggen, a father and son team who were brought from Holland. Jan Verbruggen is credited with having introduced two techniques for improving the manufacture of cannon: casting from solid and horizontal boring (the process by which the bore of the gun is made). A metal bit or tool is forced down the length of a gun removing the excess metal and forming the cavity known as the bore. Previously casting was done around a wooden spindle, which would eventually form the bore of the gun. Verbruggen introduced a method by which the gun was cast in one piece and the bore removed by turning.

The process by which guns were made was similar with or without the central core. A model of the barrel was first made in clay and horsehair. This was normally formed around a wooden spindle and built up layer upon layer. The model was usually made with an additional two feet on the end of the muzzle, which would eventually become the head during the casting process, forming a cavity which would be a reservoir for the molten metal. When complete, the model was dried and covered in molten wax. At this stage the trunnions (two solid cylindrical pieces of metal that protrude from the sides of the gun and support it) and cascable (rear section of the gun, normally from the base ring to the tip of the cascable button) were not included. Trunnion patterns made in wood were then added and they were positioned three-sevenths of the distance from the breech to the muzzle. Finally the dolphins (metal projections on the upper surface of the gun, midway between the breach and the muzzle, which acted as handles and could be used to lift the barrel) and decoration were added; these were normally cast in wax on the model and the moulds were used many times over.

The mould itself was made of a similar material to the model and was applied on top of the wax covering of the model one layer at time in a thin solution by brush. After several coats had been applied in this way thicker layers would be added until the mould was about 1½ for a 6-pounder gun, although this varied with the type of weapon being cast. Once this was complete the mould was bound with iron hoops and staves (long, narrow pieces of wood) to strengthen it. Once strengthened, the model could then be removed. This process consisted of extracting the wooden spindle by hammering it out, after which the clay of the model would collapse inward leaving the pattern of the

model on the inner mould. Any damage to the inner surface of the model was examined and then repaired with more clay. The inside was dried and then brushed with lye and soot to ensure that the bronze did not stick. Because the mould had to be made open-ended to extract the model, the breech was made separately. This could be wired to the main mould before casting, but by the Napoleonic period it was common for the foundry to use a heavy metal container that would hold the weight of the metal without attaching it to the mould and form the breech end of the gun in this way.

Casting guns was a very labour intensive process and required the mould to be placed in a pit in front of the furnace. The moulds were buried with their casting head at floor level. The bronze (known as brass in this period) was a mixture of approximately 90% copper and 10% tin, although precise recipes varied. The tapping hole of the furnace was pierced and bronze was directed into the head of the gun mould. Normally between 12 and 14 guns were cast at any one time. Once poured, the moulds were left for about a day and then they could be broken open to reveal the gun inside. Obviously a mould could only be used once and this is why guns, although designed in great detail, are never exactly the same. Finally the feed head had to be removed and this could take up to 24 hours depending upon the size of the gun. Four men would use a saw to cut through the head where it joined the muzzle face of the gun. Once this was finished a rough casting of the gun had been produced.

Horizontal boring was another technique introduced to improve quality. The cannon was mounted into a horizontal lathe, driven by horses, where it could be turned and a tool was forced down the central axis of the gun, so that the gun itself revolved while the tool head stayed still. The lathe was the invention of Johann Maritz, a Swiss, who also invented a process of casting from solid. This process produced a smooth bore with very few flaws compared with the central core method of casting. The exterior surfaces were also machined in this system but the section by the trunnions had to be finished by hand.

Once the whole thing was complete, an inspection of the bore took place because any irregularity could damage the gun when fired. A specially designed tool called a searcher was employed to check the bore. It consisted of a long stave with a number of metal arms bent at 90 degrees at their ends. The arms could be compressed together by a

A method of testing the sound casting of a gun. The piece is fitted with a rig that allows the gun to be filled with water under pressure so that it may seek out any flaws in the metal. The force is exerted on the trunnions to keep the pipe in place. From the notebook of a cadet at Woolwich Arsenal, dated 1829. (Courtesy RAHT)

ring, which was known as the reliever. The searcher was pushed down the bore and gradually drawn out. When it caught on a flaw the position of the flaw was marked by its distance down the bore. The flaws would also be examined by mirror or candlelight. Flaws could sometimes be repaired by tapping the hole and screwing in a brass plug. This sort of malpractice was viewed in a dim light by the authorities but guns that had been patched up in this way were still used often.

Once complete the gun could then be tested, a process normally called 'proving' the gun. Proof was achieved by firing the gun with a much larger charge than would be required for service. It was also possible to test the gun for damage by subjecting it to water pressure to see if the bore leaked.

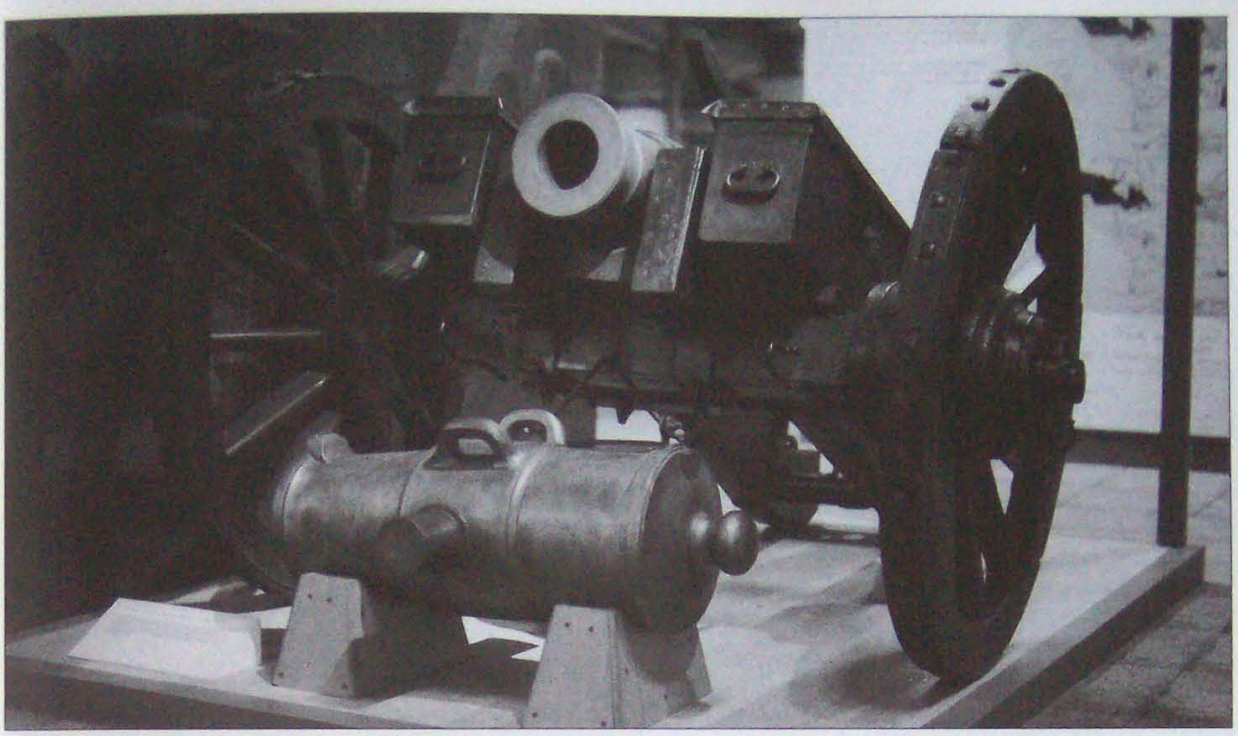
Having introduced new innovations and set Woolwich upon a firm footing as a foundry Jan Verbruggen died in 1781. His son died five years later and the responsibility of supplying most of the British Army's artillery weapons fell to John King, who was appointed a brass founder, along with his brother Henry, in 1784. John King was both Foreman and Master Founder during his career and a great many guns bear the two brothers' names. John died in 1813 and after this Henry worked with John's son Cornelius, who became Master Founder on his father's death.

Having set up its own prestigious foundry one would think that the Board of Ordnance would have no requirement for civilian foundries but this was not the case. When there was a shortage of weapons civilian contractors were used, especially Francis Kinman. Kinman had foundries in New Street Square and Shoe Lane in London and produced many guns for the government.

The cipher of the Earl of Chatham, who was twice Master-General of the Ordnance between 1801 and 1810. The Master-General's cipher was normally engraved or cast upon the chase of the gun; the first reinforce was reserved for the cipher of the monarch. Chatham was Major General John Pitt, elder brother of William Pitt the Younger, Prime Minister for much of the period. Chatham was a failure as a military commander, being the head of the unsuccessful Walcheren expedition in 1809. He was, however, considered to be a capable administrator. (Courtesy RAHT)

Brass guns

Nearly all field guns were made of bronze, commonly called brass in this period. Bronze was much lighter than iron, so it made sense in the interests of manoeuvrability to use bronze. In addition, it resisted the shock of firing, was able to stand the force of the projectile travelling down the bore and retained its shape after the whole event was complete. That is not to say that bronze was not prone to damage but a bronze gun did not explode



A 5½-inch howitzer mounted on a replica carriage. George III originally presented this particular barrel to the Chinese Emperor who then placed it in his palace. During the campaign of 1860 the palace was captured and the howitzer duly returned to Britain. (Courtesy RAHT)

into deadly fragments, as iron ones were prone to, but normally burst in a controllable way.

In the British artillery the main calibres were 3-, 6-, 9- and 12-pounder guns as we have seen. The 9-pounder was a later addition brought into service to counteract the French 8-pounder, which was thought to be more powerful than the 6-pounder which had previously been the standard British weapon.

The first of these weapons, the 3-pounder, was already a feature in British armies earlier in the 18th century and many different versions were produced. By the time of the Napoleonic Wars, the 3-pounder was used in many different roles. Drawings show 3-pounders mounted upon light carriages prepared for single draft (that is pulled by a single horse).

The Inspector-General of Artillery, Thomas Blomefield, designed many of the guns in the 1790s that were to be widely used in the Napoleonic Wars. Blomefield's designs moved towards a standardisation of guns for the British Army. The guns were effectively the same whether they were 3-, 6-, 9- or 12-pounders, varying only in size. There were two 3-pounders in Blomefield's system, one was 4 feet 1.52 inches long and weighed 4½ hundredweight while the other was 6 feet long and weighed 6 hundredweight. They are distinctive in that the muzzle has a shallow flare and there is a pronounced vent field (area on the breech where the vent is drilled). Blomefield's designs were not the only 3-pounders produced in the late 18th century and it is reasonable to assume that quite a few of these other guns still existed and were used in the later campaigns of the Napoleonic Wars; guns, after all, have a long life span. General Desaguliers, for example, designed a light and a heavy 3-pounder but details of these guns are scarce. Only one design, of 6 feet and 6 hundredweight, can be confirmed.

By contrast the 6-pounder was a widely used size of gun and had been considered a standard size since the 1770s. William Congreve designed a light 6-pounder and Desaguliers and William Belford also designed and produced guns of this calibre. Desaguliers' design was 7 feet long and weighed 12¼ hundredweight, whereas Belford's was 5 feet long and weighed 5¼ hundredweight. According to Ralph Willet Adye's tables in 1802, Desaguliers' gun was 7 feet and 12 hundredweight 24 pounds and Belford's 5 feet and 5 hundredweight 2 quarters 3 pounds. (Adye was a noted English artillerist and author of *Bombadier and Pocket Gunner*, one of the only practical manuals dedicated to gunnery that was published regularly.) Even before the start of the Napoleonic Wars, guns were being designed for a specific purpose in mind. In the early part of the 18th century bronze 6-pounders could be 8 or even 9 feet long and weighed in at about 1 ton. In 1774 the Verbruggens produced a decorated bronze 6-pounder of 19 hundredweight 2 quarters 6 pounds and 8 feet in length. This gun had a very decorative vent field, dolphins and raised decorations. Compared to this the light 6-pounder illustrated in the notebook of C.W. Rudyerd in 1793 is 4.5 feet long and 5 and 4 hundredweight. This gun was introduced into service in the late 1770s and was known as the light 6-pounder until at least 1813.

Blomefield's system tended to overshadow all the others and he produced two 6-pounder gun designs. These were: heavy 5 feet 2.36 inches and 9 hundredweight, and light 5 feet and 6 hundredweight.

In 1802 the 12-pounder was the heaviest field gun, anything larger was normally either a garrison or siege piece. There were exceptions to this caveat but even the 12-pounder was eventually generally considered to be too heavy for the field.

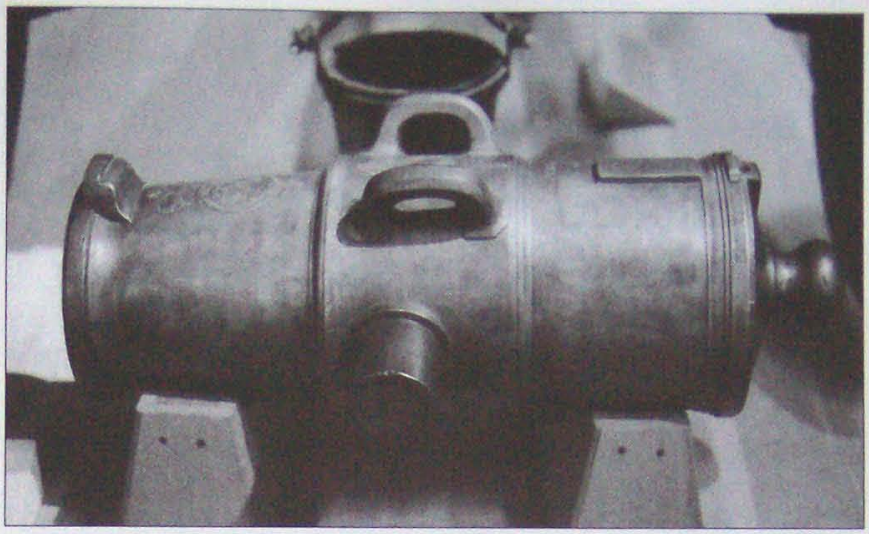
Again there were six versions mentioned in Adye's tables in 1802:

WEIGHTS ARE GIVEN AS HUNDREDWEIGHTS: QUARTERS: POUNDS		
Heavy	9 feet	31:2:8
Desaguliers'	7 feet 6 inches	22:1:21
Medium old	6 feet 6 inches	21:3:0
Medium new	6 feet 6 inches	18:0:0
Light	5 feet	8:3:4
Light new	5 feet	12:0:0

The new medium gun is thought to have been designed by Blomefield and it was the only one that remained in service after the Napoleonic Wars.

Howitzers

The word howitzer is thought to have come from the German Haubitz but it is not clear what the original meaning was. In British service howitzers were short-barrelled light weapons with a chambered bore which fired hollow shells. The chambered bore meant that a small powder charge was used and so the howitzer was a relatively low-velocity weapon. It could fire at a high angle and therefore was often used to fire over the heads of friendly troops, the projectile being designed to explode close above the heads of the enemy. There were two main types



A heavy 5½-inch howitzer cast in 1813. The muzzle bears a large projection known as a dispart sight, which was a later addition to guns. The sight was intended to keep the line of sight of the gun layer parallel with the axis of the bore of the gun. (Courtesy RAHT)

of howitzer in the British field artillery: the 4⅖-inch howitzer, sometimes known as the Coehorn and the 5½-inch howitzer, which was the main type used by the field artillery. One theory has suggested that howitzers developed as alterations of existing forms of mortar since the calibres correspond to those of the Royal and Coehorn mortars of 4⅖-inch and 5½-inch calibre respectively.

The barrel of the 4⅖-inch howitzer was very short, typically 1 foot and 10 inches in length. This howitzer was considered a useful mountain weapon with a weight of 2½ hundredweight; it had a powder charge of only 8 ounces. The 5½-inch howitzer was generally specified as being 2 feet 2 inches long and weighing 4 hundredweight, although existing examples seem to vary between 4 hundredweight and 4 hundredweight 17lb; the powder charge required was 1lb.

A much heavier 5½-inch, 10 hundredweight, howitzer was produced for service and an example of this weapon exists in the Royal Artillery Museum. This howitzer is cast with dolphins and a dispart sight, which meant that, when aimed with this aid, the line of sight was parallel to the axis of the bore. This feature was thought to be a later development in bronze guns and so this may be one of the earliest examples of a cast dispart sight on a gun made at Woolwich. The dolphins are an addition, which do not occur on earlier models, and were probably added because of the extra weight of the howitzer. However, this weapon does not appear to have been issued widely and may only ever have been intended for garrison use. The 8- and 10-inch howitzers were the heaviest in service but were generally considered to be siege weapons and therefore were too heavy for use in the field, the 10-inch weighing over one ton.

Mountain artillery

The British and Indian armies had a proud tradition of mountain artillery units for employment in areas where larger artillery pieces could not be used. But mountain batteries were not formally organised in this period and certainly during the 18th century these units were only established on an ad-hoc basis. Early references to mountain units are scarce and vague and it is not until we get to the Pyrenean campaign of

Three examples of shot from the early 19th century. On the left is a common shell showing the interior and fuse hole. The round projectile behind is the carcass. The object in front is a case shot that has been opened. The two spheres are examples of the type of shot the case was filled with. (Courtesy RAHT)

1813–14 that the beginnings of a British mountain battery can be identified. Although a mountain brigade is mentioned under Captain arabin in the Eastern Peninsular army 1812–13. Both the French and Spanish armies made use of small guns for operations in mountain areas but for the British it was a certain Colonel Cookson who attempted to form such a unit under the auspices of the Royal Horse Artillery.

During the Corunna campaign there is evidence to suggest that a mountain battery was in use but it is not until 1813 that one becomes aware of a mountain battery actually in action. Following the passage of the Bidassoa on 7 October, one mountain battery engaged the French artillery in position there. Normal batteries had found the terrain impassable with the standard gun carriages being shaken to bits by the conditions. Marshal Beresford brought several 3-pounder guns from Lisbon and eventually equipped a unit with mules and personnel. It is curious to note that Portuguese gunners and British officers and drivers were mixed in this unit. They were commanded by a Lieutenant Robe who came from a family of distinguished gunners and engineers and who was eventually killed at Waterloo. These guns were attached to the Light Division and were heavily used in the battles of La Nivelle, Arcanques, Orthes and Toulouse although the 3-pounder calibre was found to be too small to affect some of the French defences.

The equipment was generally 3-pounders and 4⅖-inch howitzers. The carriages were carried by a single mule that bore both the trail (part of the carriage which rests on the ground when unlimbered) and the wheels. After some experimentation it was found that the mules were strained by this weight and the load was split. Mountain artillery was also used in the Nepal campaign of 1814–16 and again the equipment was the same. There are no reliable lists of the drill and arrangements of these mountain batteries but the records of a 4⅖-inch howitzer battery sent to Spain during the Carlist Wars some 20 years later describes the unit as having two divisions, a front and a reserve division. The number of men in this unit appears to have been between 48 and 60, and each

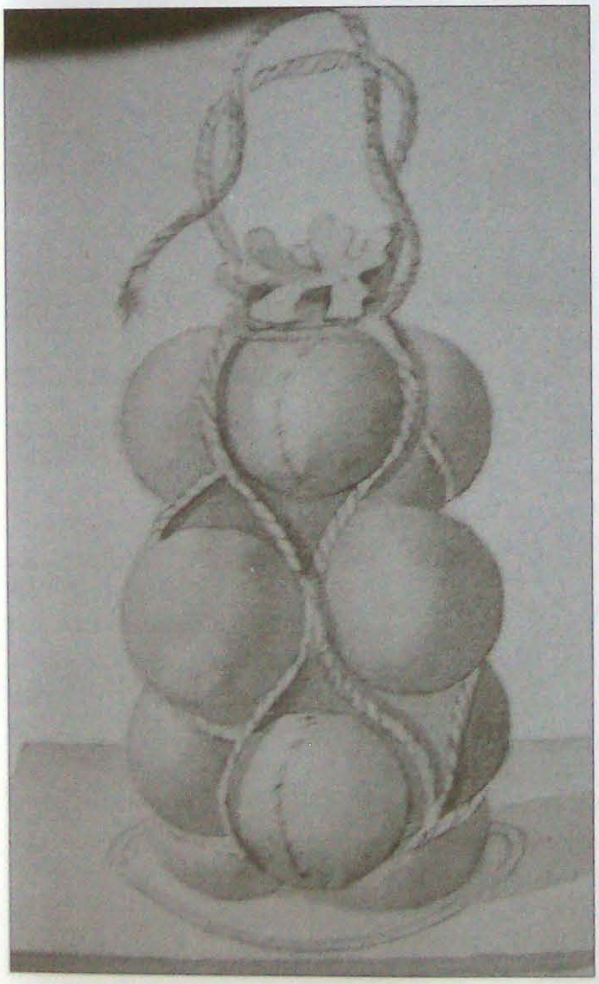
division had 36 mules. Four carried the howitzers, two carried the beds, and eight carried the ammunition (48 rounds per gun). There were four spare mules, plus four for the men's kit and two for provision and forage.

Ammunition

Of all the types of ammunition used in the Napoleonic Wars the cast iron, spherical, round shot was the staple of the British gunner. Even at long range when the shot was travelling relatively slowly it could be deadly, though it might appear to be bouncing or rolling along the ground relatively gently. At short range carnage would result.

Round shot were undeniably inaccurate. This was because, despite their name, round shot were never perfectly spherical, not did they fit to their gun barrels exactly. Air acted on the irregular surface of the projectile. These irregularities invariably threw them off target to some degree. It is often also a matter of confusion as to why a 12-pounder shot was so much more effective than a 6-pounder shot. This is because the impact of a shot was not only related to its weight but also to its velocity, which, with a heavier projectile, was much greater at the end of the trajectory.

Range is another controversial issue. Range depended mainly on two factors: the size of the powder charge and the elevation of the gun. As a gun is elevated the range increases up to a certain point. In contemporary manuals ranges for elevations of up to five degrees were often given. (Such ranges were usually listed in terms of the 'first graze' distance, the distance to the first point at which the shot will hit the ground. Depending on the composition and slope of the ground struck this distance was often much less than the total range at which destructive effect was possible since a bouncing or rolling shot could still do great harm.) So, for a medium 12-pounder gun with a charge of four pounds of powder, first graze at three degrees elevation was 1,189 yards. Compare this with the first graze of 1,444 yards from a medium 6-pounder gun using a charge of two pounds of powder. Alternatively a gun could be fired with two projectiles, in which case from a 12-pounder the first shot would travel 607 yards and second would travel 706 yards. As a general rule guns could range to about 1,500 yards, after which the aim and direction of the shot were completely uncontrollable. A lucky round could have the most unexpected results, however; Sir John Moore was mortally wounded by just such a shot at the Battle of Corunna, which injured his shoulder and chest.



A contemporary drawing of the 6-pounder grape shot. The shot are sewn into a canvas bag and tied with hemp. (Courtesy RAHT)

There were two forms of close-range weapon, which were extremely useful at up to 300 yards range. Grape shot and canister, or case, were the anti-personnel weapons of choice of the gunner. Grape was a cluster of large metal spheres tied

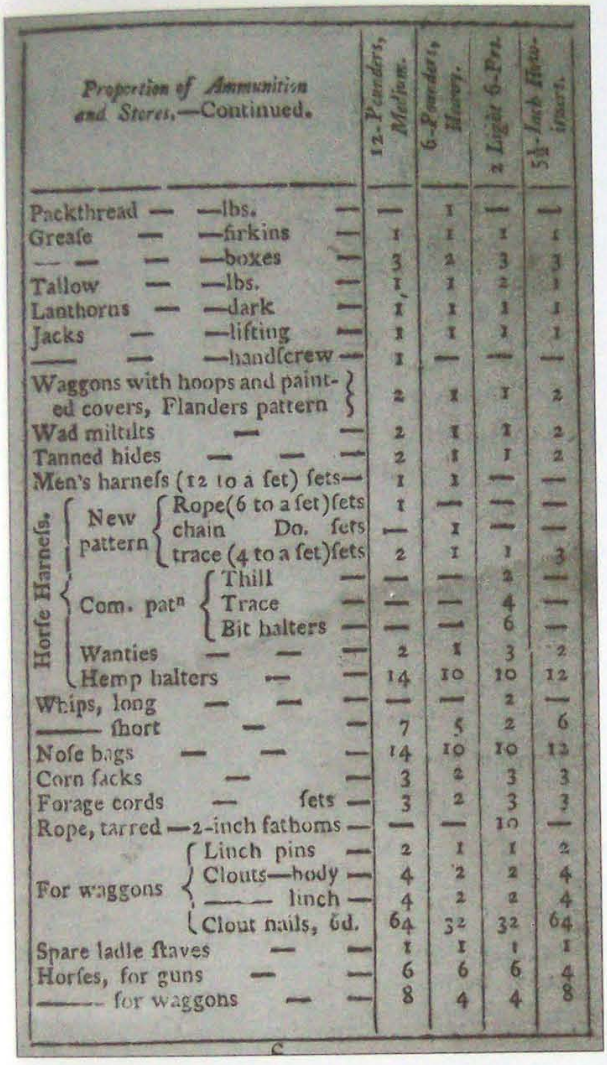
Two early fuses for howitzer shells. They still have the original cap covers, and the gradations into parts of a second corresponding to the time of flight are clearly seen. The gunner would cut the fuse to the required length. (Courtesy RAHT)

together around a central spindle and base and normally sewn into a bag, whereas canister was a metal case filled with smaller iron or lead spheres. The whole purpose of these types of shot was to break up when fired from the gun forming a wide cone of flying metal that acted in the same way as a shotgun cartridge.

For longer-range anti-personnel work the common shell was also used. This was normally only fired from a mortar or howitzer and was a hollow sphere filled with a gunpowder charge. The top of the shell had thinner walls than the bottom and had an orifice into which was forced a wooden fuse normally made of beechwood. The fuse was designed to be ignited by the discharge of the gun and had a central channel drilled through it filled with a burning compound. Before firing, the fuse was cut to a certain length corresponding to the desired time of burning and hammered into the top of the shell by a mallet. When it arrived over the target the fuse, if correctly prepared, exploded the main charge, breaking open the metal outer casing and forcing flying fragments in all directions. Although favoured for siege work, the common shell was not always effective against infantry. What was needed was a weapon with the killing effect of grape shot but able to be projected to the ranges achieved by round shot.

The answer was provided by the man whose name is now synonymous with the idea of anti-personnel projectiles. Henry Shrapnel developed a hollow shell filled full of small lead projectiles that on exploding showered the enemy with them in much the same way as the case or canister did. The weapon was first tried in 1803 and was extremely effective, so much so that guns began to be armed with the weapon from approximately 1808 onwards. The shrapnel shell was actually known as spherical case shot and was issued to British artillery in the Peninsular and Waterloo campaigns. Its one great disadvantage was a tendency to explode prematurely and this was not rectified until after this period. It was also not always effective when it arrived at the target, as Portuguese gunners found when using it at the battle of Fuentes d'Onoro. According to Maxwell's Sketches of the Peninsular War the Portuguese opened fire on a body of the Brunswick Oels, a unit on their own side. The shells exploded over the heads of the Germans but luckily not one of them was injured.

The final type of projectile for the field artillery was the incendiary or carcass (a name for an incendiary projectile). Initially this device was



Proportion of Ammunition and Stores,—Continued.		12-Pounders, Medium.	6-Pounders, Heavy.	2 Light 6-Prs.	5½-Inch Howitzers.
Packthread —	—lbs. —	—	1	—	—
Greaſe —	—firkins —	1	1	1	1
— — —	—boxes —	3	2	3	3
Tallow —	—lbs. —	1	1	2	1
Lanthorns —	—dark —	1	1	1	1
Jacks —	—lifting —	1	1	1	1
— —	—handſcrew —	1	—	—	—
Waggons with hoops and painted covers, Flanders pattern		2	1	1	2
Wad miltilts —	—	2	1	1	2
Tanned hides — —	—	2	1	1	2
Men's harneſs (12 to a ſet) ſets—		1	1	—	—
Horſe Harneſs. New pattern: Rope (6 to a ſet) ſets		1	—	—	—
New pattern: chain Do. ſets		—	1	—	—
New pattern: trace (4 to a ſet) ſets		2	1	1	3
Com. patn: Thill	—	—	—	2	—
Com. patn: Trace	—	—	—	4	—
Com. patn: Bit halters	—	—	—	6	—
Wanties — —	—	2	1	3	2
Hemp halters —	—	14	10	10	12
Whips, long — —	—	—	—	2	—
—— ſhort —	—	7	5	2	6
Noſe bags — —	—	14	10	10	12
Corn ſacks —	—	3	2	3	3
Forage cords —	ſets —	3	2	3	3
Rope, tarred —	2-inch fathoms —	—	—	10	—
For waggons: Linch pins	—	2	1	1	2
For waggons: Clouts—body	—	4	2	2	4
For waggons: —— linch	—	4	2	2	4
For waggons: Clout nails, 6d.		64	32	32	64
Spare ladle ſtaves —	—	1	1	1	1
Horſes, for guns —	—	6	6	6	4
—— for waggons —	—	8	4	4	8

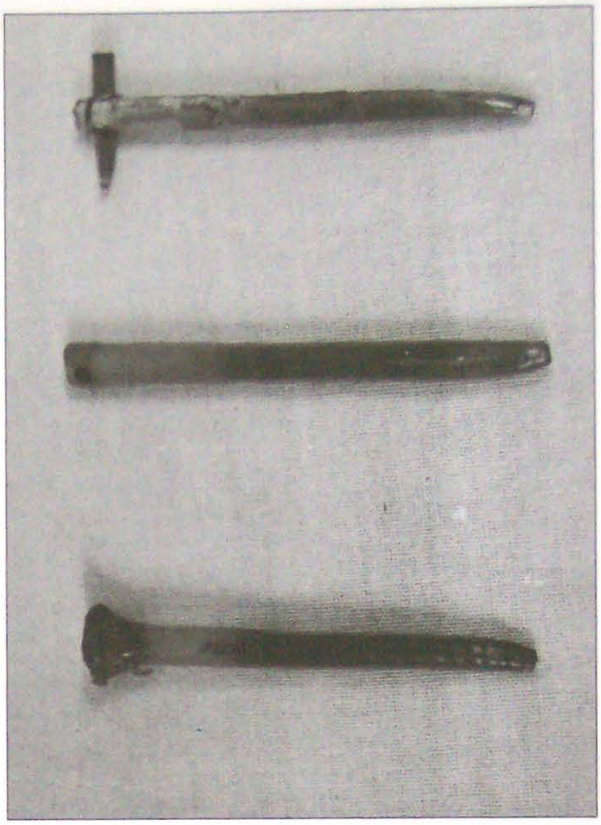
Proportions of ammunition for each type of ordnance as provided by the *Bombardier and Pocket Gunner*. (Courtesy RAHT)

composed of a metal frame, which was covered with a canvas cover and filled with a special recipe, typically saltpetre 50 parts, sulphur 25 parts, antimony 5 parts, rosin 8 parts, and pitch 5 parts. However, during the early 19th century another form of carcass became common and this took the form of a common shell with two or three apertures in its exterior into which a similar composition was put. Carcass rounds were normally only issued to howitzers or mortars, the suggestion being they were intended to attack towns. This does not preclude them from being used on the field but quite what their purpose would have been there is not clear.

All of these projectiles required propellant to fire them and in this case the propellant was a gunpowder charge placed inside a flannel bag. The great improvement in ammunition supply was the fixed round, which by this period was well established. The projectile, often with a wooden sabot (wooden base attached to the projectile, intended to keep the shot in axis of the gun so it didn't bounce) attached to the base, was fixed to the powder charge by placing the sabot in the top of the powder bag and tying it there with worsted string. It could also be sewn into a bag as was often done in India. This meant the whole unit could be placed in the muzzle and rammed home, saving time and making the drill more efficient. The old method of placing a wad into the gun after the round was still in use, and was intended to seat the bag at the bottom of the bore securely and to stop the round moving in the bore before firing.

The ignition process used a linstock and vent tubes. The linstock was a wooden stave with a bifurcated metal head, which held two screws. The screws operated jaws, which were used to hold a piece of smouldering 'match', that is a piece of rope soaked in saltpetre to make it burn for a long time. This was placed at the rear of the gun position and the gunner would light a portfire (composition of gunpowder, sulphur and saltpetre driven into a paper case) from it. The portfire was a piece of rolled paper filled with composition and known to burn for a particular length of time. The portfire was held in a short stick, the portfire holder. The vent tube was a convenient way of using a small charge to ignite the gun. They could be made of metal or goose quill and had a small amount of burning composition and often a piece of quickmatch within them. The propellant cartridge bag was pierced by the vent pricker and the vent tube placed in the vent. The burning portfire was then applied to the vent tube and the whole ignition train was set off. It is quite surprising that British artillery never adopted the flintlock firing mechanism as the navy did but the forces of conservatism were ever at work within the army and it was not until some time after this period that the army adopted firing locks, even though Sir Alexander Dickson (1777–1840), who was Wellington's

artillery commander in the Peninsular War, and became Inspector General of Artillery in 1822, had considered them just after the end of the wars.



Three quill tubes. The bottom one still has its cover and the other two have a length of quickmatch running through them. (Courtesy RAHT)

Sights

One of the more important aspects of gunnery was sighting. Smooth-bore muzzle-loaders were aimed by eye directly at the target. Up to a certain point if the gun is elevated it will increase the range but this presents problems for the gun aimer or layer as he was known. Therefore instruments were designed to aim the gun after it had been elevated, by raising the sight line at the back of the gun. These sights were called tangent sights. They were regarded with some scepticism, as a gunner in 1766 remarked: 'if the Gunner finds his gun throw at first either too high or too low or too much to the right or left, he can easily alter it by his eye without the assistance of an instrument.' Nevertheless, aiming instruments did exist and the tangent scale was one of them. It was a strip of brass marked off in quarter degrees, which allowed the gun to be elevated by a precise number of degrees above the horizontal depending on the range required. At its top the sight had a v-shaped notch through which the gunner viewed the front of the gun and aligned the muzzle marking and the tangent sight on the target.

The tangent sight could not be used for elevations less than three degrees and the gunner then had to rely on quarter sight scales. These were engravings on the rear of the base ring. The gunner aligned the appropriate one of these with a mark on the side of the muzzle and with the target. In practice the usefulness of such scales is likely to have been negligible since it would have been very difficult to align the marks on the target and in the heat of battle even more so.

Carriages

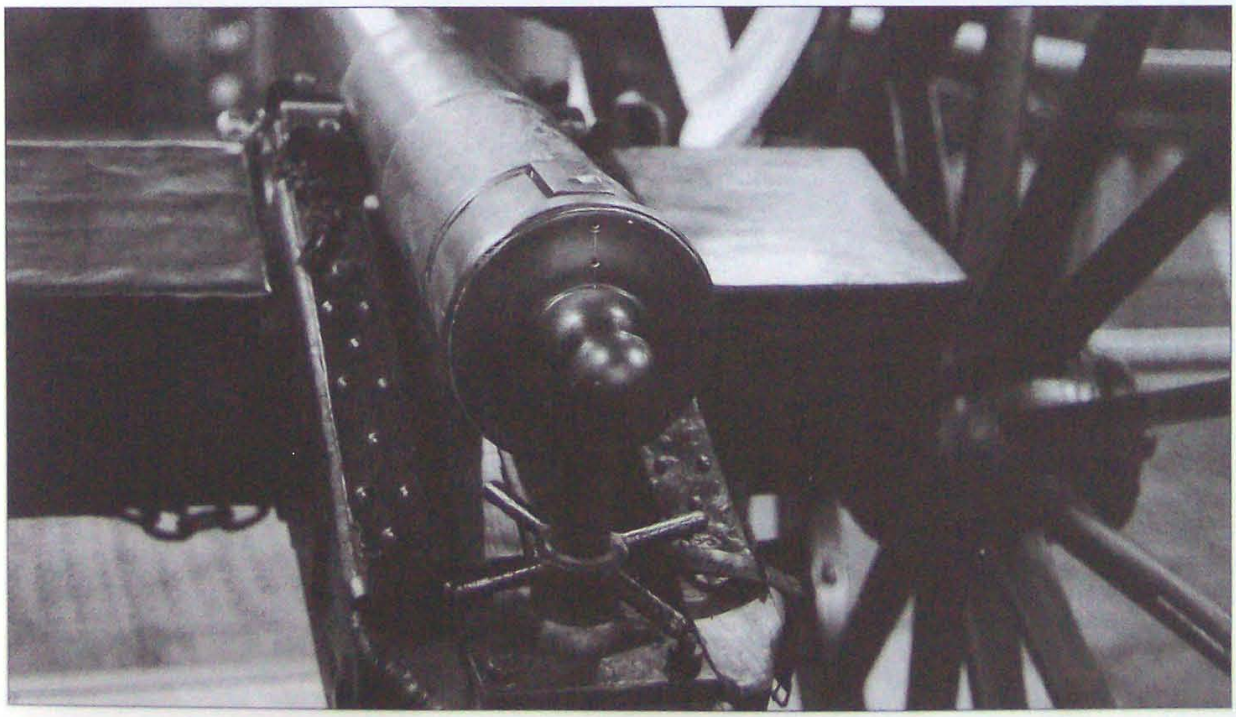
The barrels of most artillery pieces varied in slight ways over the 20-odd years in which the wars took place and therefore gun carriages also varied in their design. They went through many transitions but by the end of the period had been greatly improved in efficiency and strength. Most field guns were mounted upon the travelling carriage, though this was used both for transport and in action. The gun carriages that started the Napoleonic conflict were little changed from those used in the 17th century in that they were what were known as the double bracket type. These consisted of two longitudinal cheeks (the sides of the gun carriage in which the trunnions sit) along which were placed several connecting transoms (a stout beam or bulkhead connecting two parts of a gun carriage) and an axletree (a transverse beam supporting a gun carriage on the ends of which the wheels revolve) and bed. Two bearing recesses (the area in which the trunnions sit) were cut into the topsides of the cheeks and these formed the bearers for the trunnions of the gun. The

transom in front of the axletree, and the one that connected the two cheeks together as the trail, were placed horizontally. There were two more placed vertically underneath the breech and the first reinforce of the gun barrel and between these two a further wooden plate was fixed for the gun breech to rest upon, normally known as the stool bed.

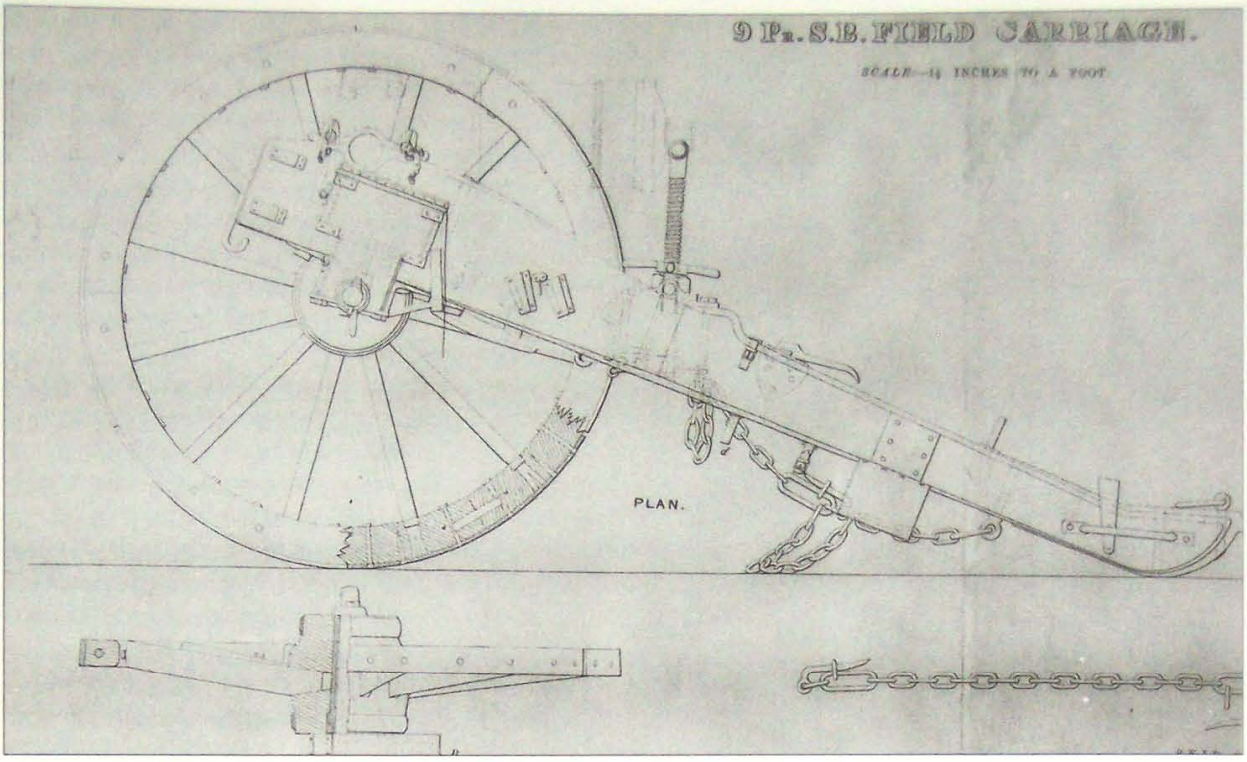
This sort of carriage was equipped with various items of metal work and was also particularly heavy. In addition, because the weight of the barrel tended to sit well to the rear of the axletree, the centre of gravity was thus positioned quite far back. Lifting a gun such as this was a major undertaking. As we can see even the so-called light 6-pounder in service in 1793 was quite a heavy piece.

The howitzer carriages were similar to the light 6-pounder design with two axletree boxes and a shorter trail. Initially these pieces were drawn by a limber consisting of a pintle (iron hook or spindle upon which the gun carriage rests and is secured when travelling) only, but by the early 1800s they were using the same limber as the field guns.

The great breakthrough in gun carriage design was the introduction of the Congreve block trail design. This consisted of a single baulk (a heavy rectangular piece) of timber carved and shaped to take two smaller brackets at the top of the gun carriage. These were bolted either side of the main trail section and were shaped to take the trunnions of the gun. Such a design conferred great advantages on the British artillery unit. The centre of gravity came to be more or less above the axletree so that one man using only a trail spike at the end of the gun could traverse the gun. The turning circle of the gun and limber was also far smaller because of the narrowness of the carriage. Soon after its establishment in 1793 the guns used by the Horse Artillery were given the block trail, although it may not have been fully introduced for howitzers, and soon after that all British guns began to be converted to



The rear of the 6-pounder gun and carriage showing the elevating screw. Two holes can be clearly seen on the cascable of the gun. These were used to affix a tangent sight. (Courtesy RAHT)



The 9-pounder smooth-bore field gun carriage as drawn by the Royal Carriage Department in 1864. Comparisons of this drawing with those of the 1820s show virtually no change in design over 45 years of use. (Courtesy RAHT)

the new design. The roots of this change actually go back to the 1780s when the artillerists Desaguliers and Congreve were designing gun carriages and limbers. It is thought that Desaguliers may have got the idea for the design from captured gun carriages taken from the island of Martinique in 1761. It was, however, Congreve who was tasked with designing the carriage and therefore in the long run he got the credit for its creation. No other European nation developed such a system as most tended to emulate the Gribeauval designs. This gave the British a considerable advantage in manoeuvrability and must therefore have lessened the work the artillery had to perform in the field.

British guns were normally fitted with axletree boxes which held a limited amount of ammunition and other stores, though larger field pieces of this type, for example the 12-pounder, were not equipped in this way. The use of such equipment appears to have altered slightly during the period. For example, in 1793 the light 6-pounder was equipped with 6 rounds of case and shot, each with their powder, in each side.

There are no exact details for the storage of the remainder of each gun's allocation of ammunition during the later Napoleonic Wars and the only similar details which may shed light on this hail from the Crimean War period. What is clear is that a small amount of ammunition was carried in each limber, along with portfires and other stores items. For the heavy 6-pounder 120 round shot and 30 case were allocated to be carried as the artillery brigade's stock for each gun in 1802. Of this it was said that 36 round shot and 14 case shot were carried in the limber boxes and the rest was carried in one ammunition wagon per gun.

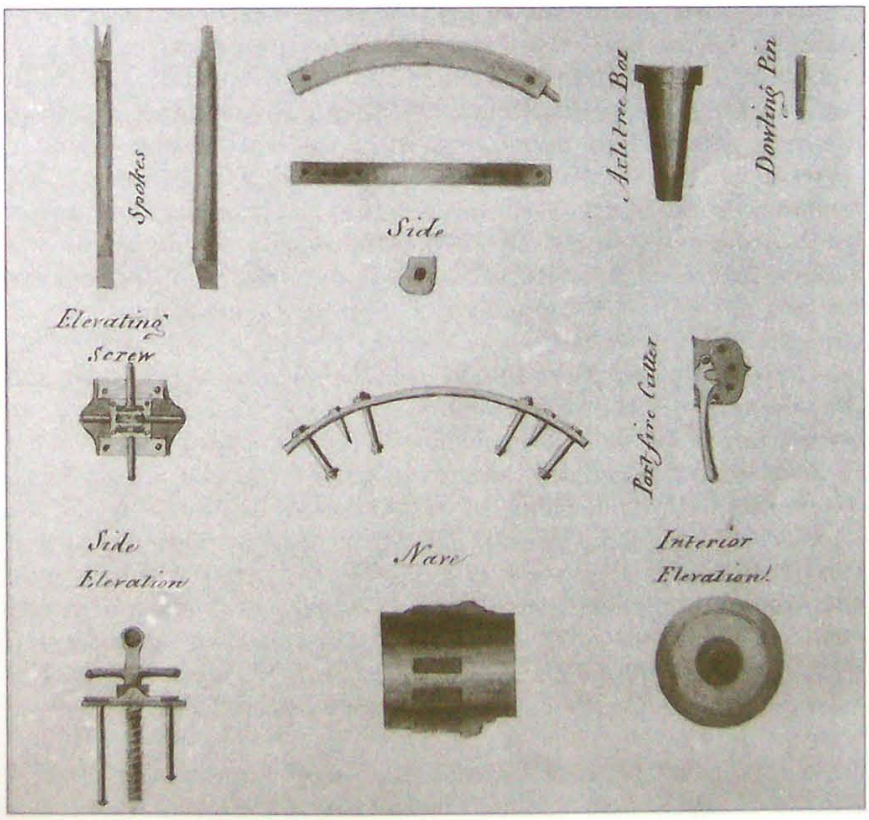
One question which constantly arises about early gun carriages is, what were their colours? This is a difficult thing to establish. It is generally

thought that the gun carriages were painted a dark grey with black metal fittings. Whilst this is seemingly confirmed by some original images, such as the Reinagle painting of William Congreve, other contemporary images in notebooks and drawings show the carriages as blue, or more commonly a light buff colour. It is my opinion that this latter is actually meant to be bare or finished wood. If this is true, it may suggest that the gun carriage was a consumable item which could be made or finished on campaign. There is no doubt that some carriages were painted grey but this may have been when time was available to do so.

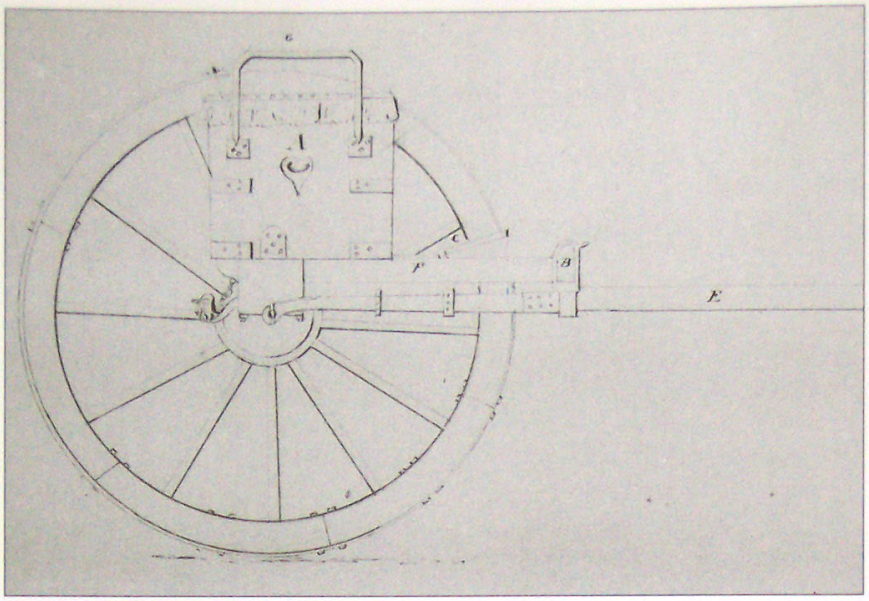
The Congreve carriage was made with a wide variety of metal fittings. The axletree itself was made of wrought iron and was set into a wooden block. The hurter is a somewhat more complex object. It was a flat piece of iron fixed against the axletree and it was intended to protect against the friction of the naves (central hub) of the wheels.

The trail plate eye was at the extremity of the trail. It was a complicated piece of engineering that encompassed a bracket for the trail spike and a towing eye, all of which was fixed to the end of the carriage by three bolts passing through the trail. Similarly the trunnion plate cap, a square assembly, had four bolts passing through, three of which attached to the axletree band.

Wheels were constructed in a similar way throughout the period. The central nave (or hub) was a specific length: for the 6-pounders it was 13½ inches on the heavy gun and 13 inches on the light gun. The nave was mortised to take the spokes and these in turn terminated in sections of wood called felloes, which formed the outer edge of the wheel. There were normally 12 spokes and six felloes. The wheel was bound with iron



Details of the wooden and metal components of a typical gun carriage wheel. The axletree box second from the upper right was made of bronze. (Courtesy RAHT)



A side view of the 9-pounder limber showing its details, as drawn in the early 19th century. The key is as follows: A ammunition box; B shaft iron and splinter bar; C foot board; E off shaft; F futchell; G ammunition box handle; and H rest. (Courtesy RAHT)

strakes, which linked the outer edge of the felloes. Wheels were preferably made in oak for the nave, ash for the spokes and elm for the felloes, although this depended on what was available. The nave was bound with iron hoops and the centre of the nave normally had a metal insert known as the pipe box, which was the piece that took the friction of the wheel turning. The axletree ends fitted into this and a lynch pin was fitted into a hole in the end of the axletree to hold the wheel in place.

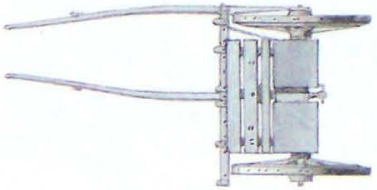
Wheels were generally 5 feet wide, although there were exceptions where the wheels were smaller. These were normally 4 feet 8 inches in diameter and this applied to some 5½ inch howitzer carriages and light 6-pounder guns. The standardisation of wheel sizes meant that wheels could easily be swapped from one vehicle or gun to another if damage occurred. Wheels were dished, that is the angle of the spokes tended outward from the nave. The reason for this was to counteract the tendency for the wheel to become damaged by the lateral forces acting on it. Dishing angled the wheels outward so that the upper rim was further away from the carriage, whilst at the same time allowing the lowest spoke to meet the ground at 90 degrees. This gave much greater strength to the wheel itself.

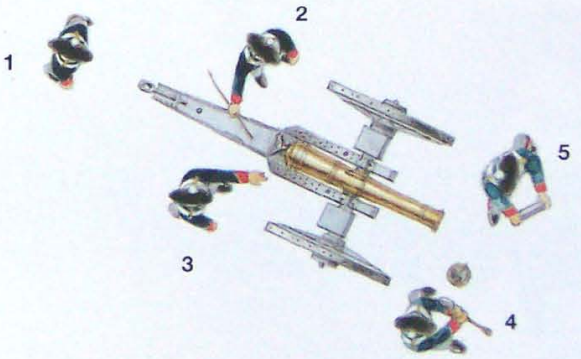
There were other metal fittings used for the wheels, principally the drag washer. This, as its name implies, was a metal washer placed on the outside face of the nave. It was made with a projecting ring which could be attached to rope and this was one of the principal points from which the gun could be hand drawn, the others being the breast chains.

Howitzer carriages went through similar design transitions to gun carriages. Initially they were of a double bracket design with long ammunition boxes fitted on either side of the barrel. Since howitzers were used primarily at high elevation, their elevating screws passed directly through the transom supporting them. An important detail of early designs was described in a military dictionary of 1779:

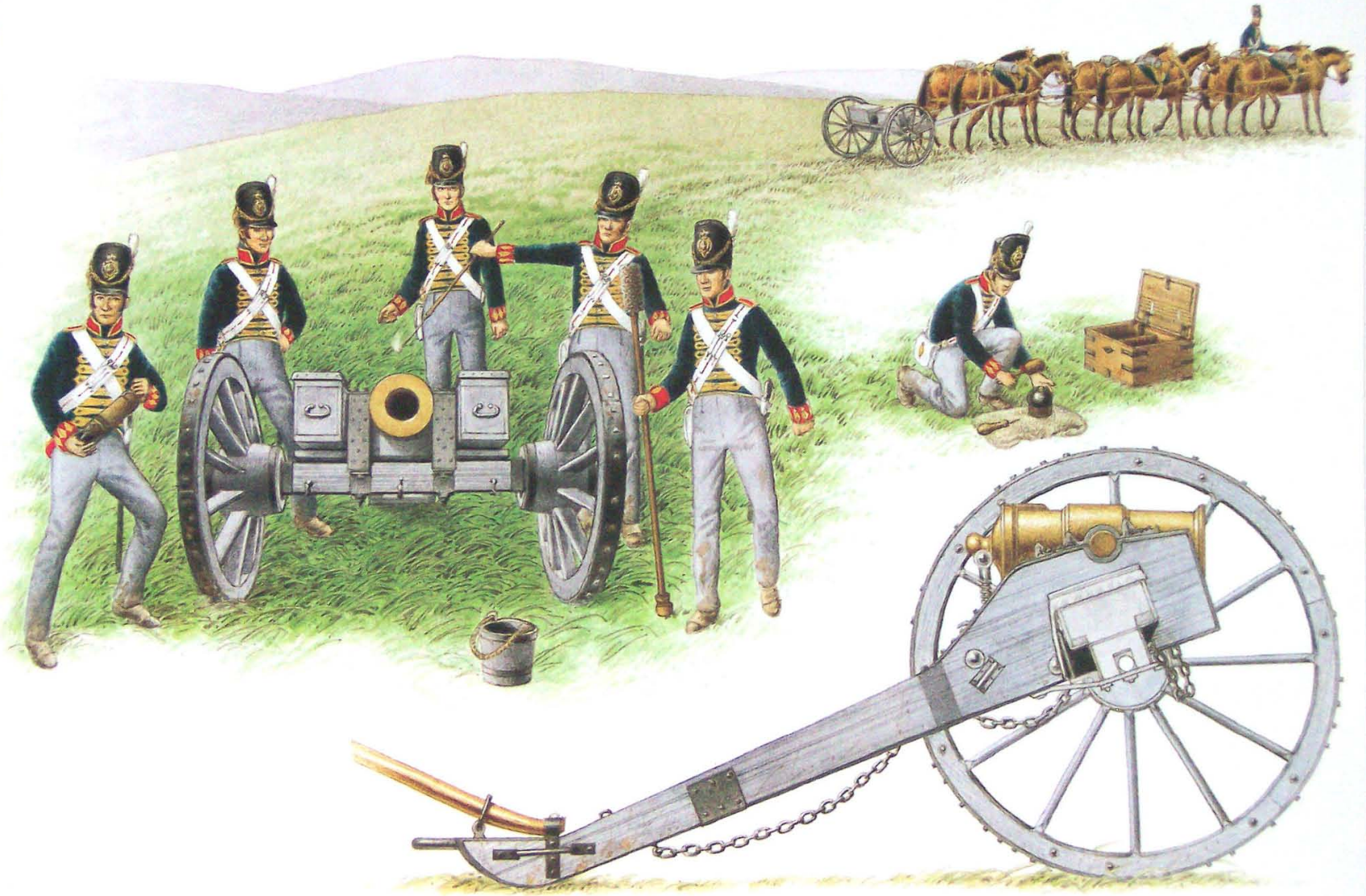
> In the centre, between the trail and centre transom, there is a transom bolt, which is not in others, because the centre transom

A: 6-pounder field gun, limber and horse team, with a layout of the detachment (crew), Royal Horse Artillery





B: 5½ inch howitzer and detachment

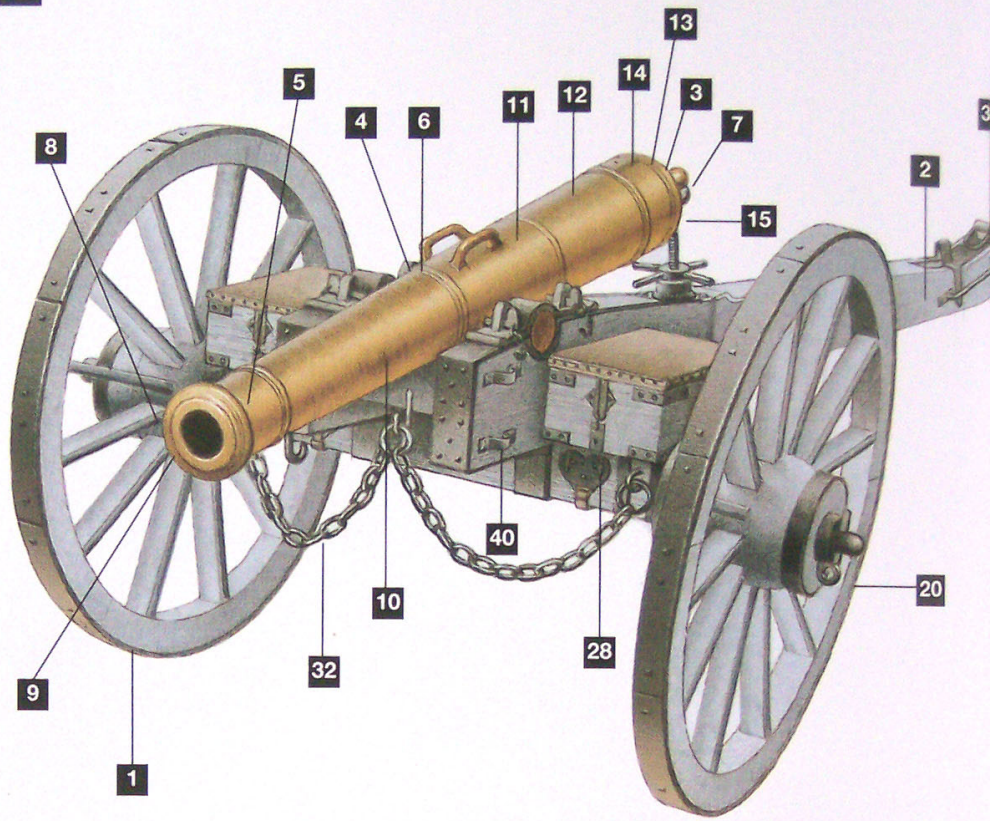


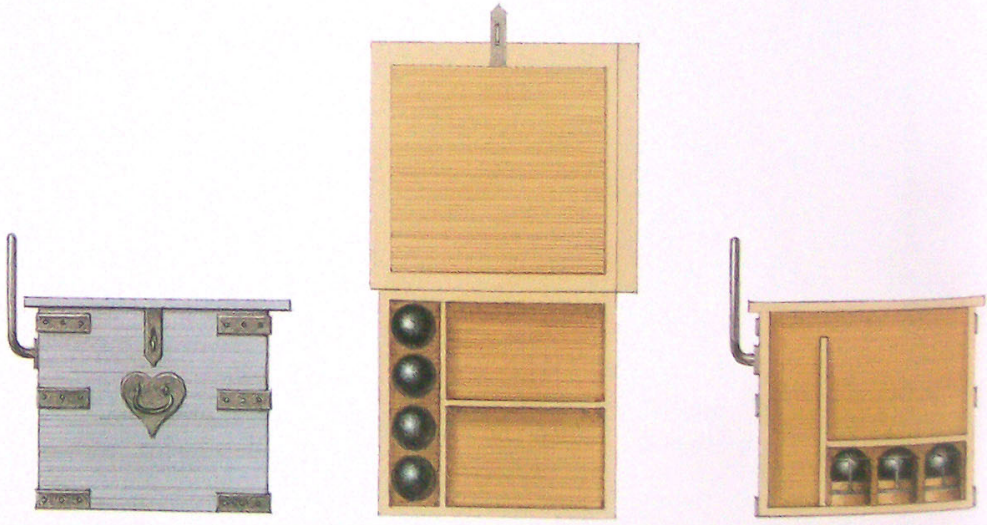
C: 12-pounder gun and the Bengal Horse Artillery

D: 9-POUNDER SMOOTH-BORE MUZZLE-LOADING GUN

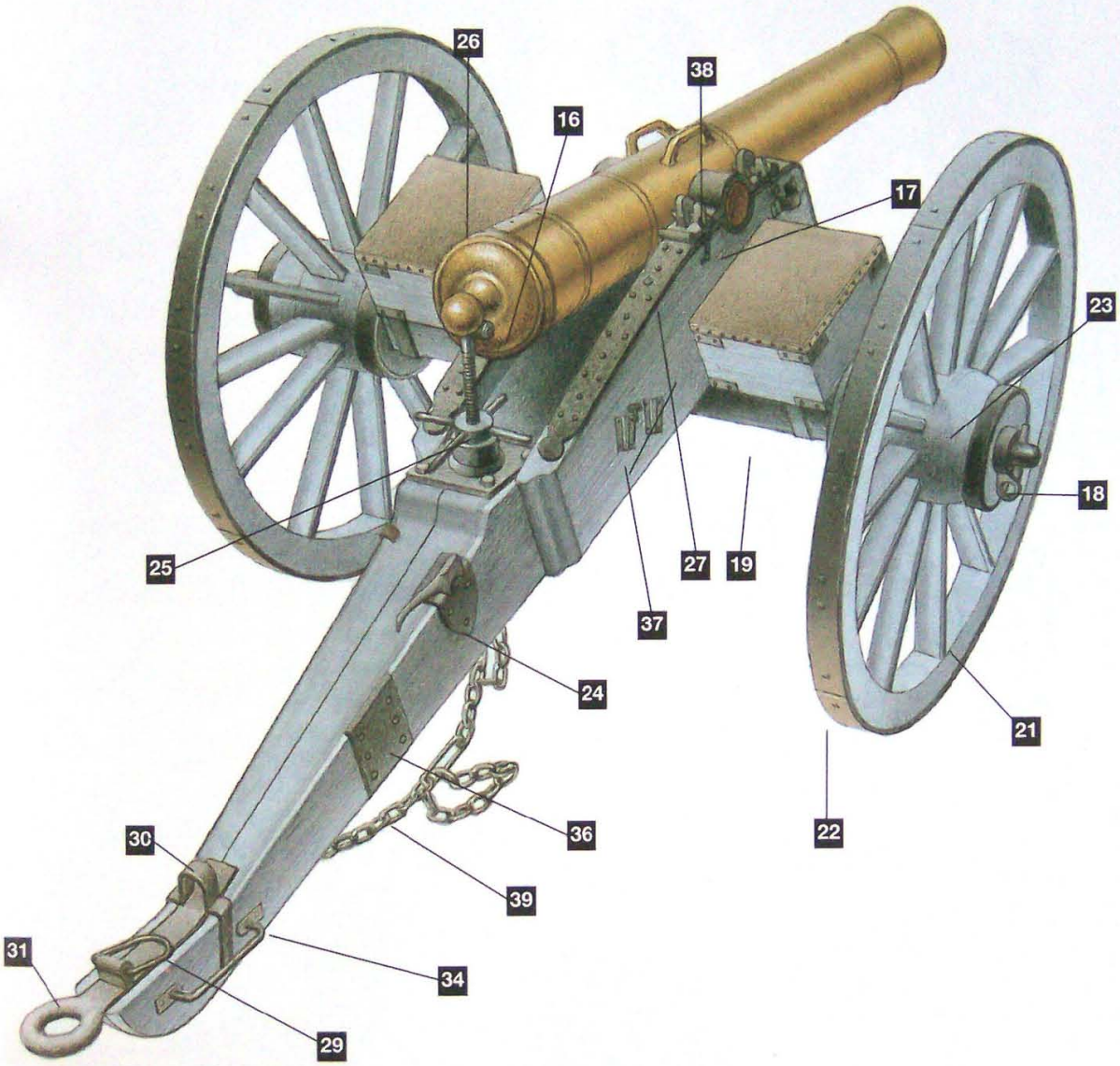
KEY

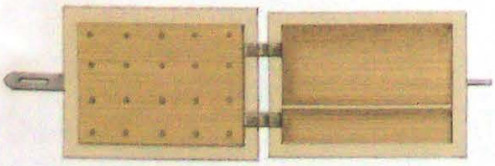
1 Wheel
2 Block trail
3 Cascable
4 Astraga
5 Fillet
6 Ogee
7 Cascable button
8 Muzzle
9 Muzzle face
10 Chase
11 2nd reinforce
12 1st reinforce
13 Vent
14 Vent field
15 Base ring
16 Quarter sight scale
17 Trunnion
18 Axletree
19 Axletree bed
20 Wheel drag washer
21 Felloe
22 Strake/tyre
23 Nave
24 Portfire cutter
25 Elevating screw
26 Ammunition boxes
27 Trunnion plate
28 Kettle hooks
29 Trail spike eye
30 Trail spike stay
31 Trail eye
32 Breast chains
33 Handspike loop
34 Lifting handles
35 Yoke hoop
36 Locking plate
37 Portfire holder
38 Cap square
39 Skid chain
40 Hammer brackets





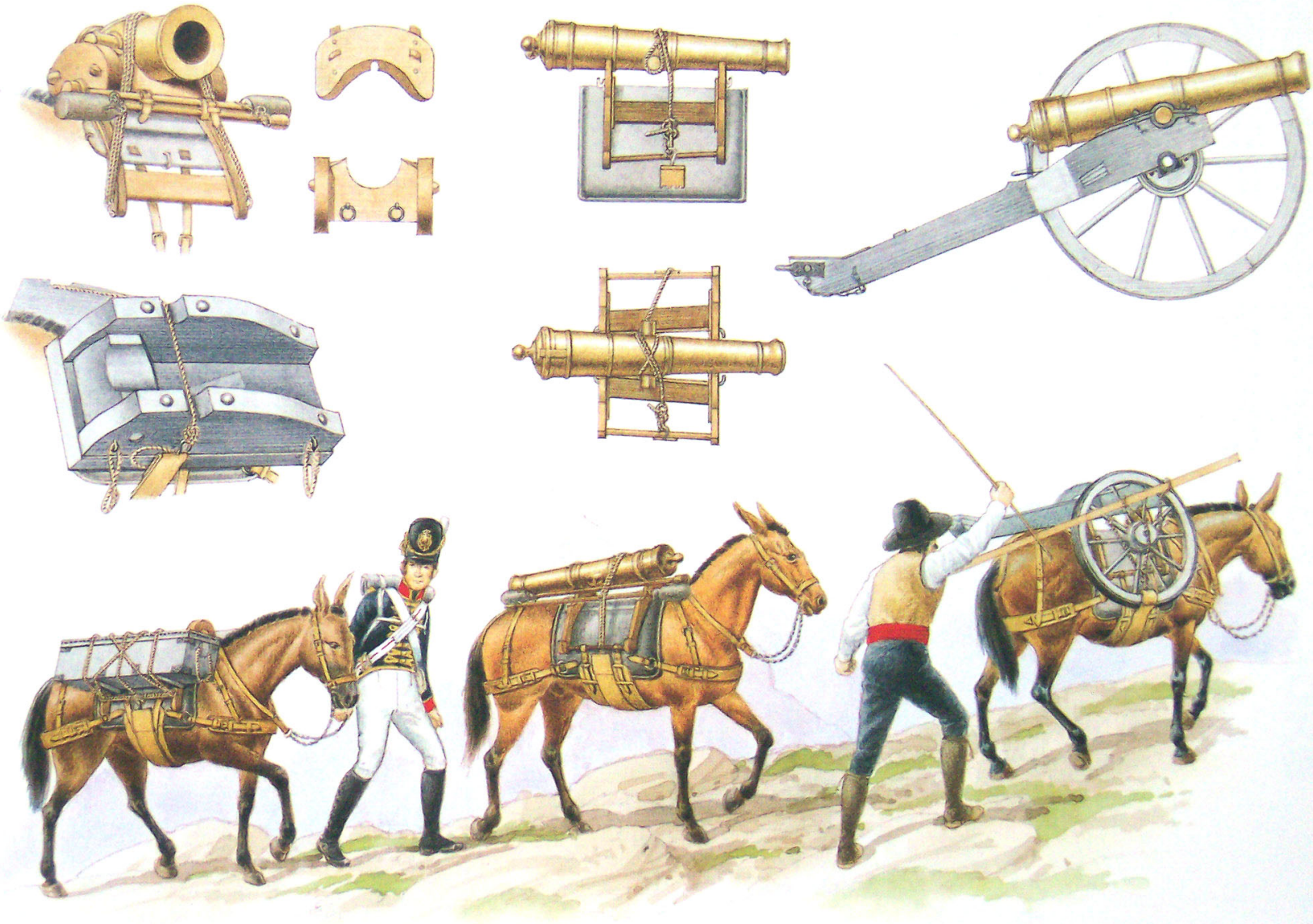
Timber boxes

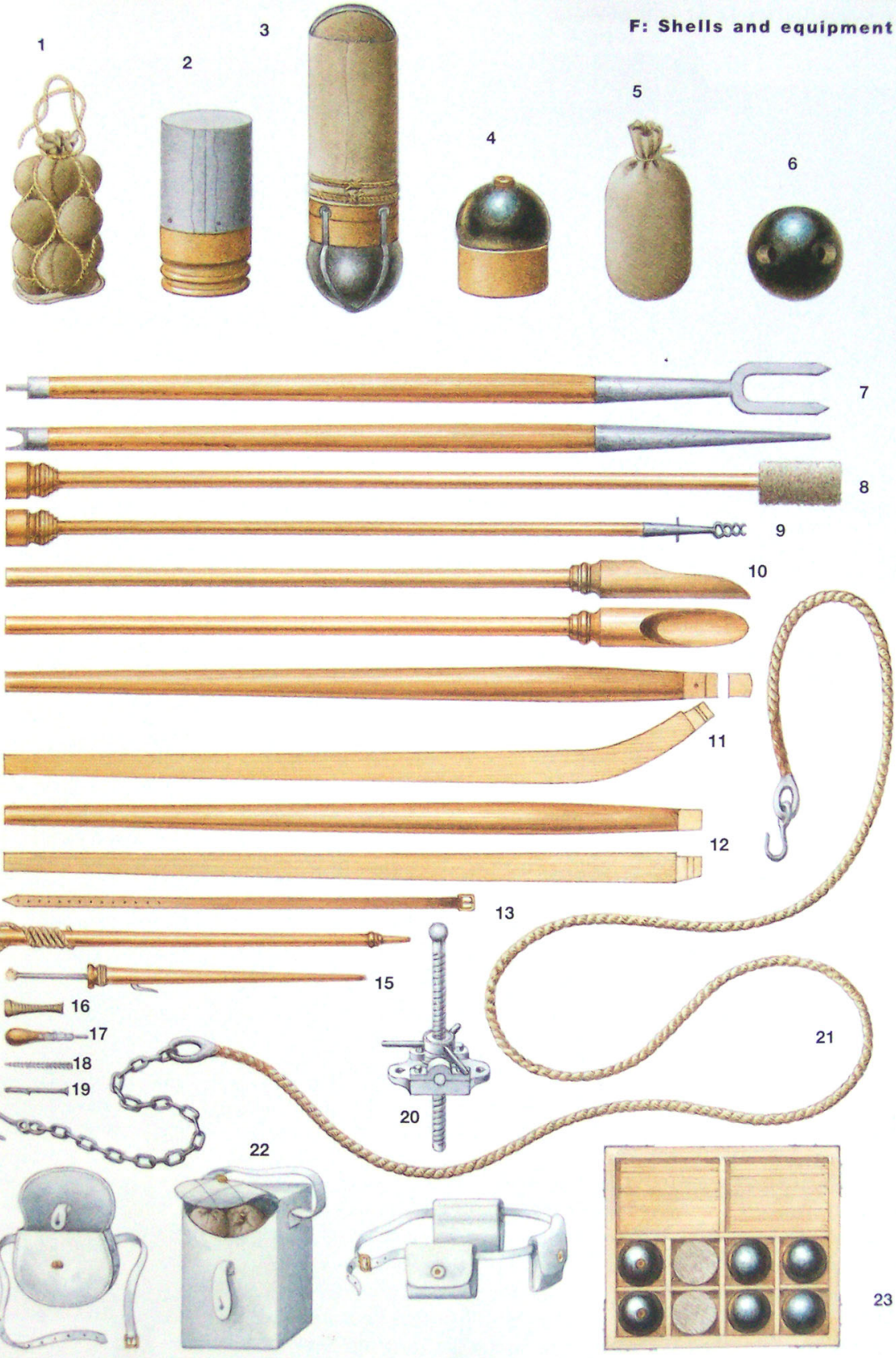




Carriage ammunition box

E: 3-pounder mountain guns and 4²/₅ howitzers

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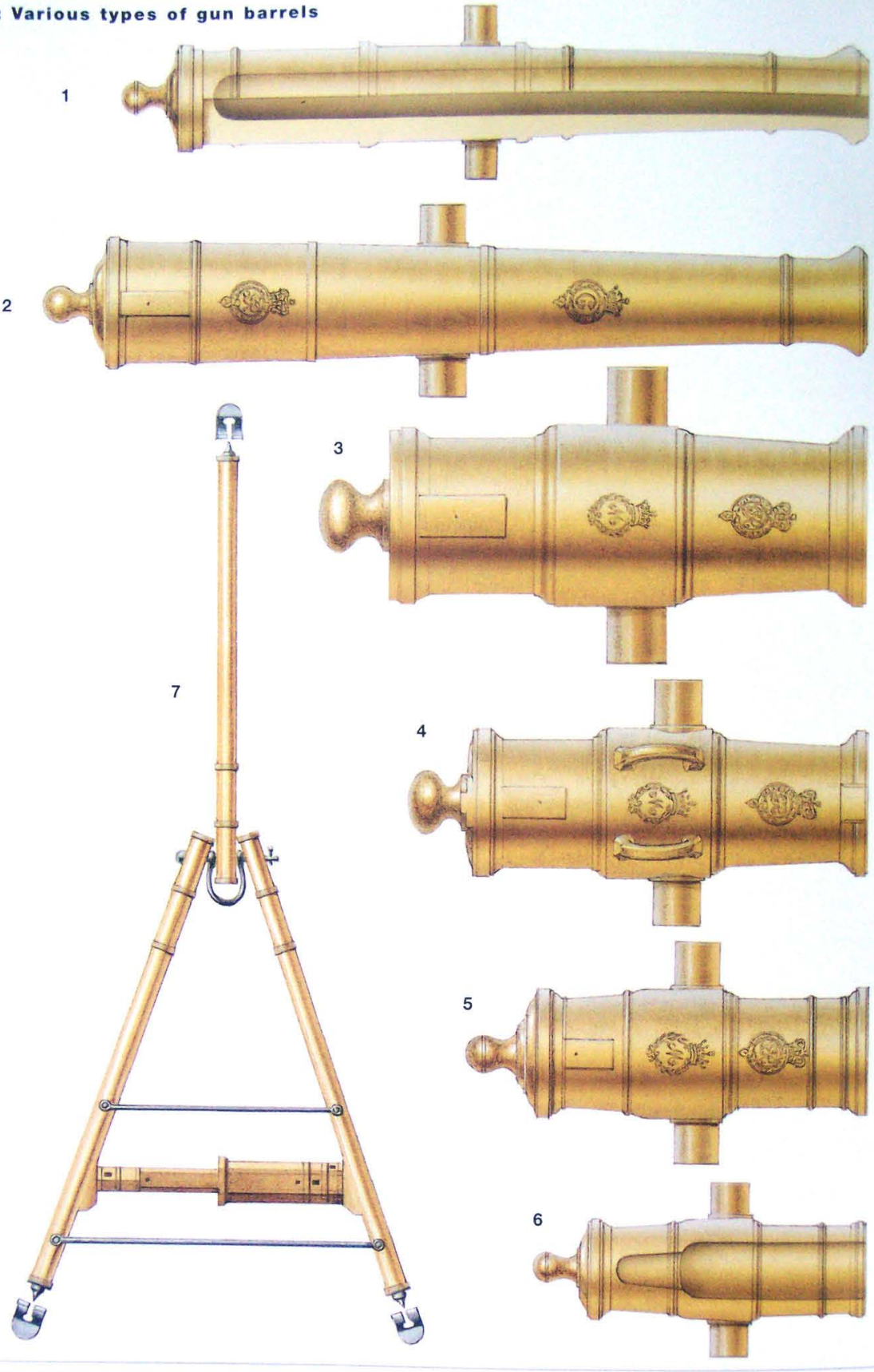
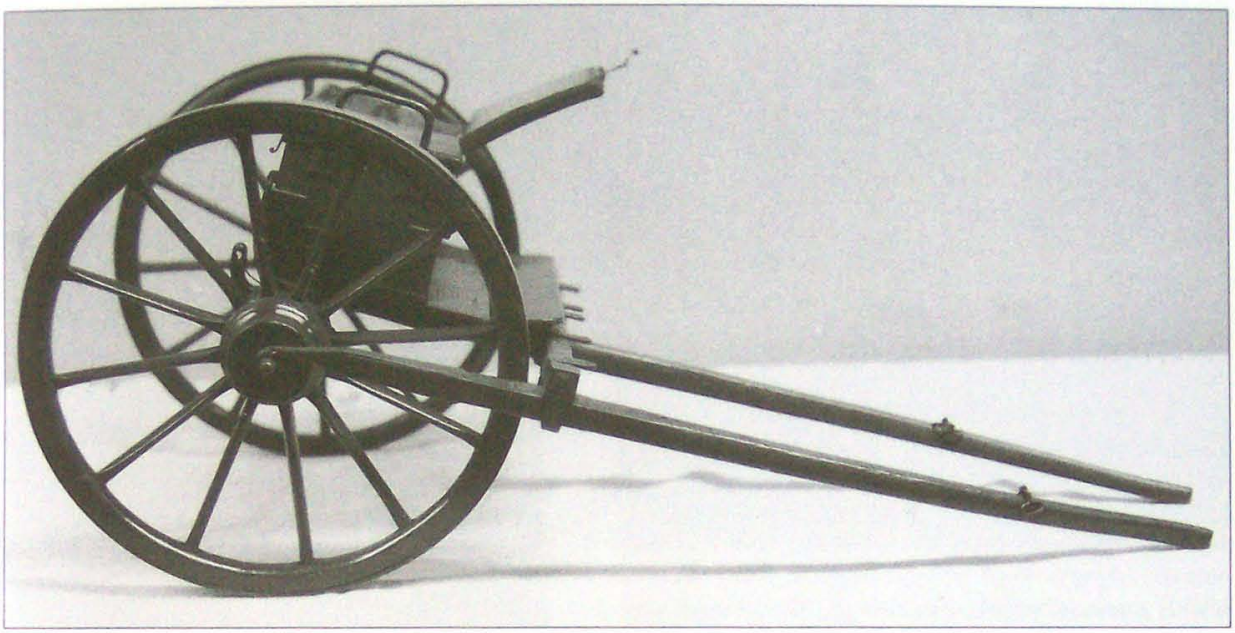
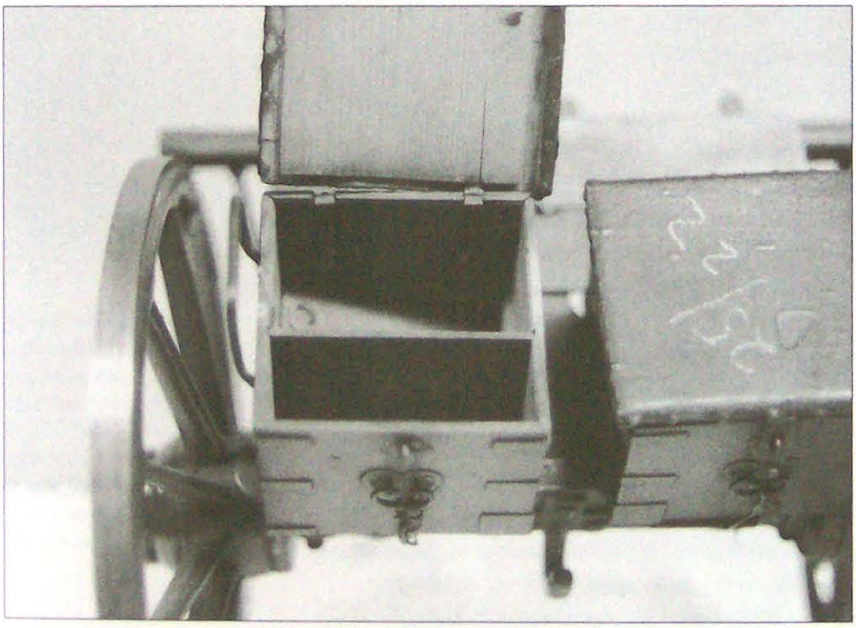
G: Various types of gun barrels



must be made to be taken out; after which the howitzer can be elevated to any angle under 90 degrees.



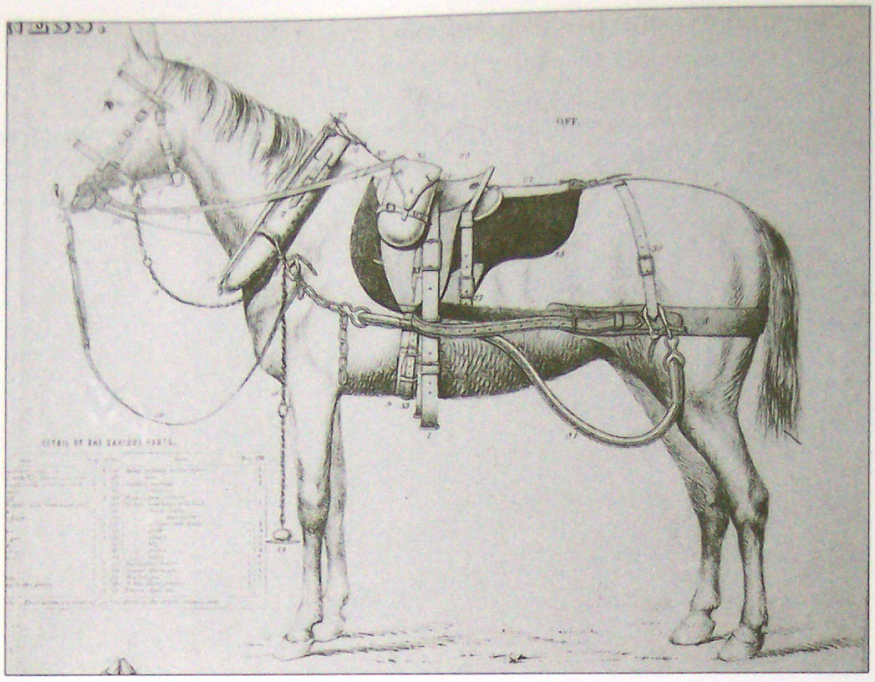


A contemporary model of a 9-pounder limber with the lower picture showing the limber box interior. (Courtesy RAHT)

The double bracket carriage did not change before the 1790s when block trail designs were created for the 5½-inch and 8-inch howitzer. A drawing by Shuttleworth in the 1820s shows this design and is reproduced in Plate D, but it is not clear how widely the design was adopted during the Napoleonic period.

Limbers

The limber was initially a small two-wheeled vehicle that was attached to the gun via the trail to make the gun easier to transport and manoeuvre. The ear-liest form of limber was basically an axletree and wheels with two shafts connecting it to the horses. On top of the axletree was a bolster (a block of wood placed over the axletree of a gun) with a metal spike or pintle fixed to it. The trail eye of the gun was lifted over this. This was still the common form of towing vehicle for howitzers in the late 18th and early 19th century. However, the wheels were normally smaller than the gun carriage wheels and these presented problems with stability and manoeuvrability. In 1776 a new limber was introduced



From the Royal Charge Department drawings, this image is of the off wheel horse. This horse was normally unridden and the driver's sheepskin was placed on its back. (Courtesy RAHT)

which was a very different design. The design was altered by effectively forming a platform on top of the axletree with the pintle moved to the rear of the platform, 18 inches behind the axletree. Two ammunition boxes were placed on the platform and acted as seats for the gunners. They could also be moved as a sliding counterbalance to the weight of the gun.

With the advent of the Congreve block trail carriage, limbers also underwent further refinement. By the time of the Napoleonic Wars, limbers commonly had two wheels, an axletree bed, three futchells (normally three strong pieces of wood forming the bottom base of the limber connecting the axletree bed with the splinter bar), a splinter bar (the wooden bar at the front of the limber that attaches to the traces of horses and connects the futchells and axletree), a platform board, a foot board, two shafts and all the iron work. The limber hook itself was fitted to the rear of the axletree bed. When the trail eye was placed over it a small key fitted across the top of the pin holding the eye in place. The key was attached to the axletree by a small chain. The shafts (sometimes called thills) were normally attached through four shaft irons or square loops attached to the underside of the wooden bar at the front of the vehicle, which was known as the splinter bar. Normally the two shafts would be fitted into the loops in such a way that they were offset to the left (when looking at the front of the vehicle).

The shaft nearer the wheel was attached in a different way to the central shaft. It passed through the iron and was fitted over the axletree arm by a metal loop on its end. This loop acted as the wheel washer as it passed over the end of the axletree. It is not known exactly why this was, but it is likely that it gave more rigidity to the limber base. Several metal hoops were placed along the splinter bar and acted as sockets so that the shafts could be arranged in different positions along it to allow for single, double, or triple draft. In addition, a prop was added to the outside shaft, so that it could be left freestanding if need be. The

ART 11

Ammunition for Field Artillery.

A Proportion of Ammunition and Stores for each Nature of Field Ordnance, viz. 1 Med. 12-Pr.—1 heavy 6-Pr.—2 light 6-Prs. as they are always attached to Battalions of Infantry—and one 5½-inch Howitzer; according to the British Service.*

Proportion of Ammunition and Stores.	12-Pounders, Medium.	6-Pounders, Heavy.	2 Light 6-Prs.	5½-Inch Howitzers.
Shot fixed to wood bottoms—case	24	30	68	24
—round	120	120	188	—
Shells — — —fixed	—	—	—	24
— — — —empty	—	—	—	120
Carcafes — — —fixed	—	—	—	4
Cartridges of flannel filled with powder. 4 lb.	120	—	—	—
3½ —	24	—	—	—
2¾ —	—	120	—	—
2 —	—	30	—	—
1½ —	—	—	188	—
1¾ —	—	—	68	—
10 oz.	—	—	125	—
1 lb.	—	—	—	144
12 oz.	—	—	—	28
Cartridges, flannel, empty —	12	12	100	12
Do. of paper, for bursting, 10 oz.	—	—	—	120
Tubes of tin—N. P. — —	172	178	560	190
Portfires—long small — —	18	18	62	18
Puzes—drove — — —	—	—	—	132
Powder, meal'd — lbs. —	—	—	—	½
Travelling carriages and limbers	1	1	2	1

* The 12-Prs. which have a fmall box on their limbers, carry 6 round fhot and 2 cafe fhot, with 6 cartridges of 4 lbs. and 2 of 3½ lbs. of powder, more than the above

A very useful table of ammunition stores displayed in the *Bombardier and Pocket Gunner* dated 1802 by R. W. Adye. This extremely useful document shows the nature of tools and ammunition required by various guns in service. (Courtesy RAHT)

ammunition boxes were held in place by the platform board and two iron plates.

This limber was used with the following guns: 9-pounder, heavy and light 6-pounders, heavy and light 3-pounders, and 5½-inch howitzer.

The limber was also the basis for the ammunition wagons that accompanied the artillery brigades and troops and were held further back in battle and used for resupply.

Horses

Before the advent of the internal combustion engine all guns were conveyed by two means of motive power: horses and men. It was only in 1794 that drivers became part of the Royal Artillery since in the early 18th century they were normally civilians hired for a specific purpose, though even after this date the Corps of Drivers was administered separately from the Foot Artillery which it supported. In the Horse Artillery drivers were fully integrated with their troops. Artillery officers spent a great deal of time learning how to handle horses and the best ways to look after them.

The regulations regarding horses were very specific:

> Horses in the service of artillery should not be made to draw above 3 hundredweight each, besides the weight of the carriage. Horses for this service should never be lower than 14½ hands. The contractor is obliged to furnish them of this height for the government. – A horse is generally supposed to equal five men. Military horses walk about 400 yards in 4½ minutes. Trot the same distance in 2 minutes 3 seconds and gallop it in about 1 minute.

The equipment required to attach the horse to the limber was a complex array of traces (links that attach the horse harness to the gun carriage), leather and rope straps, yokes and swingle trees (iron or wooden bar that was attached to the splinter bar of the limber). A swingle tree was a baulk of timber with a number of metal loops fitted to it which acted as the draw bar and was connected to the limber. The British limber normally had a horse harnessed to the shafts and one connected to the swingle tree. These horses were then connected to the ones in front by traces.

Normally there were four to six horses in a gun team. The ones nearest to the limber were known as the wheelers and those at the front were the leaders. The choice of horse for each position was extremely important because the wheelers had to be heavier and stronger than the rest of the team because they acted as the brake for the whole equipment. In British gun teams only three of the horses would be ridden in a six-horse team. Each pair had a rider and he normally sat on

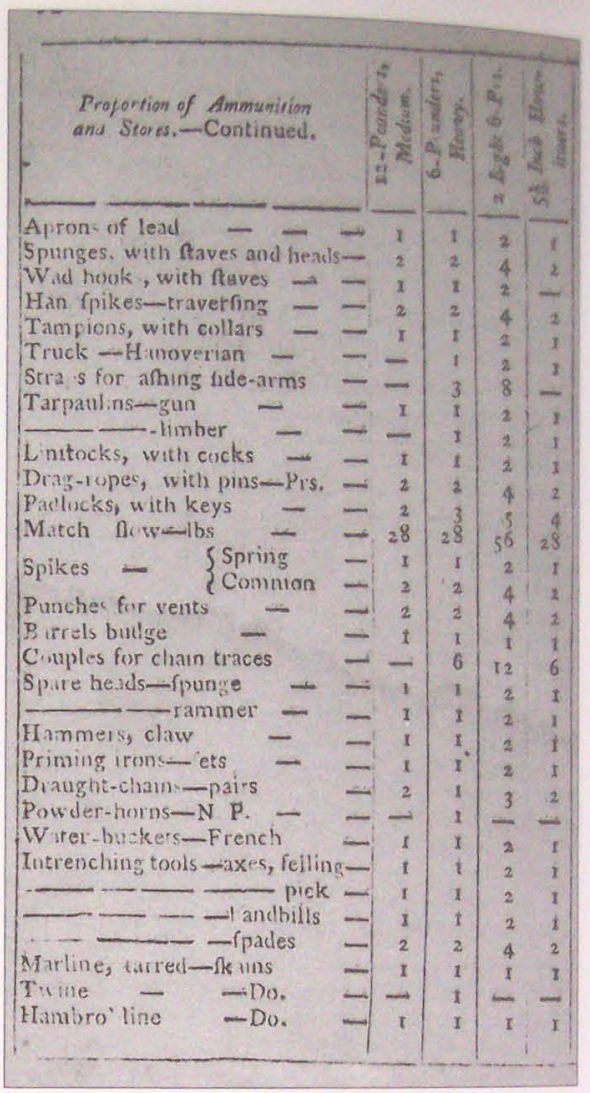
the right-hand horse (viewed from the front). The rider on the wheeler was normally the most experienced of the team and was considered to be in charge.

Tools

The gunner required a large number of specialist tools to enable him to perform his tasks efficiently. In general there were several side arms, as they were known, that were indispensable. Firstly there was a sponge rammer, a tool that doubled both to ram the projectile and to sponge the bore after the gun had been fired. The idea was not to clean the bore but to put out any burning embers that might remain in it and fire the next round prematurely. The tool had two heads, a wooden cylinder and a sheepskin-covered cylinder. The next tool was the wadhook, also known as the worm, which was used to scour the bore of the gun for any remnants of wad or cartridge left in the gun. Again the tool was a bore-length stave fitted with a spiral-shaped hook on the end and a wooden cylinder on the other end for ramming if need be.

Wooden staves called handspikes were used to traverse the gun. A specially shaped one was used to fit at the bracket at the end of the trail so that the gun could be moved left or right. A wooden or leather bucket was provided for the sponge so that it could be kept moist and also to clean the bore after the cease-fire had been given.

Loose powder might be needed for loading so a copper-headed ladle was provided for that eventuality but in general most guns fired fixed rounds already made up. Moving to the rear of the gun, the ventsman used a priming iron to pierce the cartridge bag and a leather thumb stall to wear when serving the vent. Ignition was carried out by using small vent tubes. The tube allowed a convenient amount of gunpowder composition to be placed in the vent and was safer during firing. These tubes could be tin or goose quill. The tube was lit by a portfire. The portfire was a length of rolled paper filled with a composition, which burned at a known rate. They could be between 12 and 15 inches long and were lit off the linstock placed at the rear of the gun. The portfire was held in a portfire holder, basically a short wooden staff. The linstock was a long wooden stave with a metal head having two jaws. The jaws held a piece of burning match or rope soaked in saltpetre and gunpowder, which smouldered slowly. Before the Napoleonic Wars the linstock itself had been used to fire the gun and could still be used in an emergency but it was thought better to keep it away from the gun. In adverse weather conditions the gun would need to be protected from the weather. A lead cover known as an apron was provided to cover the vent and tarpaulins for the guns. Drag ropes were provided to move the guns if horses were not available. They came in different lengths normally 23 feet, 13 and 12



Proportion of Ammunition and Stores.—Continued.

	12-Pounder, Medium.	6-Pounder, Heavy.	2 Eight-Inch Prs.	5½ Inch Howitzers.
Aprons of lead	1	1	2	1
Sponges, with ſtaves and heads	2	2	4	2
Wad hooks, with ſtaves	1	1	2	—
Hand ſpikes—traverſing	2	2	4	2
Tampions, with collars	1	1	2	1
Truck—Hanoverian	—	1	2	1
Straps for aſhing ſide-arms	—	3	8	—
Tarpaulins—gun	1	1	2	1
——limber	—	1	2	1
Linſtocks, with cocks	1	1	2	1
Drag-ropes, with pins—Prs.	2	2	4	2
Padlocks, with keys	2	3	5	4
Match ſlow—lbs	28	28	56	28
Spikes—Spring	1	1	2	1
Spikes—Common	2	2	4	2
Punches for vents	2	2	4	2
Barrels bulge	1	1	1	1
Couples for chain traces	—	6	12	6
Spare heads—ſponge	1	1	2	1
——rammer	1	1	2	1
Hammers, claw	1	1	2	1
Priming irons—ſets	1	1	2	1
Draught-chains—pairs	2	1	3	2
Powder-horns—N. P.	—	1	—	—
Water-buckets—French	1	1	2	1
Intrenching tools—axes, felling	1	1	2	1
——pick	1	1	2	1
——handbills	1	1	2	1
——ſpades	2	2	4	2
Marline, tarred—ſkeins	1	1	1	1
Twine—Do.	—	1	—	—
Hambro' line—Do.	1	1	1	1

Following on from the previous table by Adye, this illustration details tools and miscellaneous objects. (Courtesy RAHT)

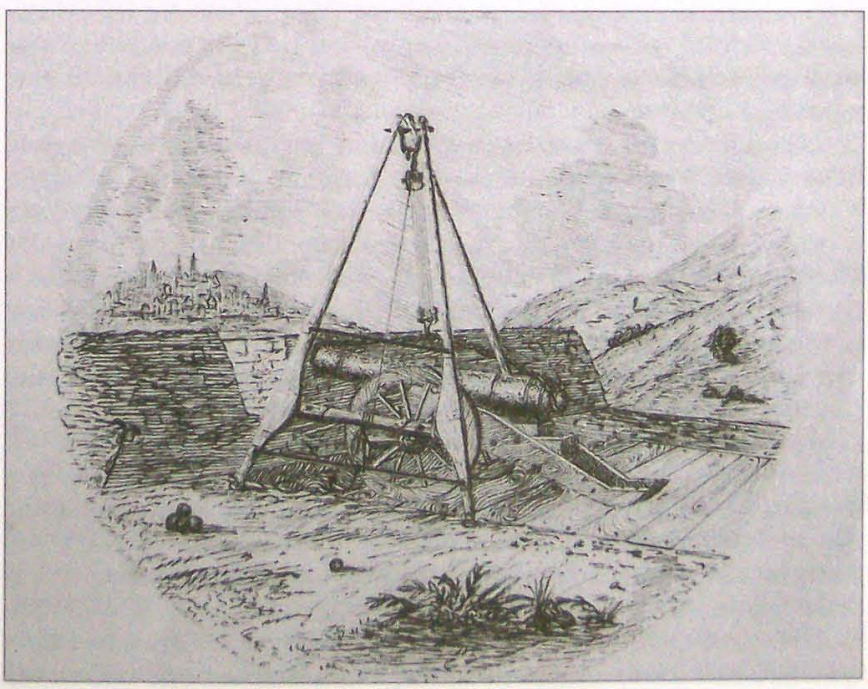
feet. Each rope had a chain section at the end and they were often fitted with wooden handles inserted into the rope length to improve grip.

Finally, the gun was a valuable weapon which could, if captured, be easily turned on its owners. Therefore the gunner needed a quick way of disabling the gun to render it useless to the enemy. The method that was used was to spike the gun. This involved taking a metal spike and hammering it down the vent of the gun. Some spikes had a roughened surface, which made them grip the softer metal of the barrel. Once used the vent spikes were very difficult to remove and normally the vent would have to be drilled. There was one other way of spiking the vent which did not completely disable the gun and that was to use a sprung spike. This was a metal rod cut across its diameter about halfway down the length of the spike. The cut did not go all the way across the diameter of the rod so it effectively formed a flap or spring that protruded from the side of the spike. When forced down the vent it acted like a normal spike, but after the gun was recovered a shaft could be pushed down the bore of the gun compressing the spring and allowing the spike to be removed.

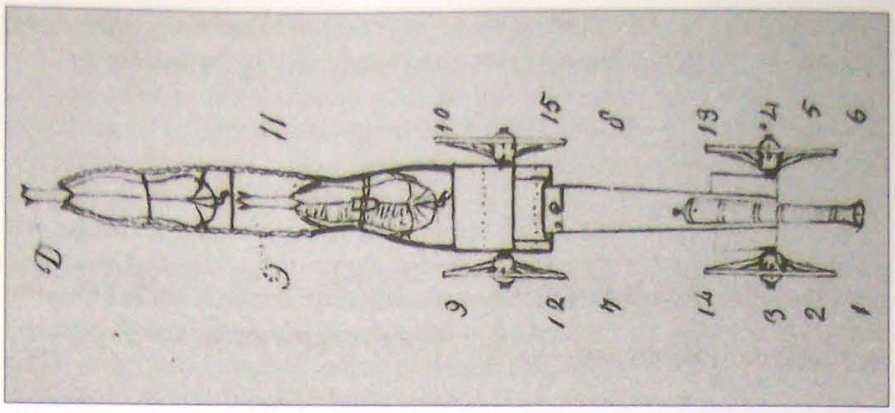
DRILL AND TACTICS

Drill

It is thought that a good gun crew could fire as many as five rounds a minute and there is no doubt that improvements in the provision of ammunition, principally fixed rounds and vent tubes, contributed to increases in the rate of fire. But in reality it was the discipline and skill of the men that really told in battle. A gun crew might have to approach the enemy, unlimber, load and fire in a very short space of time. For the gunners, standing in front of a gun when an enemy cavalry unit was charging down on them must have been a nerve-wracking experience.



An artillery gyn in position showing a barrel about to be removed from its carriage. (Courtesy RAHT)



'Order of March with side boxes on, 56 rounds of ammunition being with the gun drawn by three horses. For common travelling when no enemy is suspected and also when the wagon cannot be sent with it.' From the notebook by Richard Bogue written in 1793. (Courtesy RAHT)

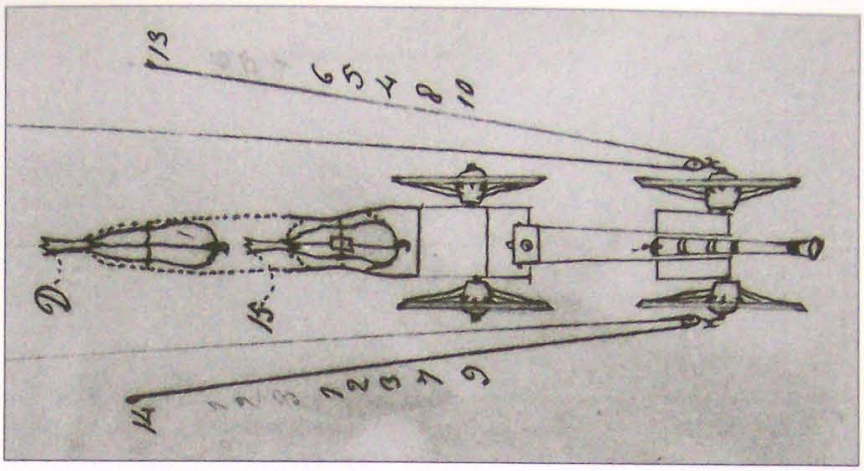
Drill was the key to good fire discipline. In British gun crews, nine men were allocated to each gun, with each man allocated a specific number correspnding to his role, with a possible maximum of 15 if it was expected that the gun would have to be manhandled. Curiously some sources state that the men were numbered from seven to 15, although this is not always consistent.

The operations of the gun depended principally on five of the crew members. The remaining crew were 5 to 10 yards in the rear and brought up ammunition and tools. The duties of the main crewmen were as follows: No. 7 sponged, No. 8 loaded, No. 9 served the vent, No. 10 fired the gun, No. 11 was the gun commander. Other crew roles were: No. 12 carried the match and water bucket, No. 13 served No. 8 with ammunition from No. 14, who carried a cartouche bag (a waterproof canvas bag for holding gun charges) and a pair of drag ropes, and No. 15 held the limber horses and carried a cartouche bag.

When viewed from the rear, the positions were: No. 7 between the right wheel and the muzzle, No. 8 between the left wheel and muzzle, No. 9 clear of the right wheel and No. 10 clear of the left wheel, both in line with the vent. No. 11 at the rear of the gun on the left of the handspike. The only difference with larger calibres was that Nos. 9 and 10 stood outside the wheels and Nos. 7 and 8 at the front assisted with ramming.

For howitzers the positions were the same but the duties were slightly different: No. 7 sponged, uncapped the fuse, and loaded the shell. No. 8 took the sheepskin out of the piece, laid it on the ground, loaded the cartridge, wiped the bottom of the shell and put the sheepskin in again. The sheepskin was used to stop the muzzle immediately after it was fired because there was a greater risk of accident with this type of weapon, due to the howitzer shells being filled with gunpowder and fused, whereas the round shot was inert. No. 9 served the vent, No. 10 fired the gun, No. 11 commanded and estimated range and fuse burning time, No. 12 carried the match and bucket, No. 13 served No. 8 with cartridges, No. 14 served No. 7 with shells from the limber, which he laid on the sheepskin, and No. 15 attended the limber. There was a system of sharing out the duties should a man be injured or killed and it was reckoned that a gun could still be kept firing with only three men in the detachment.

Horse artillery drill was essentially the same but all the gunners were mounted on horses so there had to be a horse holder. The horses and



'Assisting the horses to draw a gun thro a bad road.' This simple illustration shows where and how guns were dealt with in difficult circumstances. The two tackles were fixed to stakes in front of the gun and team and then through the drag rope eye on the wheel of the gun. Even a small gun such as the light 6-pounder required the assistance of two horses and 14 men to move it in rough going. From the notebook by Richard Bogue written in 1793. (Courtesy RAHT)

the horse holder were normally positioned behind the limber with five gun numbers manning the gun, with a sixth slightly behind them and one gunner controlling the limber team.

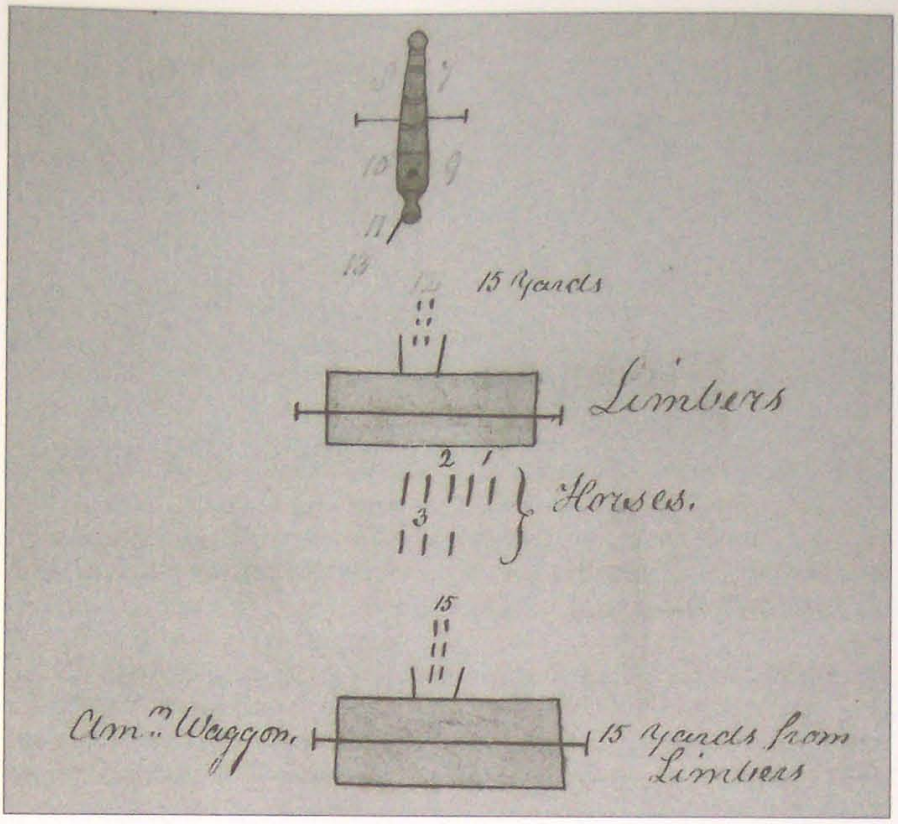
Tactics

During our period the use of artillery subtly changed within the British Army. At the beginning of the period guns were used in smaller groups and the use of the battalion gun meant that smaller calibres were spread amongst infantry battalions. The French were the great exponents of massed artillery and perfected the art of closing up with their guns in the shortest time possible. British artillery was handled in a different way.

At the beginning of the period, as we have seen, the guns were divided up into battalion guns, artillery of the park and horse artillery. The battalion guns were normally 3-pounders or light 6-pounders. Strict instructions on the positions of the guns relative to their parent units are not available but in review the battalion guns were placed to the right of the regiment with 10 yards between them and 10 yards between the left gun and the infantry, normally the battalion's grenadier company. It was said that the gun numbers 7 and 8 who stood at the rear of the trail but at a distance from it were to be in line with the front rank of the infantry. It is clear, though, that when guns were in action they would take any position that gave them advantageous locations from which to hit the enemy. A manual of 1802 gave the following advice:

> With very few variations, the guns should attend in all movements of the battalion, that division of it to which they are particularly attached; and every attention should be paid in thus adapting the movements of the guns to those of the regiment.

At the start of the period artillery of the park could normally include 6-, 9- or 12-pounders. These guns were organised into brigades of six guns and the British used the heavier calibres, again normally 12-pounders, in a very specific way. The heavier guns were placed at weak points in the line and at places where they could do the most damage at the furthest range. The emphasis was placed on hidden positions and the creation of defensive works. Contemporary authors stress the use of ground and we can see that they were inclined to use guns in a similar



A schematic diagram of a Horse Artillery sub-division showing the gun, limber and position of the men. The image is taken from a Horse Artillery exercise handbook of the early 1820s, done in notebook form. The dash marks are the positions of the horses and the diagram shows that a distance of 15 yards was suggested as a reasonable separation between the limber and gun and the ammunition wagon and limber. From *Horse Artillery Exercises 1824*. (Courtesy RAHT)

way as a World War I tank in that the reverse of the slope was used for cover and the gun was run up to fire at the very last moment. The need to wait, hidden, until the very last moment to gain the element of surprise, was very important according to contemporary authors. There was also an optimum height at which the guns should be placed on a hill, a height of 30–40 yards at a range of 600 yards being thought most suitable.

It should be made clear that most Napoleonic combat took place at very short range compared with modern day values. Musket range was very short; anything in excess of 100 yards was out of the question and the normal effective range was really 50 yards or less. The guns then were extremely significant since they could range out to a maximum of 1,500 yards, giving the army an opportunity to destroy some enemy units long before they reached their destination.

Interestingly, in theory, guns were not to be used against other guns. Whilst this may well have been the generally accepted theorem it was clearly not the practice since there are many guns from the period with damage sustained from enemy guns. It is also interesting to note that one author suggests the masking of guns by another unit until they are needed. This suggests that their power and effect on the battlefield were very great indeed. As soon as a gun was in an advantageous position it was suggested that they were protected by some kind of defensive measure. The advice given in 1802 was:

> By proper attention many situations may be found of which advantage may be taken for this purpose, such as banks, ditches. Everywhere to be met with.

Britain did not follow France's example and create grand batteries to destroy a particular part of the enemy line but during the wars the emphasis came to be placed on the need to concentrate fire on a particular target. French armies almost always had more guns than the British forces, for example during the Peninsular War Britain could rely on one gun per 1,000 men whereas the French often had four per 1,000 men.

The optimum effect would be produced by a cross-fire from the guns. This meant either choosing a target and attacking or choosing a pre-arranged point over which the enemy was likely to pass. The main thing was that the gunfire should hit an enemy unit at the head of the column and the weakest points of the front. The secret was to hit a unit at its greatest depth. For example infantry in line were ideally to be attacked by enfilade fire (to fire at an object along its greatest length from a perpendicularly placed gun). Columns were to be hit from the front. Emphasis was placed on the senior artillery officer knowing where and how his guns would produce the desired result, which was to be communicated to him by the senior commander. The only form of communication available was the messenger or word of mouth and so pre-arranged orders and changes in plan were difficult to carry out.

Horse artillery was another matter altogether since it was specifically formed to be light and mobile. A horse artillery unit was expected to be courageous and skilled, the gunners being good swordsmen as well as horsemen. They were expected to ride close to the enemy and unlimber to fire as soon as possible. A good example of how close this could be is demonstrated by the actions of Norman Ramsey's division at the Battle of Fuentes d'Onoro in Spain. As part of Bull's Troop Ramsey's two guns were firing on the retreat and were left out of the protective square of infantry within which they could have sheltered. They were attacked and completely enveloped by French cavalry and Major General Sir W.F.P. Napier describes what happened next:

> Men and horses were seen to close with confusion and tumult towards one point, where a thick dust and loud cries, the sparking of blades, the flashing of pistols indicated some extraordinary occurrence. Suddenly, the multitude became violently agitated, an English shout pealed high and clear, the mass was rent asunder and Norman Ramsey burst forth sword in hand at the head of his battery [sic] his horses, breathing fire, stretched like greyhounds along the plain, the guns bounded behind them like things of no weight.

Napier's view may be fanciful but this incident has become something of a celebrated event in the Royal Artillery and it certainly demonstrated the high morale of the horse gunners.

Since Britain always had less artillery available than the French, as the wars proceeded British commanders began to experiment with and then carry out the practice of holding an artillery reserve. At the end of the wars this reserve usually formed a large percentage, up to half, of the overall artillery available. We should not think of the reserve as a number of units held in one place but as a central grouping from which units were drawn to support particular sectors of the battlefield when the need arose.

Battlefield effectiveness

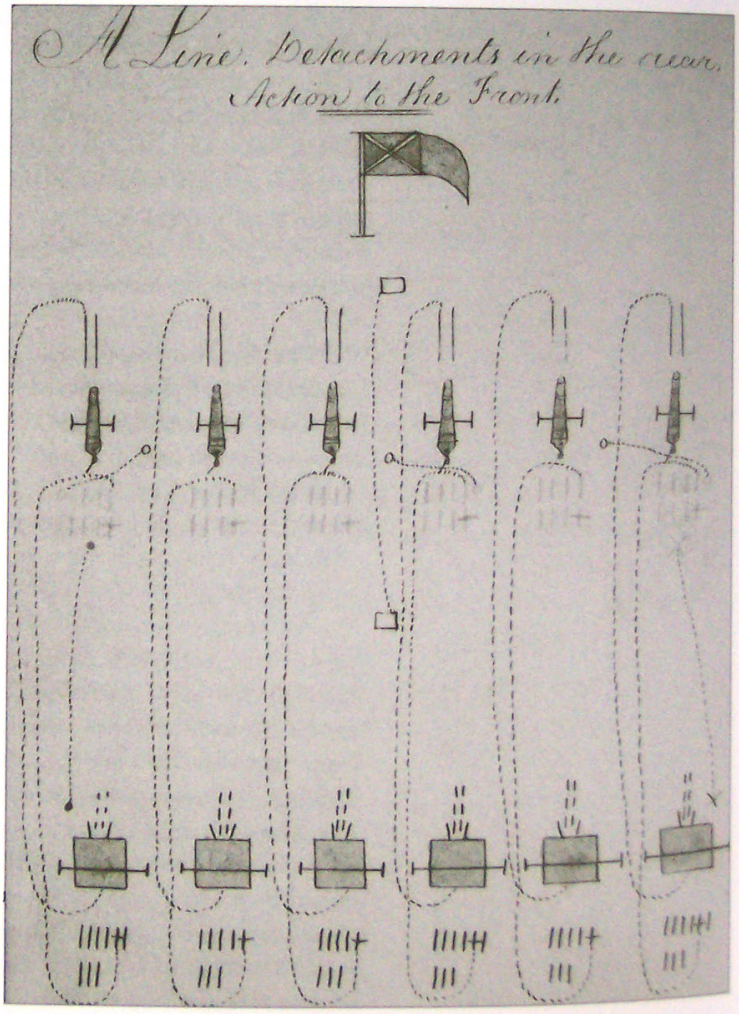
Consider these words written by Cavalie Mercer after Waterloo about a French cavalry charge receiving the full fire of his brigade at 50 or 60 yards range:

> The effect was terrible. Nearly the whole leading rank fell at once: and the round shot, penetrating the column carried confusion throughout its extent. The ground, already encumbered with victims of the first struggle became, almost impassable.

If the effect of artillery fire on cavalry was devastating it was possibly even worse when an artillery unit was attacked. Mercer's own troop was attacked by a French artillery brigade at a range of 400–500 yards:

> Every shot almost took effect and certainly expected that we should all be annihilated. Our horses and limbers, being a little retired down the slope had hitherto been somewhat under cover from the direct fire in front; but this plunged right amongst them, knocking them down by pairs, and creating horrible confusion. The drivers could hardly extricate themselves from one dead horse ere another fell, or perhaps themselves. The saddle-bags, in many instances were torn from the horses' backs and their contents scattered over the field... In some instances the horses of a gun or ammunition wagon remained and all the drivers were killed.

Following the end of the Napoleonic Wars the Duke of Wellington became an immense public figure influencing almost every aspect of military life. This was in a way a backward step for gunnery development and as Britain entered the Crimean War the artillery equipment was virtually identical to that of 40 years before. Yet within ten years British armies were armed with breech-loading rifled weapons designed by William Armstrong, which were to point the way to the artillery of the future, and the age of the smoothbore gun was over.



An illustration of the layout of a gun brigade with the limbers in the rear and the crews attending 'action front', the position from which they would engage the enemy. From *Horse Artillery Exercises 1824*. (Courtesy RAHT)

GLOSSARY

Axletree A transverse beam supporting a gun carriage on the ends of which the wheels revolve.

Baulk A heavy piece of rectangular timber.

Bearing recess The area in which the trunnions sit.

Bolster A block of wood placed over the axletree of a gun or a support for a mortar barrel.

Boring The process by which the bore of the gun is made. A metal bit or tool is forced down the length of a gun removing the excess metal and forming the cavity known as the bore.

Carcass A name for an incendiary projectile.

Cartouche A waterproof canvas bag for holding gun charges.

Cascable The rear section of the gun, normally from the base ring to the tip of the cascable button.

Cascable button The rear button at the extremity of the gun, often used as a leverpoint for elevating the gun where there is no elevating screw.

Cheeks The sides of the gun carriage.

Dolphins Metal projections on the upper surface of the gun, midway between the breech and the muzzle. They acted as handles which could be used to lift the barrel. They were originally ornate and shaped as dolphins, hence the name.

Enfilade To fire at an object along its greatest length from a perpendicularly placed gun.

Futchell Normally three strong pieces of wood forming the bottom base of the limber connecting the axletree bed with the splinter bar.

Nave The central hub of the wheel.

Pintle The iron hook or spindle upon which the gun carriage rests and is secured when travelling.

Portfire A composition of gunpowder, sulphur and saltpetre driven into a paper case and known to burn for a specified time. Used to ignite a gun.

Sabot A wooden base attached to the projectile, it was intended to keep the shot in the axis of the gun so that it did not bounce off one side or the other of the bore. Sabots improved the aim of the gun.

Staves Long, narrow pieces of iron or wood.

Splinter bar The wooden bar at the front of the limber that attaches to the traces of the horses and also connects the futchells and axletree.

Swingle tree An iron or wooden bar that was attached to the splinter bar of the limber on the nearside horse and to which the traces were attached.

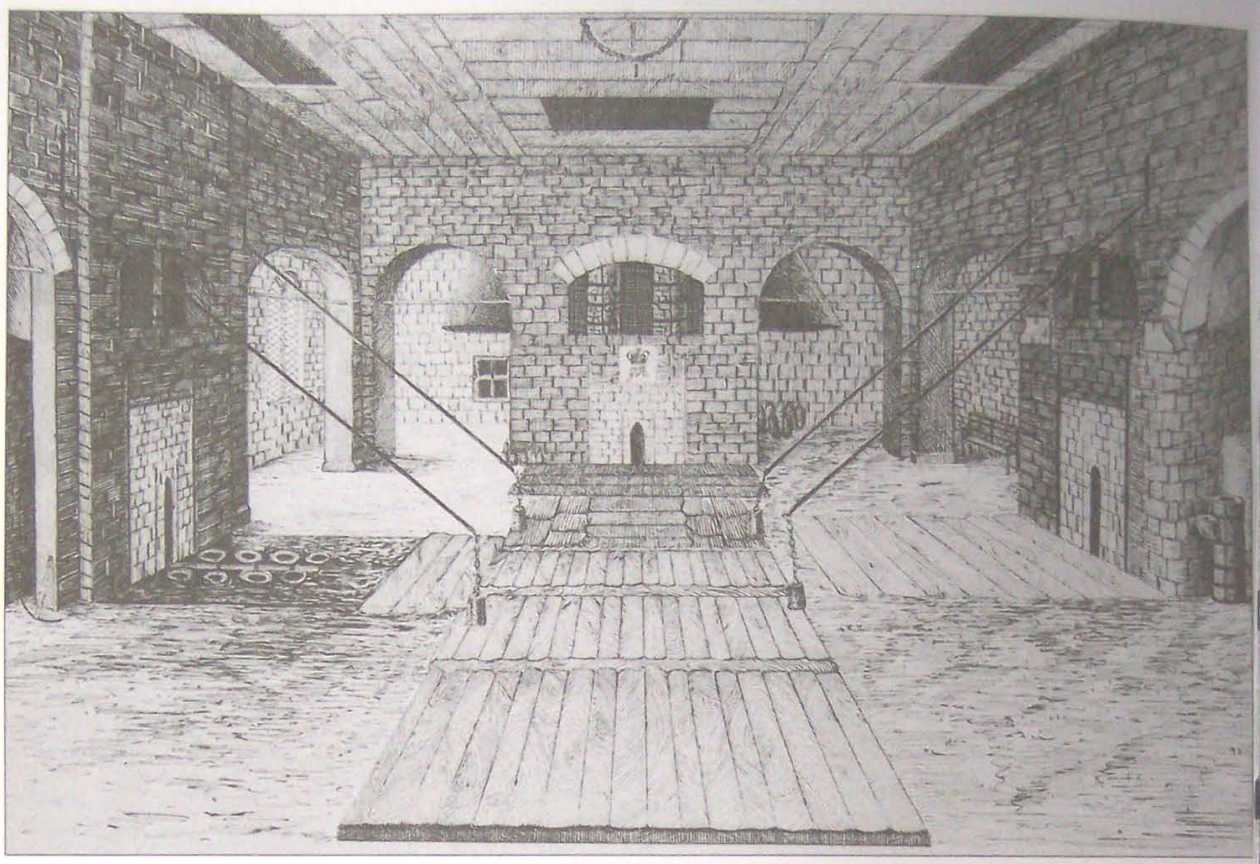
Traces The links that attach the horse harness to the gun carriage normally made of rope encased in leather.

Trail That part of the carriage which rests on the ground when unlimbered and is hooked to the pintle when limbered.

Transom A stout beam or bulkhead connecting two parts of a gun carriage.

Trunnion Two solid cylindrical pieces of metal that protude from the sides of a gun supporting it and enabling the gun to be elevated about their axes.

Vent field The area on the breech where the vent is drilled. Normally consisted of a raised metal rectangle through which the vent was drilled and to which the firing lock was attached.



The interior of the Royal Brass Foundry at Woolwich, as drawn by a cadet in the 1840s. The foundry was drawn in great detail by the Verbruggens but this view is much more spartan. Note the gun barrel mould heads on the left in front of the furnace ready for brass to be run into them. (Courtesy RAHT)

A: 6-POUNDER FIELD GUN, LIMBER AND HORSE TEAM, WITH A LAYOUT OF THE DETACHMENT (CREW), ROYAL HORSE ARTILLERY

A Royal Horse Artillery battery with 6-pounder gun on Congreve block trail carriage. The image shows the positions of the drivers and the horses. All of the crew would be mounted and the horses were normally held in a position behind the gun. The overhead view of the gun shows the positions of the principal gunners on the gun.

1 NCO who lays the gun and gives the orders.
2 From the rear of the gun the man at the right wheel serves the vent and primes the gun.
3 At the rear of the left wheel, this man fires the gun and cares for the portfire, and also traverses the gun when required.
4 At the front of the left wheel, this man rams the gun with the other gunner at the front of the gun and loads the ammunition.
5 This man worms the gun and sponges.

There were also a number of other gunners who were responsible for ancillary tasks such as bringing up ammunition from the limber, looking after the handspikes and horse holding.

The overhead view shows the sub-division drivers and limber. It can be seen that the limber was equipped with shafts on one side only and that the method for attaching the horses consisted of a swingle tree on one side and a direct attachment through rings on the other. However, the limber was so designed that the shafts could be moved for double or even triple draught.

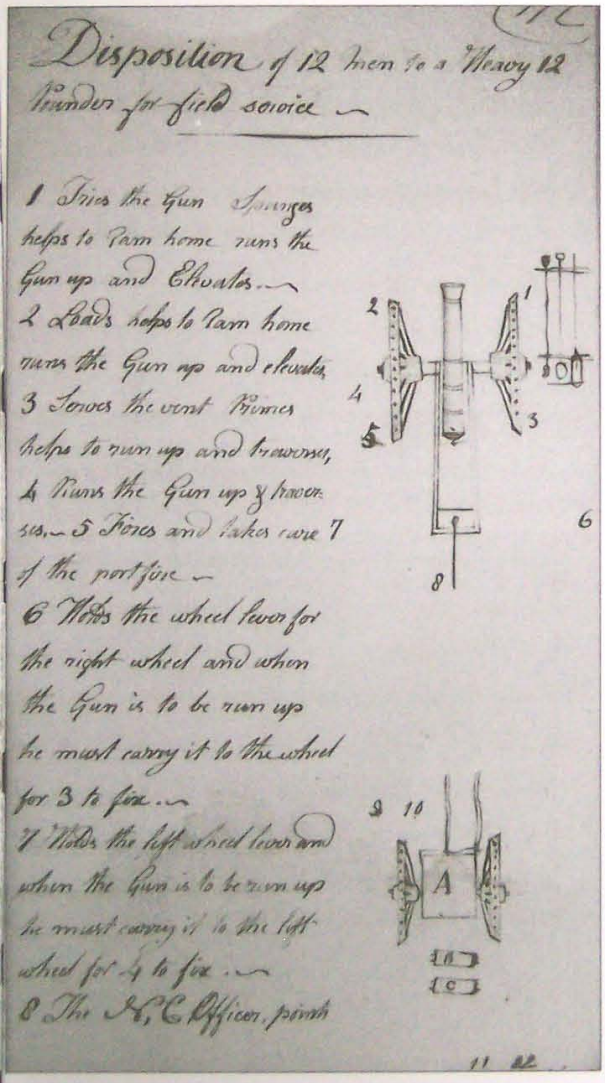
B: 5½-INCH HOWITZER AND DETACHMENT

The 5½-inch type became the principal howitzer of field brigades and was initially mounted upon a double bracket carriage as shown here. The limber was initially a two-wheeled vehicle with a central pintle for the gun trail eye. A block trail carriage was certainly designed for the howitzer and the inset here is after the illustration by Shuttleworth c.1820 which demonstrates how it would have looked. It is not clear whether this version of the carriage was ever issued. By the early 19th century the crooked pintle limber design of the 1790s with two ammunition boxes was in use with these howitzers. The howitzer on the left is the double bracket design, which remained in use for some time after the period. No details are available to show if the double

bracket carriage was modified to be used with it. In addition to the regular tools the crew would have had a sheepskin, which normally remained in the howitzer muzzle when the gun was being reloaded. It is thought that this was intended to reduce to an absolute minimum the risk of the howitzer shell exploding before the gun had been fired. One of the duties of the crew was to wipe the bottom of the shell before loading. Why this was so is not explained but it may have been for the same reason.

C: 12-POUNDER GUN AND THE BENGAL HORSE ARTILLERY

Bengal Horse Artillery with their 12-pounder gun and carriage. The Indian 12-pounder barrel was almost identical to the Royal pattern but the carriage was very different, harking back to an earlier age. It is a high cranked double bracket carriage with heavy wheels and must have weighed significantly more than its European equivalent. The horse team were all ridden and some illustrations indicate that the gunners carried their side arms when on the march. In addition the limber was very different and it was said that with this gun on the limber the weight was not easily balanced. This meant that the gun was liable to overbalance if it was travelling fast over rough going. The men of the Bengal Artillery were known as the 'red men' because of their flowing red manes of horsehair. Native-born gunners, who were often in different sub-divisions, complimented the white European gunners. Tools and equipment were very similar to those used in Europe and they were specified in exactly the same way.



'Disposition of 12 men to a heavy 12-pounder of the field service' showing the arrangement of the crew ready for firing the gun. The gun numbers and tools are laid out. Number 8 is the commander of the gun, normally an NCO. (Courtesy RAHT)

D: 9-POUNDER SMOOTH-BORE MUZZLE-LOADING GUN

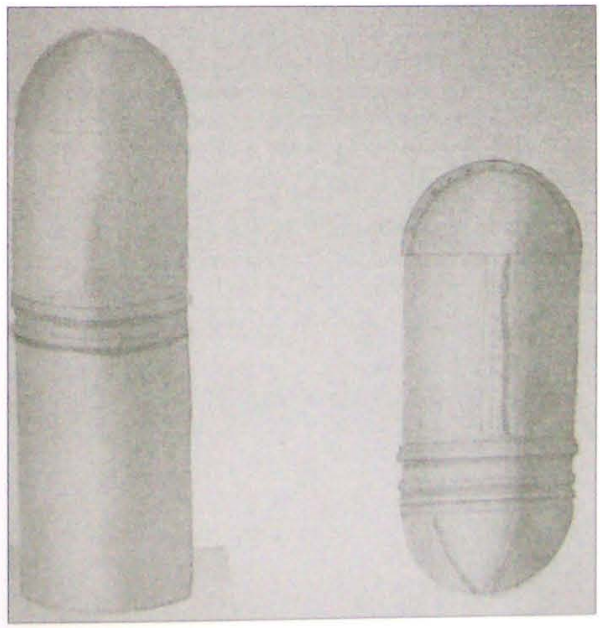
The 9-pounder smooth-bore muzzle-loading gun designed by Thomas Blomefield of 5 feet 11.4 inches. This gun was tested in 1805 and was introduced in the Peninsular War in order to counteract the French 8-pounder. It is interesting to note that the 9-pounder was equipped with dolphins, which had tended to go out of use. The 9-pounder equipped half of the Royal Horse Artillery Troops at the Battle of Waterloo.

The two ammunition boxes held a small amount of ammunition and a number of other ancillary objects such as tools, ignition devices and spares.

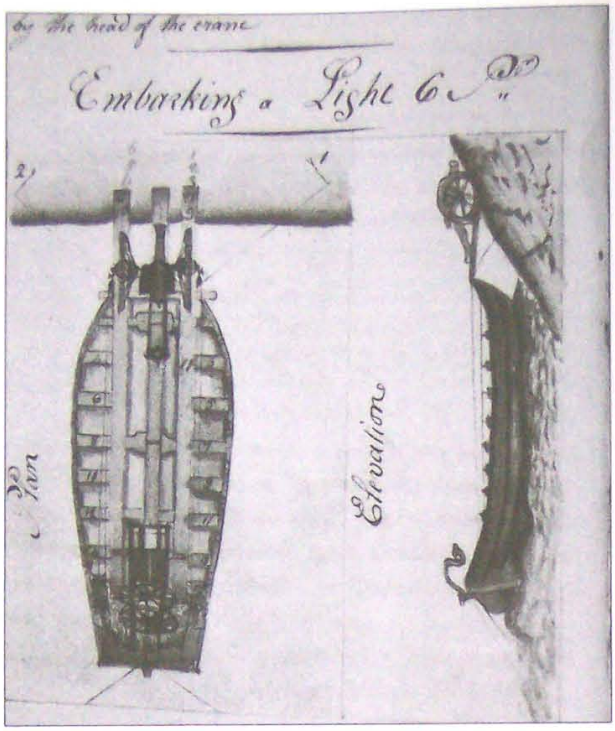
The boxes illustrated here are those that were fitted to the limber. They had several layers as shown here in order to make the best use of the space.

E: 3-POUNDER MOUNTAIN GUNS AND 4⅖ HOWITZERS

The first mountain batteries used by the British Army were commanded by Lt Robe in the Pyrenees during the advance



Two drawings of Indian fixed rounds from the 1820s. The object on the right is a fixed shot sewn into a charge bag. (Courtesy RAHT)



The light 6-pounder field gun and limber of the 1790s being loaded aboard a boat. The gun could be disassembled and transported easily by removing the wheels. From a notebook by Richard Bogue. (Courtesy RAHT)

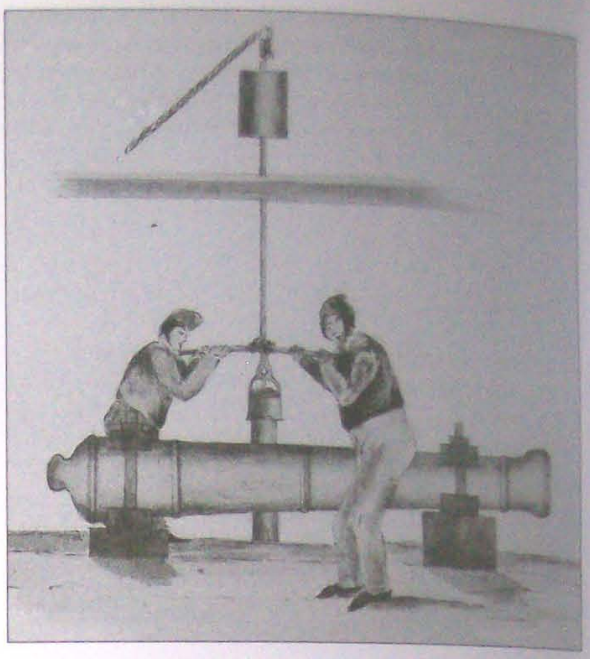
into France in 1814. Generally, the 3-pounder gun and the 4⅖-inch howitzer were favoured for their light construction. This image shows the early form of transport with the trail and wheels on the same mule. The unit was said to have Portuguese gunners, Royal Artillery drivers and some RA gunners in attendance, but it is not clear in what proportion. The image on the left shows the mounting of the howitzer barrel and carriage. A mule normally carried two howitzer mountings. The number of mules required by a brigade was in the region of 36.

F: SHELLS AND EQUIPMENT

Tools and ammunition from the Napoleonic period.

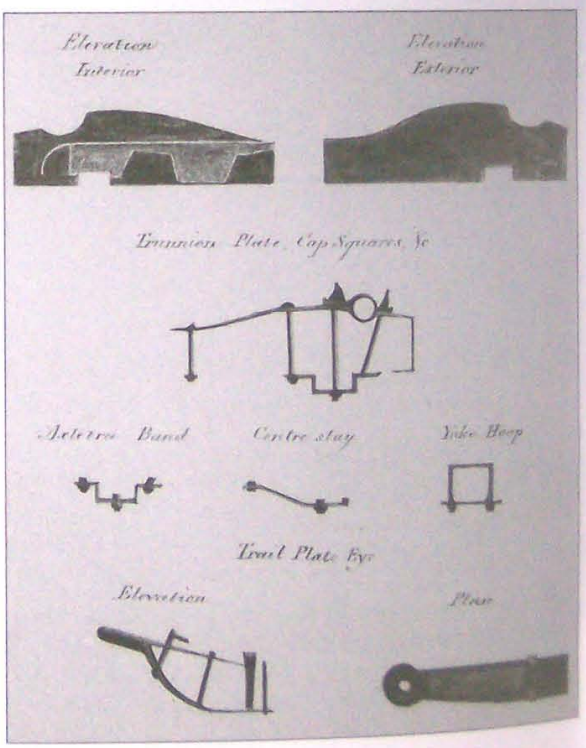
This image represents the tools, or side arms as they were known, for the gunner in the period 1792–1815. The ammunition at the top of the page is double scale. The side arms were attached to the carriage via leather straps and small brackets on the gun carriage whilst travelling and laid out by the gun in action.

1 Grape shot
2 Case shot
3 Fixed round with sabot and charge bag
4 Common shell with sabot
5 Separate powder charge
6 Spherical carcass
7 Fork lever
8 Sponge
9 Wad hook
10 Ladle

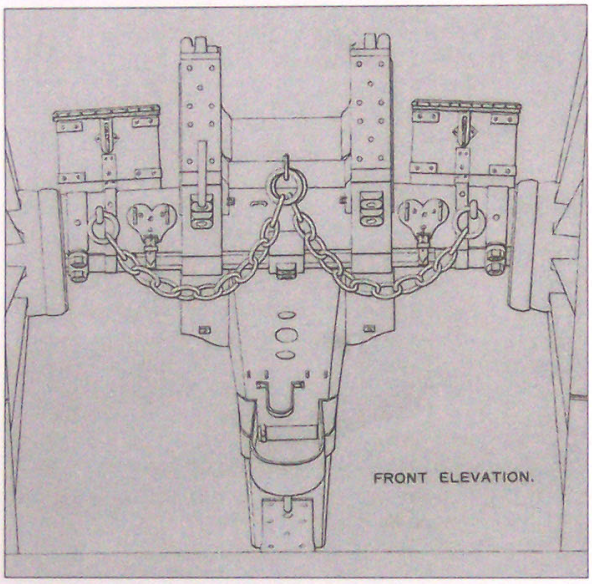


Trunnioning at Woolwich Arsenal. Because of the nature of the lathe, turning the trunnions was done by hand. The heavy weight at the top above the beam exerted pressure on the tool. (Courtesy RAHT)

Component parts of the block trail carriage illustrating the metalwork and the two cheeks. Artillery cadets were taught to draw from the moment they entered the Academy and in technical drawings would draw out each object, such as the metal trunnion plate, in meticulous detail. (Courtesy RAHT)



11 Crooked handspike
12 Straight handspike
13 Leather straps for sidearms
14 Linstock
15 Portfire holder
16 Fuze gauge
17 Auger
18 Vent spike
19 Sprung vent spike
20 Elevating screw
21 Drag rope
22 Cartouches and pouches for powder charges and ignition devices (Indian service)
23 Common shell ammunition box (Indian service)



ABOVE **The 9-pounder gun carriage front view. The heart-shaped brackets are indicative of the period. (Courtesy RAHT)**

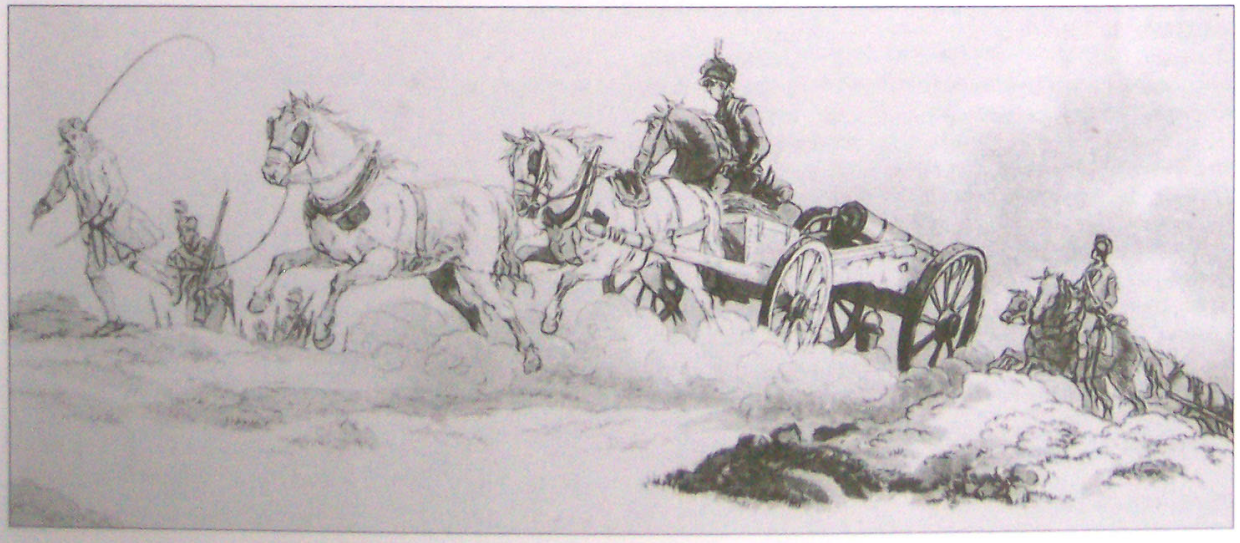
G: VARIOUS TYPES OF GUN BARRELS

A comparison of artillery barrels during the Napoleonic period. They are top to bottom:

1 The light 6-pounder of 1793. This barrel was mounted on a double bracket carriage, which had two long carriage boxes. Once the block trail carriage was designed these were greatly reduced in size. The limber was a double pole draught design with the limber boxes sitting fore and aft.
2 A Blomefield 6-pounder which came into service in the 1790s. This design became the standard shape of all field guns during the Napoleonic Wars but older patterns continued in use. There was a loop underneath the cascable button that was designed to take the elevating screw bolt.
3 The 8-inch howitzer. One of the heaviest howitzers in service it was more of a heavy siege piece but is illustrated here to show the difference between it and the field versions.
4 Heavy 5½-inch howitzer. Note that the front of the gun is moulded with a dispart sight. This feature was designed so that the line of sight was in parallel with the axis of the bore of the howitzer. This is usually considered to be a later feature, more in keeping with the 1850s, and it may be that the heavy 5½-inch howitzer was one of the first to be manufactured with a dispart sight.
5 Light 5½-inch howitzer.
6 4⅘-inch howitzer.

The object on the left of the page (7) is a gyn, which was used to place and remove barrels from their carriages. The three legs were set into the ground and the barrel hauled on a block and tackle between them. It normally took a team of one officer and ten men to operate the gyn. The tackle hook was placed directly over the dolphins (if the barrel had them) or behind the trunnions. Handspikes were fitted into the slots on the windlass and the team alternately handspiked the weight of the barrel up.

BELOW **The method of pulling a gun with two horses. This image is probably of the light 6-pounder gun. By W. H. Pyne in 1802. (Courtesy Trustees of the National Army Museum)**



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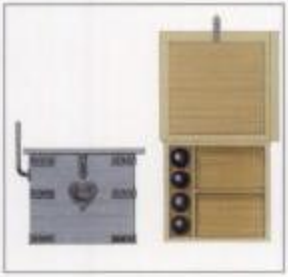

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