## 25 Pounder Quick Firing Gun

### Development

During World War I the main British field guns were the 18 pounder QF gun and 4.5 inch howitzer. The 18 pounder fired a fixed round at 1615 feet per second which meant the range of the gun could only be varied by changing the elevation at which the barrel was fired. Its elevation was restricted to between $-5^0$ and $+16^0$ for the Mark II or $+36^0$ for the Mark IV (range 6525 and 9300 yards respectively). The 4.5 inch ammunition was separate loading, it being possible to separate the shell and cartridge. The brass cartridge case contained five charges. Range of the howitzer could be varied by both changes in elevation and changes to the number of charges used in the cartridge. It fired a 35lb shell to a maximum range of 6600 yards (later 7300 yards) with an elevation of between $-5^0$ and $+45^0$.

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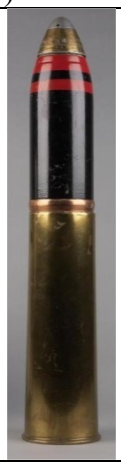
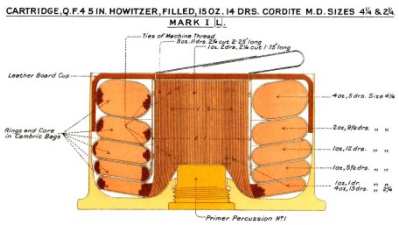
|  |  |  |
| 18 Pounder shrapnel round showing the brass cartridge case which is fixed to the projectile. | The 4.5 inch cartridge case showing the five charge bag rings. Removal of rings commenced from the top and would result in a lower muzzle velocity and therefore decrease in range. | 4.5 inch round showing the projectile seated in the brass cartridge case. The projectile is not fixed to the case allowing the removal of charge bags from the case. |

Soon after the end of World War I the Royal Artillery Committee, in conjunction with the Director, Royal Artillery began examining various options for a new field gun with a planned range of 15,000 yards and the combined capabilities of both the gun and a howitzer. In 1933, experiments began using 18, 22, and 25pounder guns. After studying the results, the General Staff concluded that the 25 pounder should be the standard field gun for the British Army. After ordering a prototype in 1934, budget restrictions forced a change in the development program. Rather than design and build new guns, the Treasury dictated that existing Mark 4 18 pounders be converted to 25 pounder. This shift necessitated reducing the calibre to 3.45 inches. Beginning testing in 1935 the result was the Mark 1 25 pounder which is better known as the 18/25 pounder.

In 1938, experiments resumed with the goal of designing a purpose-built 25 pounder. When these were concluded, the Royal Artillery opted to place the new 25 pounder on a box trail carriage which was fitted with a firing platform. This combination was designated the 25 pounder Mark 2 on a Mark 1 carriage and became the standard British field gun. Having an elevation capability

of between $-5^0$ and $+40^0$ and with separated ammunition containing up to four charges that gave a wide variation in range and muzzle velocity it achieved the ability of being a gun and a howitzer but the reduction in calibre only achieved a maximum range of 13,400 yards.

| Charge | Muzzle Velocity in feet per sec | Maximum Range in yards |
|---|---|---|
| 1 | 650 | 3900 |
| 2 | 975 | 7800 |
| 3 | 1450 | 11.800 |
| Super | 1700 | 13,400 |

Ability to fire projectiles with high muzzle velocities made the 25 pounder a useful anti-tank gun, while its wide range of depression and elevation made it most effective in mountainous terrain. In fact the 25 pounder proved to be one of the most successful field guns of its time.

## Variants

The 25 Pounder is made up of some 5000 parts of which the Ordnance (barrel, breech block and breech), cradle, recuperator, saddle and trail are the major components.

### Ordnance

Variations to the ordnance are hard to identify especially where the breech is closed but are mentioned here for the record:

- **Mark I.** The Mark I was a 25-pounder barrel and breech in the modified jacket of an 18 pounder gun.
- **Mark II.** The Mark II was the standard ordnance of World War II and was produced in the UK, Canada and Australia. In 1942 it was decided to fit a muzzle brake to the gun. This was to eliminate the instability caused when firing the 20lb AP shell with Charge Super at direct fire low elevation angles. To preserve the gun's balance on the trunnions a counterbalance weight was also fitted, just in front of the breech ring. These modifications did not lead to a change in the gun's nomenclature. Eventually all guns serving in Europe were so converted. The conversion was not made in Australian service until 1962 when those guns still in service were converted.

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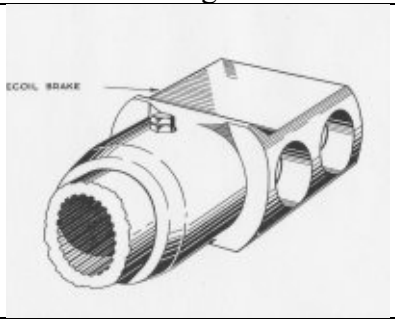
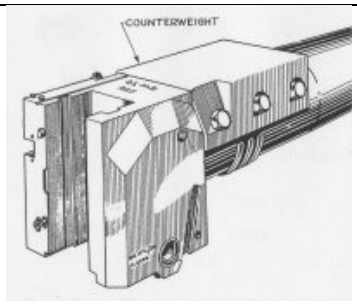
|  |  |
| The muzzle brake fitted to the barrel. It was screwed to the end of the barrel and held by a set screw and lock nut. Its purpose was to absorb some of the energy of the emerging propellant gases and so reduce the force of recoil. | The counterweight fitted to the rear end of the jacket and secured by six screws. Its purpose is to compensate for the additional weight of the muzzle brake. |

- **Mark II/I.** In 1946 a programme was introduced to modify the gun's breech ring by morticing the rear corners. A corresponding modification was made to the rear corners of the breech block.
- **Mark III.** The Mark III ordnance was a Mark II with a modified receiver to prevent the rounds from slipping back when loading at high angles. It was introduced in January 1944.
- **Mark III/I.** This was a Mark III gun with the same modification to the ring and block as for the Mark II/I above.
- **Mark IV.** The Mark IV was identical to the Mark III/I, and featured the modified ring and a paired block manufactured from new.

**Cradle**

The cradle is a trough shaped structure designed to carry the recuperator. The trunnions form part of the structure and allow the cradle to be elevated and depressed. A front cap is fitted at the front. Six types of cradles were made and differ only in minor detail to facilitate manufacture. No 1, 2 and 4 are riveted and 3, 5 and 6 welded.

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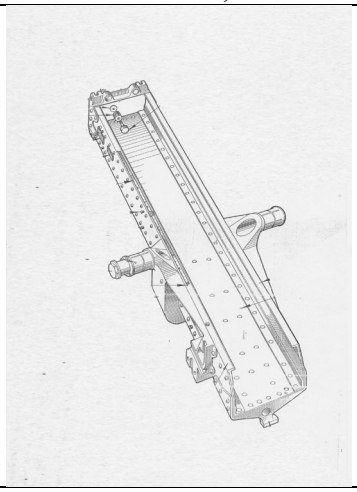
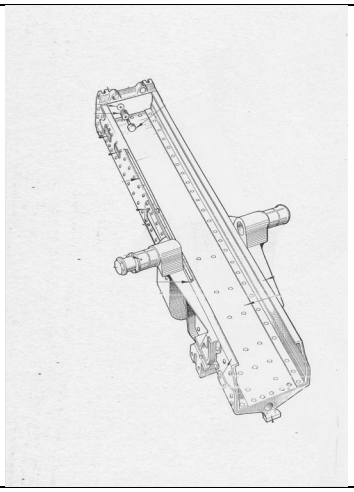
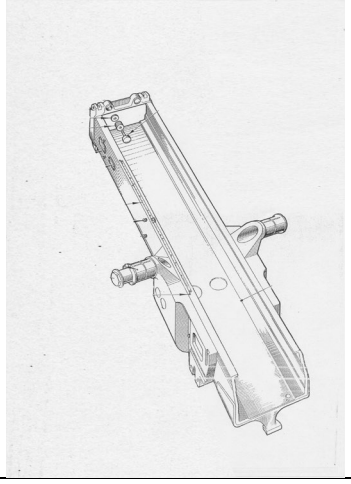
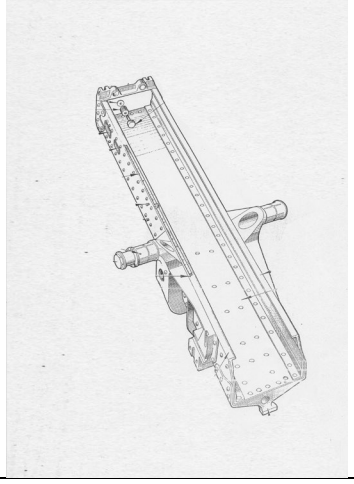
|  |  |
| Cradle No 1 | Cradle No 2 |
|  |  |
| Cradle No 3 | Cradle No 4 |

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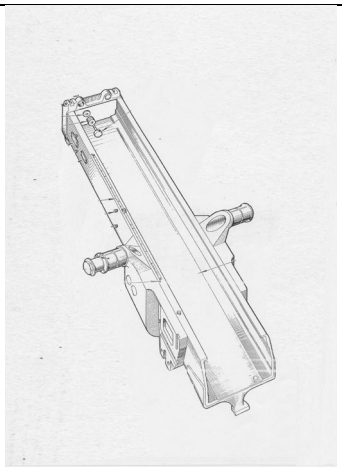
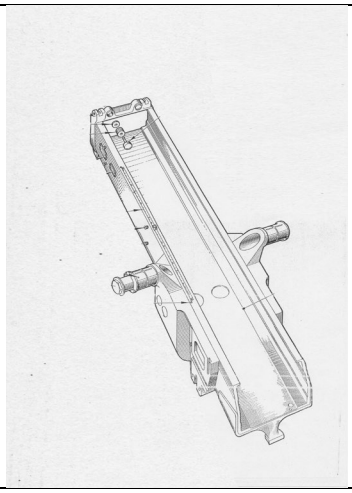
|  |  |
| Cradle No 5 | Cradle No 6 |

**Recuperator**

The recuperator is that part of the gun that fits into the cradle and to which is attached the ordnance. It allows the ordnance to recoil when fired and then return to the normal position.

**Saddle**

The saddle is that part of the gun onto which the cradle is attached and which allows elevation and traverse to occur. Generally speaking the variations in saddles is mainly in their construction as shown below:

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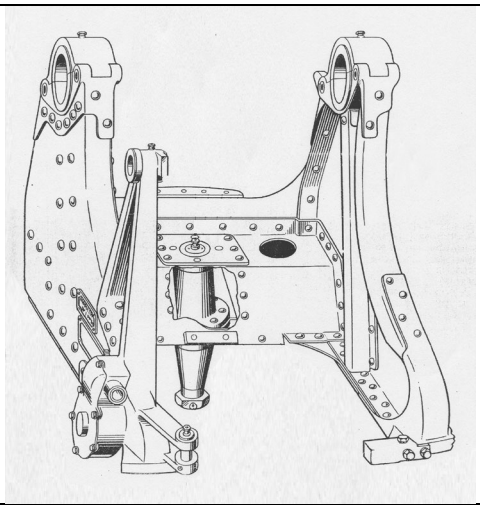
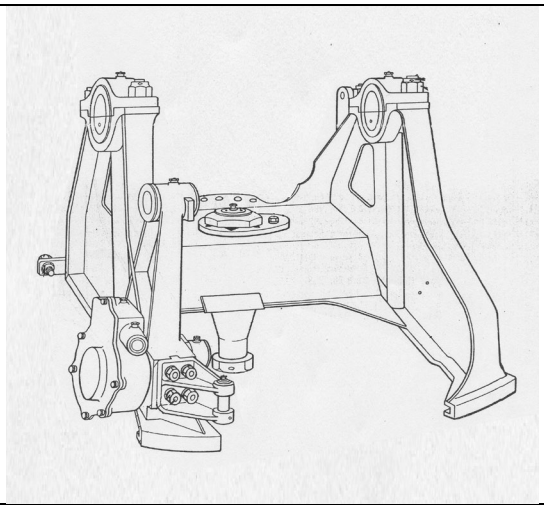
|  |  |
| Saddle No 1 | Saddle No 2 |

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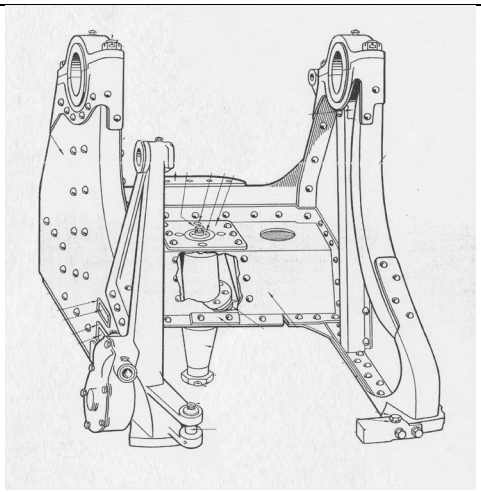
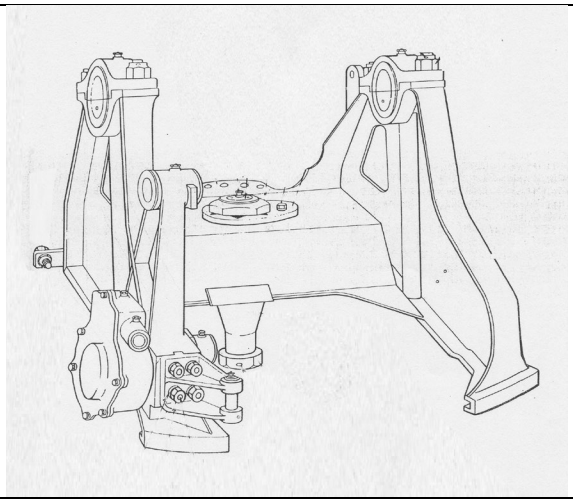
|  |  |
| Saddle No 3 | Saddle No 4 |

**Trail**

The trail is of the box type and is the main component of the carriage which in addition to the trail included the wheels, crossbar, shield, saddle, sighting gear and elevation and traversing gear. A firing platform could be attached. The major difference in trails is their construction.

- **Mark 1.** The first of the 25 Pounder trails it is of riveted construction.
- **Mark 2.** Developed for use with light vehicles the cross bar was reduced in length by approximately 1 foot 2 inches it was narrower than the Mark I trail. It is of welded construction.
- **Mark 3.** This carriage is converted from the Mark 1 carriage to enable the gun to be elevated to $+76^0$. The trail is cut at the rear end and joint brackets are fitted to each leg to allow the trail to be hinged to achieve the higher elevation.

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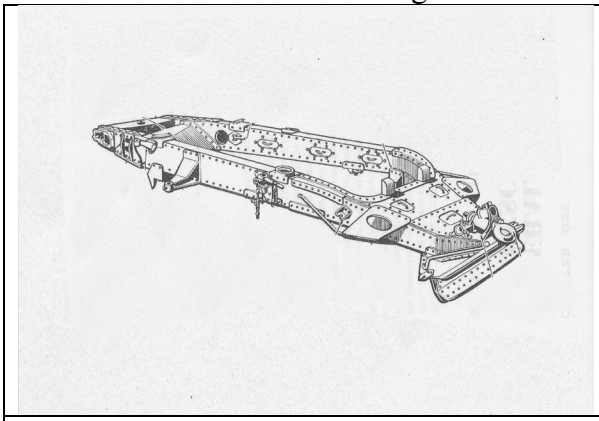
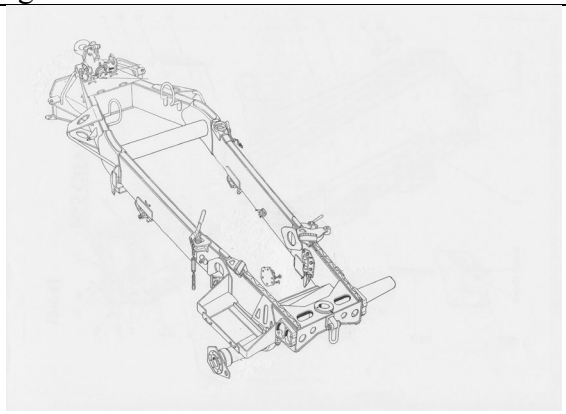
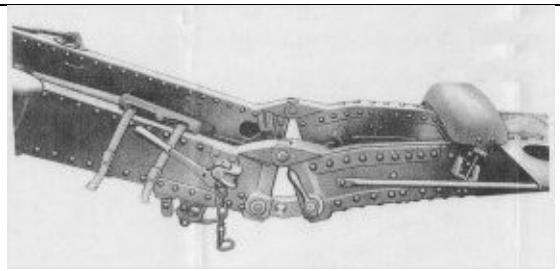
|  |  |
| Mark 1 | Mark 2 |
|  |  |
| Mark 3 | |

**Variants:**

While the 25 pounder Mark 2 was the most common type of the weapon, three additional variants were built. The Mark 3 was an adapted Mark 2 that possessed a modified receiver to prevent rounds from slipping when firing at high angles. Mark 4s were new build versions of the Mark 3. For use in the jungles of the South Pacific, a short, pack version of the 25 pounder was developed by Australia. This is the Short 25 pounder which could be towed by light vehicles or broken down into pieces for transport by animal or deployment by air. It had two carriages. The Mark 1 was in the initial production run which because of excessive jump was modified with larger wheels and tyres and stands to make the Mark 2 carriage. Mark 1 carriages were then progressively modified. Self propelled versions of the gun were also developed:

- The Bishop developed by Britain using the Valentine tank chassis. 149 of this gun were built from late 1941. Its high silhouette, slow speed and restricted elevation ($15^0$) which limited its range to 6400 yards saw it replaced when the M7 Priest (105mm) US SP gun and Sexton.
- The Sexton developed by Canada using the Ram or Grizzly tank chassis. Based on the design of the US M7 Priest the Canadians built 2,150 Sexton SP guns for use by the British and Canadian forces. They began service in 1943.
- The Yeramba developed by Australia using the M3 Lee tank chassis. In 1949 Australia developed a self-propelled version of the 25 Pounder for use as a close support gun for the independent armoured brigades. Only 14 were produced.

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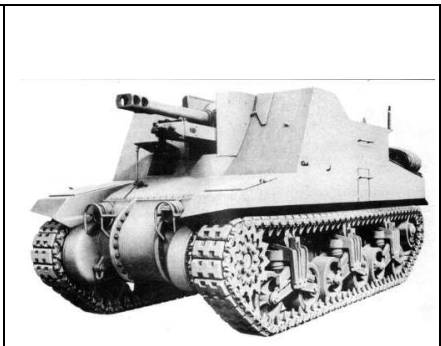
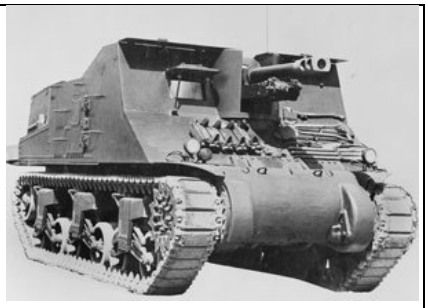
|  |  |  |
| British Bishop<br>SP 25 Pounder. | Canadian Sexton<br>SP 25 Pounder | Australian Yeramba<br>SP 25 Pounder |

**Operational History**

The 25 pounder saw service throughout World War II with British and Commonwealth forces and generally thought to be one of the best field guns of the war. Initially the 25 pounder Mark 1 (18/25 Pounder) were used by the British in France and in North Africa during the early years, Many were lost during the withdrawal from France in 1940. These were replaced by the Mark 2 which entered service in May 1940.

**Australian Service**
Australian Forces were initially equipped with 18 pounders and 4.5 inch howitzers. A Regiment consisted of two gun batteries equipped with a total 24 guns (16 x 18 pounder and 8 x 4.5 inch howitzer. In 1940 this changed to three gun batteries of two troops each with the same number of guns in total.

The 2/3rd Australian Field Regiment was the first Australian unit to be equipped with the new 25 Pounder Mark 2. It was in the United Kingdom at the time. These guns were to be lost during the operations in Greece. As guns became available they were issued to the units and saw action in North Africa, Greece and Syria. In Greece, in addition to the guns of the 2/3rd Regiment already mentioned those used by the 2/1st and 2/2nd Field Regiments were also lost. Units of the 7th and 9th Divisions were equipped with the 25 Pounder but they were not used by Australian gunners at Tobruk.

The 2/10th and 2/15th Field Regiments of the 8th Division received their 25 Pounders in Malaya late in November 1941 (2/15th) and early January 1942 (2/10th). These guns were lost to the Japanese during the fighting and fall of Singapore. The 25 Pounder were to subsequently see action in New Guinea and the Islands. The difficulty in moving guns in the poor conditions of New Guinea resulted in the development of the Short 25 Pounder. The Short 25 Pounder was used in the only operational air-drop of Australian Artillery in World War II when two guns of the 2/4th Field Regiment and their detachments were parachuted into the Markham Valley near Nadzab on 5 September 1943.

Generally speaking it can be said that wherever the Australian fought during World War II the 25 Pounder gave service. Following the war the 25 Pounder was the standard field gun of the Australian Army. It was taken with 'A' Field Battery when it joined the British Commonwealth Occupation Force in Japan from 1946 until late 1948. Australia did not provide artillery during the Korea War where the Australian Force was provided artillery support by the British and New Zealand artillery which included 25 Pounders.

In 1949 Australia developed a self-propelled version of the 25 Pounder for use as a close support gun for the independent armoured brigades. Known as the Yeramba it utilized the chassis of the M3 General Grant tank. A total of 14 were produced. The Yeramba was issued to the 22nd Field Regiment, a CMF unit based in Victoria in 1952. In 1956 the Yeramba's were declared obsolete possibly because of the introduction of the Centurion tank which had come into service in 1952.

In 1955 105th Field Battery was sent to Malaya to assist Commonwealth Forces in their operations against communist terrorists. In the late 1950s the decision was made to standardize on a calibre of 105 mm for NATO forces. Australia began to re-equip in 1959 when the first 105 mm guns arrived. Despite this the 25 pounder did not disappear and remained in service for training, mainly with the CMF. In 1962 remaining stocks were fitted with muzzle brakes and counter weights. Previously the 25 Pounders used on the Yeramba were the only ones in Australian service so fitted. The 25 Pounder was withdrawn from service in the Australian Army in 1975.

**Australian Production**

*The 25-pounder gun-howitzer.* The suggestion that the 25-pounder should be manufactured in Australia was made by Colonel Sturdee of Army Headquarters as early as 1938. His proposal was supported enthusiastically by Mr Jensen, then Controller of Munitions Supply but opposed by the Chairman of the Treasury Finance Committee, Sir Walter Massy-Greene. This meant that when war started in September 1939 the army was still equipped with World War I vintage guns and it wasn't until 18 January 1940 that the War Cabinet approved the construction of a new gun factory estimated to cost £300,000. Within about six months the factory was completed, but manufacture of the 25-pounder could not begin because drawings of the gun had not arrived. On learning that the 25-pounder was about to go into production in Canada, Mr Essington Lewis sent a cable to Sir William Glasgow, Australian High Commissioner in Canada, asking for assistance in procuring drawings and specifications. Within a few days Glasgow replied that some drawings had been despatched from San Francisco on 24 July. By the end of August nearly all the important drawings had arrived.

In spite of the recent extensions to the Government factory orders during and soon after June 1940 for 25 pounders and other guns far exceeded its capacity and the only hope of meeting them was to call in the help of commercial industry. The automotive industry, by reason of its long and extensive experience of production engineering, figured largely in the new plans and it was no accident that Mr Hartnett, the Managing Director of General Motors-Holden's, was appointed head of the newly-formed Directorate of Ordnance Production. In conformity with the general policy of having an administrator with experience of the government munitions organisation to assist the director, Mr Daley, who some years before the war had been an assistant manager in the Ordnance Factory, was appointed Controller.

The sequence of the directorate's operations was roughly as follows: as soon as an order (in this instance for trailers and carriages of the 25-pounder) had been received, the relevant drawings and specifications were examined with a view to deciding the Australian equivalents of the materials (principally steels and other alloys) called for and also to calculating the quantities that would be required. These questions were discussed with the Director of Materials Supply (Sir Colin Fraser) who was able to state whether the materials were available or not. Where shortages were evident, alternative materials were sometimes sought. A good example of this was the Australian bullet-proof steel, which avoided the use of nickel, then extremely scarce. To deal with other shortages, for example gun steel, new centres of production were set up. An electric furnace and auxiliary equipment for making gun steel were installed at the Brooklyn works of the Melbourne Iron and Steel Company.

The nature and extent of the tooling and gauging necessary to meet the rate of production agreed upon was then discussed with the Director of Machine Tools and Gauges (Colonel Thorpe). Owing to the general shortage of machine tools a good deal of improvisation was often necessary.

In the meantime the directorate's production engineers, in cooperation with the Boards of Area Management in each State, sought out suitable firms to undertake the manufacture of components. A salient feature in the plan of production was the appointment of a major

coordinating contractor, whose special responsibility was to coordinate the work of the many sub-contractors. For the manufacture of the 25 pounder two large engineering firms were chosen: Charles Ruwolt Pty Ltd (associated with Thompson's Engineering and Pipe Co Ltd of Castlemaine) for Victoria, and General Motors-Holden for New South Wales. Each firm cooperated with the directorate, in planning production, organising sub-contractors, defining the requirements of gauges, cutting tools, jigs and fixtures, ordering materials and the final assembly of the finished gun.

Before manufacturing began production engineers of the directorate often made requests to the Army Inspection Branch for permission to modify specifications to meet Australian technical practice or to allow for the use of Australian materials that differed slightly from corresponding British materials. The system for requesting these changes was so simple and flexible, and so wholeheartedly supported by Colonel Gipps, that the efficiency of the directorate's activities must be attributed to this form of cooperation with the Inspection Branch.

With the single exception of ball bearings all the 5,000 components of the 25-pounder were made in Australia. Some of the larger and more difficult components were made by the major coordinating contractors; this often involved them in designing and building special-purpose machine tools for the work. The two major firms were obliged to call in the assistance of nearly 200 sub-contractors, who were as strange to the work of making guns as they themselves were. That the whole project was completed with so few hitches and in such a short time was testimony to the industrial adaptability and ingenuity of all the firms concerned.

Australian Iron and Steel forged barrels, the Colonial Sugar Refining Co machined them, Australian General Electric made trails, Melbourne Tramway Workshops the platforms, Chubb's Australian Co Ltd, recuperators, Automatic Totalisators Ltd dial sights, and Claude Neon Ltd (Victoria) spirit levels. This very incomplete list is quoted in order to emphasise that the manufacture of the 25-pounder gun was very much a team effort. It would be wrong to imply that there were no failures and hold-ups. The recuperator, a vital part of the carriage of the gun, was for some time a source of considerable anxiety to the major contractors in New South Wales. The firm to whom its manufacture was first entrusted—one of the most highly regarded engineering firms in the country—failed. It was then turned over to Chubb's Australian Co Ltd, makers of office safes, who made a success of it. The major Victorian coordinating contractor (Ruwolts) recognised that the recuperator was a difficult piece of engineering and did not sub-contract it. Chubb’s Australian Co Ltd also produced a number of breech blocks.

Forging and heat-treating the chrome-molybdenum steel for the recuperator (both carried out by the Thompson Engineering and Pipe Co Ltd) were by no means simple operations, but the real problem was the machining of the block: three holes, each of a small but accurately known diameter, had to be bored through the full length of 65 inches in such a way that they were parallel to within an axial limit of a few thousandths of an inch. The firm's technical staff designed and built a machine tool which enabled the three holes to be bored

simultaneously. Of this difficult component Ruwolts made no less than 1,024, some of which were supplied to General Motors-Holden's.

The first 25-pounder carriage and ordnance to be made wholly in Australia was completed in May 1941 in the works of Charles Ruwolt. Government and commercial engineering works both contributed parts to this gun. By 31 October 1941, nine months after the receipt of the drawings, the first complete gun to be made entirely by commercial industry came off the assembly line of General Motors-Holden's and was successfully proofed on 26 November. This particular gun was fitted with a recuperator made in Victoria.

The Australian output of 25-pounders to the end of 1943, when it ceased, was: 1,173 ordnance and 230 spare barrels made by the government factory, and 354 ordnance and 445 spare barrels made by industry. The carriages and trailers for use with these were made entirely by commercial industry —principally by Charles Ruwolt Pty Ltd, General Motors-Holden's and Ruskin Pty Ltd of Victoria.

**The 25-pounder short (Aust) quick-firing gun-howitzer.** Despite its adaptability as a howitzer, the 25-pounder was not suited to remote jungle or mountainous terrain because of the difficulty of transporting it. For use in these circumstances it was considered desirable to redesign the gun so that it could be broken down into comparatively light units—light enough to be dropped by parachute or to be packed into a jeep—which could be quickly reassembled. To meet these special requirements Brigadier O'Brien (Director of Artillery) suggested to the M.G.R.A. in September 1942 that the 25-pounder should be redesigned by shortening the barrel and the recuperator and by making the trail lighter. Advantage was taken of the fact that Ruwolts had just redesigned the recoil system of the 25-pounder to enable the standard gun to be mounted in the Australian cruiser tank, an adaptation which proved equally suitable for a short 25-pounder. Redesign of the gun to meet the new requirements without adversely affecting its valuable ballistic characteristics was carried through by the staff of the M.G.O. Design Division under Major Emery, in collaboration with the Ordnance Production Directorate and Charles Ruwolt Pty Ltd. The gun was made so that it could be broken down into ten pieces, all of which could be dropped by parachute. Assembled, it could easily be towed by a jeep, and this was an advantage as the jeep could be carried in an aircraft. The maximum range of the modified (short) gun was approximately 87 per cent of that obtainable with the standard gun.

The muzzle velocity and maximum ranges expected for the short gun were as shown in the accompanying table.

| Charge | Muzzle Velocity in feet per sec | Maximum Range in yards |
|---|---|---|
| 1 | 565 | 3,100 |
| 2 | 837 | 5,700 |
| 3 | 1,248 | 10,400 |
| Super | 1,464 | 11,500 |

Instructions issued by the Master-General of the Ordnance warned artillery officers not to use the super charge, except in conditions of extreme urgency, on account of the severe strain likely to be imposed on the light carriage.

The prototype was proved early in December 1942 and after several minor modifications had been introduced as a result of the proving, large-scale production was begun early in 1943. Altogether 213 short guns were manufactured. Artillery officers were unanimous that Australian industry had done a remarkably good job on the standard gun (25-pounder Aust Mk II); their opinion of its performance in the field seems to have been uniformly high. On the qualities of the short gun there were extremely divergent views. There is reason to believe that much of the criticism of the short gun arose from the fact that more was expected of it than its designers intended. Critics lost sight of the fact that the "short" was a special-purpose weapon, and that some sacrifices of performance of the standard weapon had to be accepted in order that it might fulfil its special roles. Because of its light weight it tended to be "lively" when fired. The need to save weight made the gun less suitable for sustained heavy firing. The short barrel caused a heavy blast effect on the crews, who, in consequence, sometimes suffered from severe earache and temporary deafness, as well as occasional nose-bleeding. Whatever the gun's shortcomings they appear to have been outweighed by its good points.

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|  |  |
| 25 Pounder Short (Aust) Mark 1 on Carriage Light (Aust) Mark 1 | 25 Pounder Short (Aust) Mark 1 on Carriage Light (Aust) Mark 2 |