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The 18-pounder field gun in Irish service, 1922-1942

by

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Abbreviations

ACOS	Assistant chief of staff
AFO	Army finance officer
AFV	Armoured fighting vehicles
DFTC	Defence Forces Training Centre
GHQ	General headquarters
HE	High explosive
HQ	Headquarters
MA	Military Archives
NAI	National Archives Ireland
NAUK	National Archives United Kingdom
NLI	National Library of Ireland
OC	Officer commanding
QMG	Quartermaster General
Regt.	Regiment
RFA	Royal Field Artillery
RGA	Royal Garrison Artillery

Glossary of terms/explanation of technical information

Armament artificer: The tradesman who maintained and repaired artillery. The work on small arms was carried out by an armourer.

Artillery: A term that describes the three types of cannon; guns, howitzers and mortars.

Barrage: A curtain of shell bursts. In this study the term is used to describe a small bombardment.

Battery: 1. A sub-unit in the artillery which is a collection of a specific number of guns.
2. The position of the gun in the cradle when it is ready to fire.

Bore: The inside of a gun barrel, from the rear of the chamber and the muzzle.

Breech: The rear of the gun barrel, where the ammunition is loaded.

Calibre: The diameter of the gun's bore.

Dial sight: A periscope-like sight which is horizontally movable over a scale of 360 degrees. It can be used to bring a gun's fire onto a target using a given angle.

Directorate: This is the office of the highest-ranking officer of a corps such as artillery or ordnance. He held the position of director.

Gun: a piece of artillery that fires a projectile at an angle that is less than 45-degrees.

Gun carriage: The carriage upon which a gun barrel is mounted.

Howitzer: a piece of artillery capable of firing at angles above 45-degrees at low velocity. It fires a heavier shell a shorter distance than a gun of the same calibre.

Mortar: A weapon that fires at angles greater than 45-degrees, it has a shorter barrel and a lower muzzle velocity when firing. Its range decreases as the angle of elevation increases.

Muzzle: the front of the gun barrel.

Muzzle velocity: The speed of the shell as it leaves the muzzle of the gun.

Ordnance: The barrel of the gun is also known as the ordnance. The term is also used to describe a unit in the military that deals with equipment of all kinds.

Piece: Artillery piece, another way of describing the field gun.

Practice (range/firing): The exercise during which gunners were rehearsed or tested as they fired the gun on the training range. In Ireland firing practice took place in the Glen of Imaal.

Recoil: The rearward movement of the gun caused by the firing of a projectile.

Run-out: The forward movement of the gun in the cradle after firing to return it to the ready-to-fire position.

Round: the ammunition for a weapon. In the case of the 18-pounder the shell and case were loaded as one.

Shell/Projectile: The part of the round that is fired from the gun.

Sub-calibre: A weapon of smaller calibre than the primary gun that is used for training.

Whippet: Rolls Royce armoured car.

The British Imperial System of units has been used to describe measurement in this thesis because it was the system that was used at the time the 18-pounder was in service. The table below has been inserted to assist with conversion.

Imperial unit	**Metric equivalent**
1lb (pound)	0.45 kg
1cwt (hundredweight)	50 kg
1 mile	1.6 km
1 yard	0.9 m
1 inch	2.54 cm

The following table contains the weapons mentioned in the text, including calibre and weight of shell.[1]

Weapon	**Calibre mm (inches)**	**Weight of shell kg (lbs)**
18-pounder field gun	83.83mm (3.3-inches)	8.39kg (18.5lbs)
3-inch anti-aircraft gun	76.2mm	
3.7-inch howitzer	93.8mm	9kg (19lbs)
4.5-inch howitzer	114.3mm	15.87kg (35lbs)
6-inch howitzer	152.4mm	45.35kg (100lbs)
9.2-inch howitzer	233.68mm	132kg (290lbs)
12-inch howitzer	304.8mm	340.19kg (750lbs)

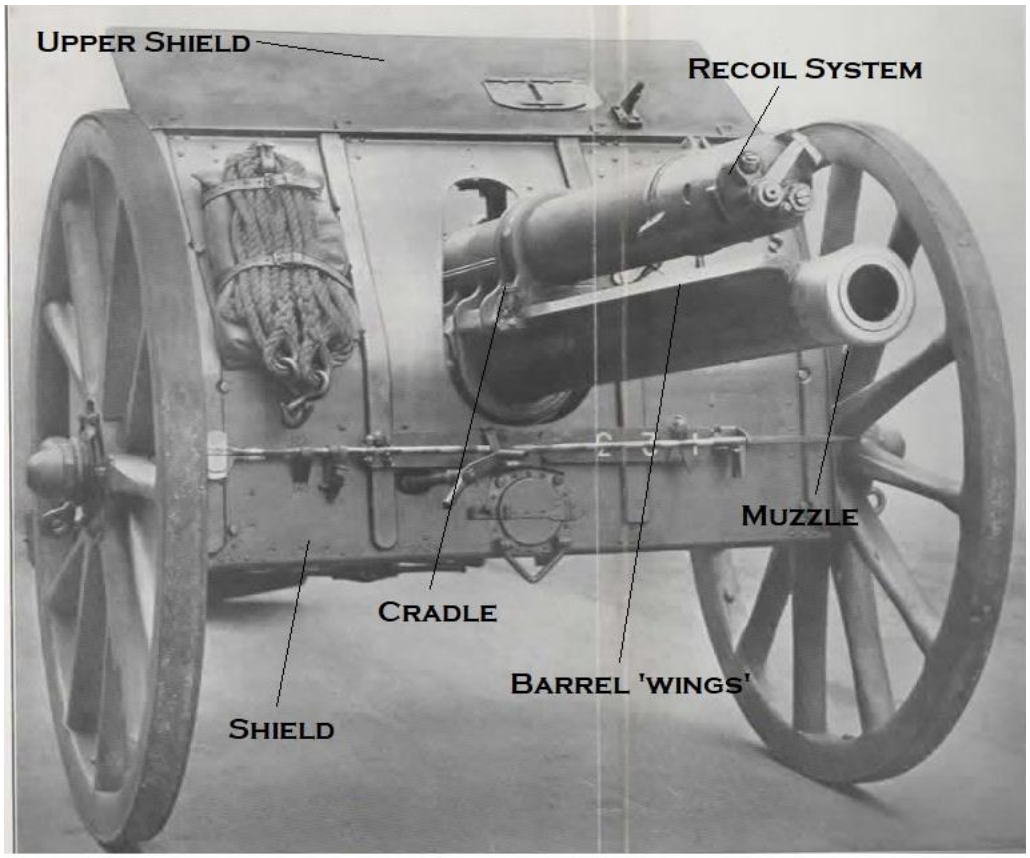
[1] I. V. Hogg, *Allied artillery of World War One* (Wiltshire, 1998).

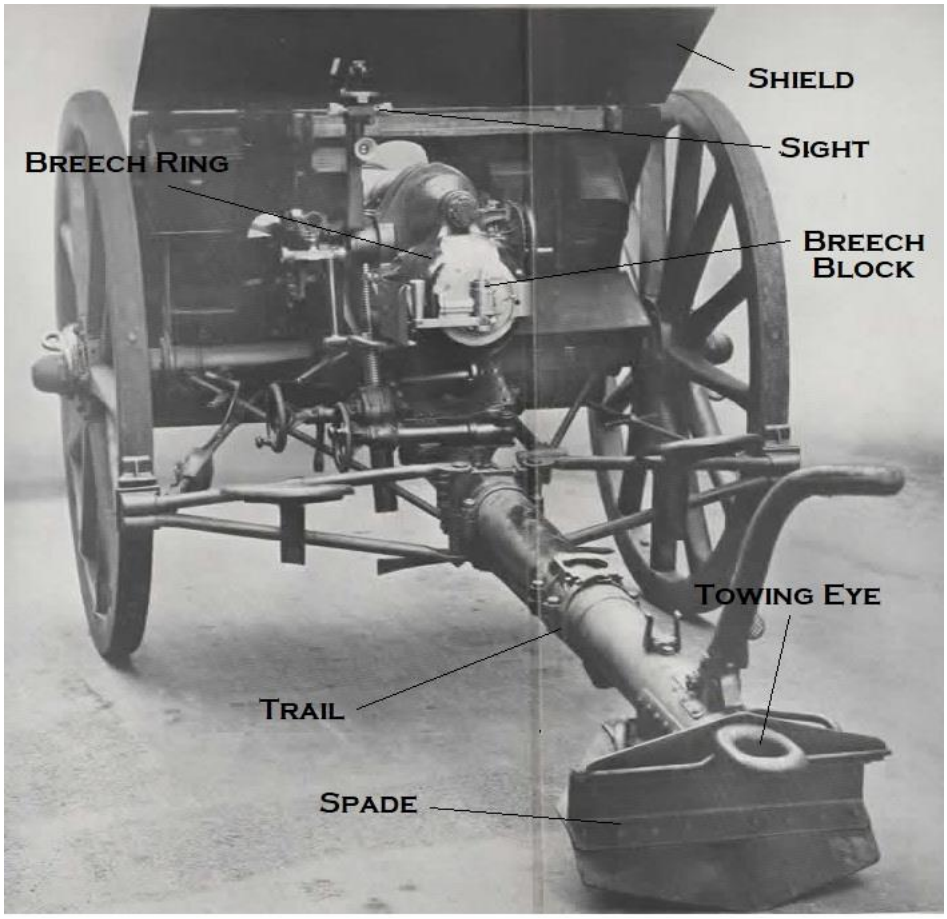
Rank structure of the Defence Forces during the period.

Commissioned ranks	
General	Gen.
Lieutenant General	Lt. Gen.
Major General	Maj. Gen.
Colonel	Col.
Lieutenant-Colonel	Lt-Col.
Commandant	Comdt.
Major	Maj.
Captain	Capt.
Lieutenant	Lt.
Other ranks	
Sergeant Major	Sgt. Maj.
Battalion Quartermaster Sergeant	BQMS
Company Sergeant	CS
Company Quartermaster Sergeant	CQMS
Sergeant	Sgt.
Corporal	Cpl.
Gunner (artillery) / Private (infantry & ordnance)	Pte. / Gnr.

Timings: The military format for time is used in this study.

18-pounder field gun, identification of parts and assemblies.





18-pounder front and rear views showing the main parts of the weapon that are discussed in the text. (images from War Office, *Handbook for the 18-pr Marks I to II guns on Marks I to II field carriages* (London, 1929).

It should be noted that variants of the field gun were designated a 'Mark' that corresponded with the type of carriage they were mounted on I, II, IV and V. At the same time components were manufactured as a variant or 'Mark' of that component. This Mark was specific to that component and should not be confused with the overall Mark of the field gun.

Introduction

The idea for this thesis originated from the author's position as the leader of the team that was involved with the restoration of a "Quick Firing" 18-pounder field gun Mark II, serial number 9168 in the Irish Defence Forces' Ordnance Base Workshops. Research carried out for this study confirms that this was one of the guns that were handed over to the fledgling Free State Army in June 1922. The opening shots of the Civil War were fired by an 18-pounder and the gun had an important role during the subsequent fighting. In a broader context the mass-produced 18-pounder was one of the great field guns of the early decades of the twentieth century. Its initial development and subsequent variations were an amalgamation of the great advancements in artillery design and its impact on a small nation like Ireland was therefore significant. This thesis will examine the 18-pounder field gun during its service in the Irish Defence Forces between 1922 and the Second World War.

The history of the field gun in Irish service is developed here using a bottom-up approach which keeps the 18-pounder central to the narrative. There are four key topics in the thesis that are summed up by the following questions. How was the 18-pounder developed and what effect did its service in the Great War have on the gun? How were the field guns employed by the pro-Treaty side during the Civil War and how did that compare to artillery doctrine of the time? Where did the field gun fit in the new Free State Army after the Civil War? How were the guns maintained, what sort of problems were encountered and how were they adapted for mechanical haulage? The subject is analysed at close range and the methodology used is like that employed when researching a microhistory. The story of the field gun in Irish service must include the preceding two decades a period which saw the initial introduction of the weapon and witnessed the major adaptations of the piece that changed its appearance and greatly improved its performance. For that reason, this study covers the forty years or so from the development of the 18-pounder in 1902 to the arrival of the last batch of field guns for the Irish arsenal in 1942. The story is of course set in Ireland but there are transnational elements and the 18-pounder's considerable involvement in the Great War cannot be ignored as this led to many of the improvements that modernised the piece. The careful way in which the surviving field gun number 9168 was disassembled during the restoration project allowed the author to examine every component and assembly, and a huge amount of information was retrieved about the manufacture and service of the weapon. It is therefore an appropriate piece of material evidence and is used to fill gaps in the primary source material. This type of approach has been

used before by archaeologists David Pearson and Graham Connah who examined a single gun to understand its 'cultural biography'.[2]

The four topics covered in this study are spread across three eras: the period before 1922, the Irish Civil War and the subsequent service in the Free State Army. For that reason, a range of – sometimes very different - primary sources have been consulted. British and Irish government papers have been used to understand the development of the 18-pounder and the handover of the first guns to the Provisional Government in Dublin in 1922 along with other aspects of the Civil War and of course the records of the Free State government have been used when researching military matters during the twenty-years between 1923 and 'the Emergency'. It is interesting that a discernible difference of opinion is apparent between Gen. Neville Macready's and Winston Churchill's version of events regarding the amount of artillery and ammunition that was held in Dublin in June 1922. Churchill's research notes and his published account in *The Aftermath* questions Macready's earlier published version. The British cabinet papers from the time add to this research, they show that the deployment of artillery was the preferred option and they loosely keep an account of its use by the Free State in the weeks that followed.

British and Irish military records too have been invaluable when exploring the handover of field guns to the National Army and the Civil War engagements where the gun was used. Battery digests for Royal Artillery units although brief cover the movement of British field guns in Ireland at the time and the Mulcahy and O'Malley papers, newspapers, and a limited number of records from the Irish Military Archives have been used to catalogue the movement and deployment of the Irish field guns. The Mulcahy papers are particularly relevant as they contain the Free State Army reports from the war, but whilst they often contain the official - and sometimes the principal - account of military engagements their focus on the artillery is regularly limited in detail. The research for this part of the thesis involved a combination of small fragments of information from various primary sources to complete the picture. The Military Archives collection has been an essential resource for the research of the post-Civil War period in matters to do with the Artillery Corps, and the maintenance and mechanisation of the artillery pieces and Bureau of Military History records, Pension Records and the 1922 Army Census have been used during the search for artillery men.

[2] David Pearson and Graham Connah, 'Retrieving the cultural biography of a gun' in *Journal of conflict archaeology*, viii, no.1 (Jan. 2013).

Contemporary manuals, mostly from the British War Office, but also from the US military, have been a great source when examining the tactical deployment and maintenance of the 18-pounder and the doctrine of field artillery in general. And the importance of articles from the period about these subjects is considered in main body of the thesis. *The official history of the Ministry of Munitions* was at the time a far-sighted approach to the preservation of the record of munitions production in Britain during the Great War and volumes one and ten were particularly useful when examining 18-pounder manufacture, especially when used with the annual accounts for the Ordnance Factories that survive in the British parliamentary papers. For a detailed understanding of the mechanical development and the manufacture of the gun it has been necessary to resort to this published primary source material. Unfortunately, the records from individual factories that related to manufacture have not survived. What exists often only relates to correspondence and the accounts and in the age before the bottom-up approach to history was popular, subject matter expert Simon Trendall, remembered seeing 'most of the Vickers archive…loaded into dumb barges and towed into the Irish sea to be scuttled'.[3]

H. A. Bethell's 1911 publication on field artillery was an important source to understand the field gun generally and artillery tactics in the pre-world-war era and it was augmented by published works – books and articles – by J. Headlam, H. G. Bishop, C. N. F. Broad, C. Beard, F. G. Herr and H. Rowan-Robinson, all military men, to develop the history of the field gun during the decades before the Second World War. A selection of contemporary articles describe with some detail the mechanisation of different armies and though they have a broad scope they have provided some detail here in relation to the mechanisation of artillery.

Secondary source material has been more difficult to find. Whilst the 18-pounder is considered – briefly – in numerous studies on the Great War and in publications about artillery in general it is rarely the primary focus of the work. On the whole writers who study artillery look at either the hardware or tactical doctrine and use. One of the first to examine the hardware was Ian Hogg, an ex-Royal Artillery officer who held the position of Master Gunner at the Royal Military College of Science when he retired. His publications have proved useful for an overview of the history of the 18-pounder and its place in the Great War, though frustratingly he does not list his sources.[4] The development of artillery and artillery tactics are subjects that

[3] Simon Trendall, UK expert on the restoration of artillery equipment, email to author, 26 Apr. 2020.
[4] I. V. Hogg, *Allied artillery of World War One* (Wiltshire, 1998). I. V. Hogg, *The illustrated encyclopaedia of artillery* (London, 1987).

have been addressed by Bruce Gudmundsson and J. B. A. Bailey.[5] Both served in the military – Bailey served as Director, Royal Artillery – and both are able to explain difficult tactical issues in terms that can be easily understood by the non-military student. Paul Strong and Sanders Marble's *Artillery in the Great War* is one of the most important works – it should perhaps be consulted along with Dale Clarke's well illustrated Osprey publication - on the theory, use of and tactical deployment of artillery in that conflict and it places the 18-pounder in context in action at battles like Neuve Chapelle.[6] Strong and Marble demonstrate how tactical doctrine and the employment of artillery changed during the war and their analysis shows how important different types of ammunition were for the artillery.

Doug Knight's, *The 18-pounder field gun in Canadian service* probably comes closest to the approach taken for this thesis, but Knight makes the point that he did not want his work to become 'a footnoted-to-death historical thesis' and instead choses to follow the 'career' of the 18-pounder in the Canadian military.[7] Nevertheless his publication has been an important source to support primary source information about the development, deployment and maintenance of the gun, and Knight's lists of gun serial numbers was of use when identifying the year of manufacture for the Irish field guns. In the same way the section on the 18-pounder in Len Trawin's *Early British quick firing artillery* is a valuable piece that has assisted in the physical work that was carried out on gun 9168 and it bolsters and clarifies details from the primary source material such as the technical manuals.[8] Although Andrew Breer's doctoral thesis (available online) primarily examines the heavy ordnance industry and is weighty with the bureaucracy that surrounded the trade, it is an exceptional piece of work that also engages with many of the problems and issues that surrounded the production and development of the 18-pounder and has been an important source when investigating how they were dealt with. Breer complains about the biased approach taken in so many accounts about the armaments industry which take the form of corporate histories, and he circumvents that well with the use of primary sources, but his work unfortunately ends in 1917 and does not examine the crucial developments that led to the later variants of the 18-pounder. It is clear also that Breer does not fully comprehend the technical details of gun design and he sometimes fails to comprehend technical aspects of gun manufacture.

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[5] Bruce Gudmundsson, *On artillery* (Westport Connecticut, 1993). J. B. A. Bailey, *Field artillery and firepower* (Oxford, 1989).
[6] Paul Strong and Sanders Marble, *Artillery in the Great War* (Barnsley, 2013). Dale Clarke, *World War I battlefield artillery tactics* (Oxford, 2014).
[7] Doug Knight, *The 18-pounder field gun in Canadian service* (Ontario, 2019), p. 55.
[8] Len Trawin, Len, *Early British quick firing artillery* (Hertfordshire, 1997).

For the section on the Civil War R. A. Riccio's *The Irish Artillery Corps since 1922* is a crucial source that brings together the various engagements during the conflict that involved the field gun.[9] Riccio deals with many of the aspects that are dealt with here like the use of the Lancia armoured car and the numbers of rounds fired, but his source material is limited to secondary sources. The principal publications on the war are those by Eoin Neeson, Carlton Younger and most recently by Michael Hopkinson.[10] The first two were published in an age when footnotes were less common and though the authors appear to have interviewed many of those involved in the war, they do not refer to the extensive collection of army reports from the Mulcahy papers. Their works have however been used widely as source material for more recent studies. Hopkinson was more thorough and at the time of publication his was one of the best studies that examined the military side of the conflict.

In recent years a plethora of publications have examined the Civil War, some using the county as a unit of analysis and others that have looked at specific battles. Each of these have been used during the research for this thesis though too often there are gaps in the source material when it comes to the use of artillery. Tom Doyle, who relies heavily on newspaper reports and secondary sources for his two books on the war in Kerry only briefly mentions the field gun and does not record the fact that the 18-pounder was drawn by horse from Fenit to Tralee.[11] It is a detail perhaps that is not relevant in a broad study of the war. Liz Gillis on the other hand uses better primary sources in her *The fall of Dublin* and she devotes more space to the deployment and use of the artillery.[12] Michael Fewers' comprehensive examination of the battle of the Four Courts is one of the first to give so much space to the role of the 18-pounder during that battle.[13] Fewer makes great use of the Mulcahy papers and his work on gun positions and on shell strikes on the front of the building is excellent, though he may not have seen the roughly drawn map in the Mulcahy papers that suggests there was an 18-pounder positioned to the north-east of the Courts during the latter part of the battle. Two publications since 2008 have looked at the fighting in Limerick city. Jim Corbett's assessment of the artillery assault on the Strand Barracks from the anti-Treaty point of view is very welcome and when accompanied by Pádraig Ó Ruairc's 2010 study of the Limerick fighting, presents as

[9] R. A. Riccio, *The Irish Artillery Corps since 1922* (Poland, 2012).
[10] Eoin Neeson, *The Civil War in Ireland, 1922-1923* (Dublin, 1989). Carlton Younger, *Ireland's Civil War* (London, 1968). Michael Hopkinson, *Green against green, the Irish Civil War* (Dublin, 1992).
[11] Tom Doyle, *The Civil War in Kerry* (Cork, 2008). Tom Doyle, *The summer campaign in Kerry* (Cork, 2010).
[12] Liz Gillis, *The fall of Dublin* (Cork, 2011).
[13] Michael Fewer, *The battle of the Four Courts* (London, 2018).

complete a picture as can be found in the secondary source material.[14] The fighting in Limerick county has been examined by John O'Callaghan in his excellent study of the battle for Kilmallock in which he presents the role of the field gun in a clear and comprehendible way.[15] Writing about the fighting outside Cork city, John Borgonovo is the only author who mentions the ranges that were taken on by the 18-pounder gun crews.[16] It is an often-neglected piece of information that is important when assessing the capability of the gunners manning the weapon. Otherwise, details about the artillery engagements during the battle for Cork are rare in secondary source material, a deficiency that seems to be due to the shortage of good primary source material – this author had to depend on newspaper reports - and might be explained by the disjointed nature of the battle.

To date there is only limited secondary source material about the history of the Defence Forces, and even less that looks at the Artillery Corps or the Ordnance Service. J. P. Duggan's history of the Irish Army and Eunan O'Halpin's *Defending Ireland* both take a broad view of the force and have been useful for the history of the army in general and background information on army units, supplies, training, and exercises.[17] Mark McLoughlin's history of Kildare Barracks covers the period when the Artillery Corps occupied that post whilst armed with the 18-pounder and has been an important source when looking at the establishment of the Artillery Corps. McLoughlin looks closely at the characters involved in the unit and the Corps' batteries, though he relies heavily on newspapers and *An tÓglach* for primary source information and does not appear to have used anything from the Military Archives collection.[18] For a closer look at the Artillery Corps the collection of essays by ex-members – many of which appeared earlier in *An Cosantóir* - edited by Tom Clonan in the form of a commemorative booklet has been a great source, though it too lacks good primary source referencing and relies heavily on the often-nostalgic memories of those who served with the field guns.

The history of the Ordnance Service/Ordnance Corps has not yet been written in any form other than a small commemorative booklet and a 1977 article in *An Cosantóir*. Both focus on the Corps' commissioned ranks and unfortunately barely mention the technician which

[14] John O'Callaghan, *Limerick the Irish revolution 1912-23* (Dublin, 2018). Jim Corbett, *Not while I have ammo, A history of Captain Connie Mackey, defender of the Strand* (Dublin, 2008). Pádraig Óg Ó Ruairc, *The battle for Limerick City* (Cork, 2010).
[15] John O'Callaghan, *The battle for Kilmallock* (Cork, 2011).
[16] John Borgonovo, *The battle for Cork July-August 1922* (Cork, 2011).
[17] J. P. Duggan, *A history of the Irish army* (Dublin, 1991). Eunan O'Halpin, *Defending Ireland, The Irish state and its enemies since 1922* (Oxford, 1999).
[18] Mark McLoughlin, *Kildare Barracks, from the Royal Field Artillery to the Irish Artillery Corps* (Sallins, 2014).

means a large proportion of relevant research material is neglected. In fact, it is worth noting that only one non-commissioned soldier from the Ordnance is named in the mass of Military Archives primary source files that were consulted for this research. Historic accounts about maintenance work are hard to find in secondary source material and none exists for either the 18-pounder or the Irish military. It seems the technician and the historian rarely join forces. For the mechanisation of the field gun one excellent publication exists, written by Philip Ventham and David Fletcher.[19] It lacks a bibliography – a common feature of these books unfortunately – but it is a very well researched body of work and stands alone in this field of study. Mechanisation in the Irish Army only ever receives a brief mention in the secondary source material. Nothing has been written that looks into the subject in any depth and this thesis is the first time the conversion of the artillery has been examined in detail.

The first chapter of this study examines the way in which the 18-pounder was developed in the aftermath of the Boer War, and it looks at how problems with the weapon were dealt with in the decade before 1914. The huge demands that were placed on field artillery during World War One and advancements in artillery doctrine altered the way the 18-pounder was deployed. Modifications were made to the gun and two new variants appeared. All variants were in Irish service, so it is of value to understand how they differed and why. The massed produced 18-pounder was an amalgam of components from all corners of early twentieth century British industry which is proven by the data from gun number 9168, so it is important to look at the process that brought everything together.

Chapter II continues by looking at the 18-pounder and its role in the Civil War. The army had no experience handling artillery which makes its use during the conflict a worthwhile study. Quite often the field gun was deployed in an unconventional way and the primary objective here is to examine the way the guns were manoeuvred, deployed, and operated whilst examining the artillery tactics adopted by the Free State side. This chapter also debunks some of the myths that have continued to surround the field gun and its Civil War service. Some secondary sources claim that an 18-pounder was captured by Republicans when they took Dundalk Barracks in August 1922, but there is no evidence for this in the primary source material. Other published sources claim that only one gun was used at the Four Courts or that Royal Artillery gunners operated the guns for the Free State Army. There have even been claims that British held guns fired on the anti-Treaty position. It is true that the Provisional

[19] David Fletcher and Philip Ventham, *Moving the guns, The mechanisation of the Royal Artillery 1854-1939* (London, 1990).

Government would have been keen to stifle these claims, but it is shown here how the poor quality gunnery supports the notion that the bombardment was undertaken by inexperienced ‘gunners’ in the Free State Army.

The second half of the thesis covers the history of the 18-pounder in the National Army between 1923 and the early years of ‘the Emergency’. The field gun was the primary armament of the new Artillery Corps during its formative years. The Corps was essentially built around this weapon, and the part it played in training, exercises, manoeuvres, parades, and gun salutes is analysed in Chapter III. The upkeep and maintenance of the artillery piece is the subject tackled in Chapter IV and this leads to the way that the guns were adapted to be towed mechanically. The author has been working as an armament artificer maintaining and repairing heavy weaponry for more than twenty-five years and was probably most comfortable researching this topic, though care has been taken to avoid making this an overly technical account.

The Q.F. 18-pounder field gun was the primary artillery piece of the Irish Defence Forces for twenty years. It served through two wars and was at the centre of the development of an Irish artillery doctrine. It is time it received its place in the historical record.

Chapter I
The 18-pounder field gun: development, production and manufacture

On 6 August 1959 the cargo ship, *Finnmerchant*, left Dublin port for the United States with a large shipment of obsolete military equipment from the arsenal of the Irish Defence Forces.[20] The shipment, (appendix 1, serial numbers of 18-pounders shipped to the USA) which was made up of weaponry and weapons parts, included seventeen "Quick Firing" 18-pounder field guns. Nine of these guns had been handed over to the fledgling Free State Army between 1922-1923 and were used during the Civil War. They were the first artillery pieces to be operated by an Irish army since the Williamite Wars and went on to become the main armament of the Irish Artillery Corps from March 1923 when it was formed. The Irish Army purchased more 18-pounders during the 1920s and 1930s and two consignments were received from the British during the early 1940s. All variants of the field gun were used during 'the Emergency'. The differences between the first and the fifth variant of the 18-pounder are immense. Whilst the Mark I field gun followed developmentally from the earlier – Boer War era - 15-pounder, the Mark V had more in common with its successor, the 25-pounder, than with the guns handed over in Dublin in 1922. The weapon was moulded initially through combat experience in South Africa, and it was remodelled by the lessons learned during the Great War. During the years in between, the piece was fine-tuned as design faults were remedied. The focus of this chapter is the development and manufacture of the 18-pounder and though it does not specifically take a chronological approach the history is generally in order. To avoid a blatant rehash of previous studies and to keep with the overall theme of this thesis the Irish perspective is maintained using two primary sources in particular. The first is the 'history sheet' or *Memorandum of Inspection* for gun number 10756, the first gun handed over to the National Army in 1922. This is the only surviving Irish record of this type and is considered in detail throughout the thesis. The second source is the material evidence, the only known 18-pounder to have survived from the first batch of guns handed over to the Irish. During the preservation and restoration of this artefact the author carried out an extensive study of its components and assemblies. In recent years studies of this kind have been carried out on various weapons from both world wars and these have been used to understand the 'cultural biography' of the piece.[21] In this case the evidence gleaned from the artefact has been used to develop the history of that gun but also of the design and manufacture of the 18-pounder in general. The lack of sources connected to the

[20] *Irish Independent*, 7 Feb. 1959.
[21] Pearson and Connah, 'Retrieving the cultural biography of a gun', pp 41-73.

actual production of artillery pieces like the 18-pounder increases the value of these two primary sources for the researcher.[22] Parliamentary reports and the Ministry of Munitions accounts are used with records from the Churchill Archive to examine the broader development and manufacture of the field gun. Before looking at the 18-pounder in Irish service it is important to understand where it came from, how it was developed and how its design changed over time; the Irish guns, of various types, exemplified that development and transformation and are a worthwhile study for 18-pounder research in general.

The first "Quick Firing" 18-pounders entered British service in 1904. The field gun was the outcome of a significant body of research and investigation that was the result of lessons learned during the second Anglo-Boer War based on the requirements of the Royal Artillery. One British commander during that conflict complained that his artillery was 'outclassed' by the Boer guns.[23] The Boers were using different versions of the "Quick Firing" 75mm field gun, manufactured by the firms Creusot and Krupp and, strangely enough by Vickers-Maxim, all based on the French *Canon de 75 Modéle 1897*.[24] This was the first fully integrated 'quick firing' gun and once it appeared, it rendered every other field gun obsolete overnight.[25] Even the hastily purchased Ehrhardt QF 15-pounders that the British acquired from Germany were no match for the *Mle 1897*.[26] Its success was due to the speed with which a round could be loaded and fired and the gun made ready to fire again. The design of its breech and its firing mechanisms, the use of fixed ammunition – the shell and case were loaded as one - and a hydro-pneumatic recoil system all made the '*Mademoiselle Soixante-Quinze*' a formidable weapon. Prior to the invention of the recoil system, the entire field gun was forced rearward every time a shot was fired, and it was necessary for the gun crew to push it forward, reposition the weapon and relay the barrel on the target before firing again. The hydro-pneumatic system designed by the French allowed the barrel to move to the rear without moving the carriage and once the force of recoil was spent it returned it to the forward position – known as the run-out position - ready to fire again. The sighting system was fixed to the carriage and remained stationary during firing, which meant only slight adjustments were required to realign the barrel on the target after each shot.

[22] Andrew Breer, 'British industrial policy concerning the heavy ordnance industry, 1900-1917' (P.H.D. thesis, King's College, London, 2015), p. 29.
[23] Gudmundsson, *On artillery*, p. 9.
[24] Thomas Pakenham, *The Boer War* (London, 1979), p. 68.
[25] Hogg, *Allied artillery of World War One*, p. 41. Hogg, *The illustrated encyclopaedia of artillery*, p. 34.
[26] John Headlam, *The history of the Royal Artillery from the Indian Mutiny to the Great War Vol. II, 1899-1914* (Woolwich, 1937), pp 15-6.

Before the war ended in South Africa a committee was formed, under Gen. Sir George Marshall, to examine the possibility of designing quick firing guns for the Royal Artillery.[27] It followed the usual design procedure for a piece of artillery by considering calibre, weight of projectile, muzzle velocity and other technical aspects of the piece.[28] A summary of its initial findings recognised that the power of a field gun might be defined by its ability to pour 'the greatest number of effective bullets on a given area in the shortest possible time', and it went on by acknowledging that

> Power is, however limited by weight, and the roles of horse and field artillery are so different that each equipment should be fixed from separate premises…mobility the predominating factor in fixing the weight for horse artillery, while gun-power should be that for field artillery.[29]

For that reason, two guns were considered, an 18-pounder for field artillery and a lighter 13-pounder for horse artillery. The committee admitted that the Boer War 'afforded much experience and many valuable lessons' and it deliberated that artillery in any future European war would only require 'well-served guns firing accurate time shrapnel'.[30] The use of high explosive (HE) ammunition was not considered. The predilection for shrapnel came from its effectiveness against the Boers. Boer War veterans were disinclined to favour HE ammunition, having witnessed how little an impression the lyddite filled shells made on enemy troops.[31] Writing later, Maj. Gen. Sir John Headlam of the Royal Artillery claimed, 'the absurdly exaggerated ideas regarding the capabilities of lyddite had failed to materialize' in South Africa.[32] The 18-pounder was therefore designed as 'a shrapnel gun' albeit one that fired the 'most powerful shrapnel in existence'.[33] At eighteen pounds and eight ounces the field gun's shell was to be two pounds heavier than the round for the 75mm *Mle 1897* making the British field gun the largest quick firing gun to be adopted by any country before the Great War.[34] South African veterans approved of the heavier shell believing it would ensure that their

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[27] David Stevenson, 'The field artillery revolution and the European military balance, 1890–1914' in *The International history review*, (2019) pp 1301-24,p. 1308, online https://www.tandfonline.com/doi/full/10.1080/07075332.2018.1476396), (29 Nov. 2019).
[28] To understand the principles and design procedures required in the design of a piece of artillery see War Office, *Textbook of service ordnance 1923* (London, 1923), pp 35-40.
[29] War Office, *Textbook of gun carriages and gun mountings* (London, 1924), p. 44.
[30] Breer, 'British industrial policy concerning the heavy ordnance industry, 1900-1917', p. 140.
[31] On one occasion Boers were seen boiling coffee outside their dugouts during a bombardment, unafraid of the danger from H.E. shells. Gudmundsson, *On artillery*, p. 10.
[32] Headlam, *The history of the Royal Artillery*, p 64.
[33] John Headlam, 'Developments in artillery during the war' in *Journal of Washington Academy of Sciences*, viii, no.10 (19 May, 1918), pp 301-19, p. 303. J. D. Scott, *Vickers, A history* (London, 1962), p 111.
[34] War Office, *Handbook for the 18-pr Marks I to II guns on Marks I to II field carriages* (London, 1929), pp 114-5.

artillery would have the maximum impact on entrenched troops.[35] As things turned out the shrapnel shell would not be enough.

On the 8 July 1901, the committee released the official specifications for the design competition and waited for the arms industry to produce sample guns. The specifications included:

1. Shell power - should not be less than 18 pounds.
2. Ballistics – to have an elevation of 16 degrees and a range of not less than 6000 yards.
3. Weight was not to exceed that which could be pulled behind a team of six horses.
4. Must be rapid firing
5. Should be fitted with a shield
6. Number of rounds carried – not less than 15 in the limber wagon[36]

The three leading arms manufacturers – the government's Royal Ordnance Factory, and the civilian companies, Armstrong-Whitworth and Vickers - submitted experimental guns for trial and whilst 'all possessed various features of excellence', none were deemed satisfactory.[37] All three submissions were overweight, the Ordnance Factory's gun was inaccurate and Vickers' submission lacked optics and an adequate shield.[38] However, each gun had commendable elements and the committee deviated from the usual practice by asking the representatives of the arms firms to come together and build a composite design using the best components from each weapon.[39] It was agreed to use Armstrong's gun, Vickers' recoil system and the Royal Ordnance Factory's sighting system and elevating gear. A further series of trials using experimental gun batteries armed with the redesigned weapon followed until finally on 30 March 1904 the successful field pieces were recommended for acceptance.[40] (fig.1) The production of the 18-pounder exemplified the mechanical engineering concept of interchangeability of parts. Developed in the United States between 1800-1840 interchangeability was part of the American System of Manufactures and was employed with great effect in the arms industry in America before being adopted in Europe.[41] By 1904 it had been well established across the industrial world. The very design of the 18-

[35] Gudmundsson, *On artillery*, p. 12.
[36] War Office, *Textbook of gun carriages and gun mountings*, p. 45. See also p. 46 for how this list developed into the design for the 18-pounder.
[37] *The Times*, 15 Dec. 1904.
[38] Breer, 'British industrial policy concerning the heavy ordnance industry', pp 150-2.
[39] Headlam, *The history of the Royal Artillery*, pp 73-4.
[40] *The Times*, 24 Feb. 1905.
[41] Interchangeability was essentially the ability to use the same manufactured component in any mechanism of a similar nature. To understand how this developed see David Williams, *The Birmingham gun trade* (Stroud, 2004), pp 55-71. David Carnegie, 'The private manufacture of arms, ammunition and implements of war' in *International affairs*, x, no.4 (Jul. 1931), 504-523, p. 504.

pounder brought together the three leading arms manufacturers in Britain and its production opened the manufacture of the gun up to a plethora of smaller factories. The contract for the first order of 18- and 13-pounders, signed in March 1905 valued at £1 million, was one of the largest peacetime contracts ever placed. The government owned Royal Ordnance Factories were to supply one third of the guns, whilst the rest were split between Vickers, Armstrong and Cammell Laird.[42] Research has identified parts that were manufactured by seven different firms, on one single field gun from the Irish arsenal. (table 1)

Firm	**Identification Markings**	**Place**
Vickers Sons and Maxim	VSM	Barrow-on-Furnace
Elswick Ordnance Company	EOC	Newcastle Upon Tyne
Royal Gun Factory	RGF	Woolwich
Cammell Laird	Cammell Laird Steel	Sheffield
William Beardmore and Co.	WB & Co.	Glasgow
Hicks Hargreaves and Co.	HH & Co.	Bolton
Bethlehem Steel Co.	BSC	Bethlehem, Pa., USA

Table 1. Showing the manufacturing companies involved in gun no. 9168 (author's research during preservation of gun)

The Royal Gun and Royal Carriage works at Woolwich were part of the government's Royal Ordnance Factory complex. The supply of armaments according to one view, was 'the business of the crown' and government ownership and control of the Ordnance Factories guaranteed that an element of the arms industry remained in state hands.[43] (appendix 2, list of advantages of government manufacture) It maintained a pool of skilled labour during peace time with the option for expansion in the event of war. Privately owned companies like the Vickers, Sons and Maxim firm and Armstrong's, Elswick Ordnance Company were leviathans in the arms trade, but smaller firms like Cammell Laird, William Beardmore & Company and the Coventry Ordnance Works were as important and active in the industry. These factories were very much dependent on government contracts, and it was in the government's interest to ensure that they too were available to mass produce armaments when called upon. All the private firms were in an ideal position to manufacture field guns with their extensive expertise in the steel industry, but they also had what one historian has described as, previous experience working to the 'multitudinous specifications of the

[42] Breer, 'British industrial policy concerning the heavy ordnance industry', pp 158-9.
[43] Scott, *Vickers, A history*, p. 25.

vacillating officials' from the War Office.[44] In the background throughout the period are accusations about 'Arms Rings' formed between the private armament factories to compete for contracts against the government factories at Woolwich. The machinations of Armstrong, Vickers and the others – whether actual or otherwise – may not have been directly linked to 18-pounder production, but all the players appear in the web.[45] Vickers acquired shares in Beardmore in 1902 and later offered Armstrong a share of the Scottish company in an effort to stop William Beardmore himself from regaining full control of 'his great enterprise'.[46] On the other side Cammell Laird were offered shares in the Coventry Ordnance Works when it was established to oppose Armstrong's and Vickers' domination of the market. The March 1905 contract for 18-pounder was one of the first offered to the Coventry firm, but the speed at which the government wanted the order fulfilled, led to it being placed instead with Cammell Laird.[47] The Laird Brothers shipbuilding company had merged with the Sheffield steel firm of Charles Cammell only two years earlier and the new business not only manufactured 18-pounder gun barrels, but supplied steel to the Royal Gun Factory for the barrels that were produced there.[48] During the Great War Cammell Laird was asked by the British government to setup and run the Nottingham Ordnance Factory, initially to produce shells, but from 1917 the new business began repairing 18-pounders and soon after it started manufacturing the field gun and by the end of the war it was building eleven guns per week.[49] The National Projectile Factory at Leeds, was also established to produce shells, but it took a similar route to 18-pounder manufacture and one of the first 18-pounders that were handed over to the Irish rolled off its production line in 1918.[50] The barrel of another of the Irish guns, serial number 9168, was built the same year at Cammell Laird's Cyclops Plant in Sheffield.[51]

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[44] P.L. Payne, 'The emergence of the large-scale company in Great Britain, 1870-1914' in *The economic history review*, xx, no.3 (Dec. 1967), pp 519-42, p. 533.
[45] For a view of both sides see Carnegie, 'The private manufacture of arms, ammunition and implements of war', pp 504-523. Clive Trebilcock, 'Legends of the British armament industry 1890-1914: A revision' in *Journal of contemporary history*, v, no.4 (1970), pp 3-19.
[46] *Vickers, A history*, pp 49, 92. A. J. Marder, 'The English armament industry and navalism in the nineties' in *Pacific historical review*, vii, no.3 (Sept. 1938), pp 241-253, p. 245.
[47] Breer, 'British industrial policy concerning the heavy ordnance industry', pp 105-6. *The Times*, 15 Dec. 1904.
[48] Breer, 'British industrial policy concerning the heavy ordnance industry', pp 159.
[49] Ministry of Munitions, *The official history of the Ministry of Munitions, The supply of munitions, Part I, Guns*, (12 vols, London, 1922, republished Uckfield, undated), x, p. 67. Lloyd George, *War memoirs of David Lloyd George* (2 vols, London, 1938), i, p. 340.
[50] Ministry of Munitions, *The official history of the Ministry of Munitions, The supply of munitions, Part I, Guns*, x, p. 63 History sheet, Memorandum of inspection, gun number 10756, 1918 (MA, Personal collections, Ivor Noone, PC 625).
[51] Author's examination of gun no. 9168.

The manufacture of the gun barrel is the fundamental and most important part of gun production. It entailed several forging, turning and boring operations and could take up to nine months to complete.[52] All through the process the metal was checked for flaws and the machined piece was measured to verify accuracy.[53] An 18-pounder barrel was formed from two tubes, known as the 'jacket' and the 'A' tube. A recessed section around the rear of the 'A' tube was wound with successive layers of specially shaped steel wire to reinforce the chamber before the jacket was fitted over it. It was only when the tubes were fitted together that the piece was referred to as a gun and given a register number.[54] The breech ring, which was machined to take the breech block, was fitted afterwards, and helped secure the tubes together. It too was marked with a register number – assigned by the War Office - and this became the gun's serial number in Irish service.[55] There were two variants or 'Marks' of barrel.[56] The Mark II differed to its predecessor only in the shape of the 'A' tube and how it fitted into the jacket.[57] Sometime after 1906 the stepped interiors and the exteriors of the tubes on heavy artillery were replaced with a uniform, tapered finish which improved the fit, and the technique appears to have been adopted in the production of field artillery around the same time.[58] The jacket for the Mark I 18-pounder barrel was fitted to the A-tube using heat, expansion and shrinkage, the one on the Mark II variant was joined using hydraulic pressure.[59] The records show that the Royal Gun Factory ceased producing Mark I barrels in 1907, which makes the barrel fitted to gun number 9168 a noteworthy artefact.[60] Manufactured in 1918, this Mark I barrel indicates that the manufacturer, Cammell Laird, was still fitting A-tubes and jackets using heat and shrinkage. (fig. 2) Government wartime funding allowed the company's Cyclops Works at Grimesthorp to expand by 70,000 square-feet between 1914-18 and the new specialised gun-

[52] War Office, *Treatise on service ordnance* (London, 1908), pp 35-7. For an explanation of the complete process of manufacturing a barrel see Benedict Crowell, *America's munitions 1917-1918* (Washington, 1919), pp 47-53.
[53] War Office, *Textbook of service ordnance 1926*, p. 51.
[54] War Office, *Treatise on service ordnance 1908*, p. 38.
[55] For the allocation of this number by the War Office see Knight, *The 18-pounder field gun in Canadian service*, p. 10.
[56] Not mentioned here is the Mark I*. This denotes a Mark I barrel that had its 'A' tube replaced. War Office, *Treatise on service ordnance 1908*, p. 445.
[57] War Office, *Handbook for the 18-pr Marks I to II guns*, pp 39-40.
[58] War Office, *Textbook of service ordnance 1923*, pp 49-50.
[59] War Office, *Treatise on service ordnance 1908*, p. 445.
[60] For mention of the change of barrel pattern see *Annual accounts of the ordnance factories, for the year 1907-1908; with the report of the comptroller and auditor-general thereon*, p. 64, H.C. 1909 (16), li, 338. For the last mention of Mark I barrels see *Annual accounts of the ordnance factories, for the year 1906-1907; with the report of the comptroller and auditor-general thereon*, lxiii, p. 310, H.C. 1908 (52), lxiii, 634.

forging and heat-treatment plants may explain why the factory continued to build 18-pounder barrels in this way instead of using the hydraulic method.[61]

Data retrieved during the examination of gun number 9168 has revealed further information about the way the 18-pounder was produced by different factories at this time. The Cammell Laird barrel on the gun was fitted with a breech ring made by the William Beardmore Company.[62] It must be assumed that the smaller breech ring was transported from the Beardmore works in Glasgow to Cammell Laird's Sheffield factory to be fitted to the barrel, but records for this type of transaction have unfortunately not survived. The barrel was afterwards fitted to a carriage manufactured at the Vickers Sons and Maxim works and the evidence presents a picture of gun production that demanded considerable co-ordination between the firms involved. It also required supervision. A British cabinet committee brought the arms firms together three months into the Great War, having consulted with their French allies about how their armament manufacture was going.[63] The chief superintendent of the Ordnance Factories was authorised 'to take whatever steps were necessary to secure an additional output' from the main firms.[64] The result was twofold, first the expansion of the armaments works already in existence was to be subsidised and secondly some of the workload was to be sub-contracted to firms not already producing armaments.[65] Vickers' Crayford Works in Kent and Cammell's massive extension at Sheffield were examples of subsidised expansion and a new workshops was built specifically for 18-pounder production by Vickers at Sheffield.[66] The chief inspector at Woolwich whose workload had increased due to the war, was in no position to take on sub-contracting and it was 'decided to adopt the policy of utilising the resources and knowledge of the armaments firms themselves to the uttermost…for the consequent co-ordination in the flow of the products of manufacture'.[67] Gun barrel production was left to the specialists, but small firms took on the manufacture of components for the

[61] Kenneth Warren, *Steel, ships and men: Cammell Laird, 1824-1993* (Liverpool, 1998), p. 177.
[62] Author's examination of gun no. 9168.
[63] Interestingly the French group that Lloyd George met with included General Saint-Clair Deville, inventor of the *Mle 1897*, 75mm field gun. The French *Sous-Secretariat* took responsibility for overseeing armaments production from May 1915. Bostrom, Alex, 'Supplying the Front, French artillery production during the First World War' in *French Historical Studies*, xxxix, no.2 (Apr. 2016), pp 261-286. Ministry of Munitions, *The official history of the Ministry of Munitions, Industrial mobilisation, Part I, Munitions supply, 1914-5* (12 vols, London, 1922, republished Uckfield, no date), i, pp 98, 101.
[64] Ministry of Munitions, *The official history of the Ministry of Munitions, Industrial mobilisation, Part I, Munitions supply, 1914-5*, i, pp 109-10.
[65] Ibid., p. 98.
[66] Scott, *Vickers, A history*, p. 104. Ministry of Munitions, *The official history of the Ministry of Munitions, The supply of munitions, Part I, Guns*, x, p. 60.
[67] Ministry of Munitions, *The official history of the Ministry of Munitions, Industrial mobilisation, Part I, Munitions supply, 1914-5*, i, pp 98, 100.

sighting and firing mechanisms and the gun carriage. It was up to the larger firm to oversee the work of the sub-contractors in its area in a form of localised co-operative manufacture which minimised delay in moving parts. The director of the Gun Department at Woolwich was informed by weekly progress reports and was ready to act to prevent a hold up in the system and from January 1916 a resident supervisor was installed in each of the big companies. Weekly meetings with representatives from the arms firms began in June that year to keep things running smoothly.[68] When gun number 9168 was built in the last year of the war the industry was at its zenith, and the assembly of the major components to complete the weapon represented the system of production that had been expertly refined.

The development and production of the 18-pounder was not without its difficulties. A year after the first Royal Artillery batteries received their field guns it was noticed that barrels were bending. A slight curvature of the barrel along its vertical axis was acceptable and was known as droop. It was more pronounced in longer barrelled guns and could occur as a result of gravity refraction, or be caused by flaws formed during the production of the steel.[69] In fact the amount of deflection was measured, recorded and taken into account when adjusting the sights.[70] The condition in the 18-pounders in 1905 was quite pronounced however, and it caused uproar amongst battery commanders who were upset about their 'damned crooked guns'.[71] The problem was investigated by the Ordnance Committee and faults were discovered in the alignment of the wing-like projections that protruded from each side of the barrel to support its movement in the cradle. The problem apparently did not occur in guns manufactured by the Royal Gun Factory and a source claimed it was caused by fitting barrels made in one factory to cradles manufactured by another. One solution suggested firing a longer round through the barrel to straighten it and Cammell Laird recommended cutting grooves along the ribs to prevent them from bending.[72] Although not entirely successful the grooved ribs appear to have been quite extensive and are visible in photographs of Irish 18-pounders taken during the Civil War. It is not clear if the groove became a production feature for barrels that were manufactured in particular factories, but the appearance of grooves on Mark II 18-pounders

[68] Ministry of Munitions, *The official history of the Ministry of Munitions, The supply of munitions, Part I, Guns*, x, p. 61.
[69] Hogg, *The illustrated encyclopaedia of artillery*, p. 128.
[70] War Office, *Handbook for the 18-pr Marks I to II guns*, p. 186.
[71] Headlam, *The history of the Royal Artillery*, p. 80.
[72] Breer, 'British industrial policy concerning the heavy ordnance industry', pp 160-2. Headlam, *The history of the Royal Artillery*, p. 80.

might identify a Mark I gun that had been converted with the new recoil system to remedy the problems that arose in that assembly during the Great War.[73]

The problems that developed in the recoil system would never have occurred during peacetime. When the 18-pounder was being designed in the early 1900s no one could have imagined the demand that would be placed on it in combat a decade later. During the gun's design phase, the main concern was a high rate of fire and a Vickers representative claimed twenty rounds per minute were achievable with the French-style long recoil system.[74] But the British settled for a hydraulic buffer and a spring-operated recuperator. The French at first were very secretive about their field gun. Every time it fired the police were employed to keep onlookers back and British observers were prevented from viewing it close-up. When the US Army adopted the '75' as its field gun in 1917 they struggled to get information about the workings of the recoil system prompting one American officer to claim, 'the French would sooner lose the war than lose the secret of the 75'.[75] The British were not left completely in the dark about the French system however and one report indicates that the War Department acquired two French guns, probably as relations between the two countries improved in the early 1900s.[76] Still the Americans could not understand why the British used a spring operated recuperator and the US assistant secretary for war noted that 'although the superiority of these [French] recoil devices in their respective classes were universally conceded…England, with the cooperation of the French ordnance engineers freely offered, did not attempt them'.[77] Headlam explained the reason why; the pneumatic recuperator was 'unsuitable for the world wide requirements of the British Empire, owing to the difficulty of keeping valves in order in tropical countries.'[78]

The rapidity of aimed fire was fourth on the list of prerequisites laid down during the design phase of the 18-pounder but intense firing was not anticipated by military tacticians and the 1913 allotment for each field gun was only 1,000 rounds.[79] Before 1914 armies trained for

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[73] The 18-pounder that was used to carry the remains of Michael Collins was a Mark II gun with grooved guide ribs, which suggests that it may in fact have been a Mark I gun that had been converted. See W. D. Hogan, photograph of Seán Collins at the funeral of his brother (National Library of Ireland, Hogan-Wilson Collection, HOGW 163)

[74] Stevenson, 'The field artillery revolution', p. 1309.

[75] Hogg, *Allied artillery of World War One*, p. 38.

[76] Anglo-French relations improved greatly in 1903 following Edward VII's visit to Paris. The *Entente Cordiale* followed in April 1904. The French field guns are likely to have been handed over to the British between the King's visit and the date when the report that mentions them was published. *Scientific American*, Nov. 7 1903.

[77] Stevenson, 'The Field Artillery Revolution and the European', p. 1309. Crowell, *America's munitions*, p. 57.

[78] Headlam, *The history of the Royal Artillery*, p. 191.

[79] War Office, *Textbook of gun carriages and gun mountings*, p. 45. Clarke, *World War I battlefield artillery tactics*, p. 8.

a war of movement, field artillery would support the infantry where possible, but would not be used to break through enemy lines.[80] An artillery officer writing in 1922 explained that the 'great cry before the war, was mobility. In wartime, people want shell power, in peace time, mobility'; the field artillery's 18-pounders were certainly mobile, but they had not been truly tested in battle.[81] For a brief period in France in 1914 mobility was required, but everything changed when the armies on both sides dug in, the war of manoeuvre halted and neither side had the firepower to start it again.[82]

The 18-pounder recoil troubles were not highlighted earlier because of the developing 'shell crisis'. A shortage of artillery ammunition caused the war on the western front to slow down in the winter of 1914 and during the early months of 1915 there were only enough shells for one major attack. This came at the battle of Neuve Chapelle. Artillery was transferred from other areas of the front for the initial barrage. The short 'hurricane bombardment' was so intense that waiting infantry believed the shelling 'was winning the war before our eyes'.[83] An experienced gun crew could fire up to twenty rounds a minute for short periods, but continued firing at this rate would damage barrels and recoil mechanisms.[84] The maximum recoil of the gun was 47 inches depending on the angle of elevation, and the constant movement of oil through the mechanism of the buffer caused it to heat. As it heated the oil expanded and seals failed.[85] Though not as intense, longer bombardments like Festubert in May and Loos in September would still have caused heat and expansion in the system.[86] The problems in the buffer put pressure on the recuperator and springs began to fail drastically lowering the rate of fire as gun crews were forced to push the barrel back to the run-out position after every shot.[87] The recuperator springs were fitted in two banks of four to relieve the stresses that would have occurred in a single column of springs and they were kept short to make them easier to handle

[80] J. B. A. Bailey, 'Deep battle 1914-1941, the birth of the modern style of warfare' in *Field artillery* (Jul-Aug. 1998), pp 21-7, p. 23.
[81] C. N. F., Broad, 'The development of artillery tactics 1914-1918' in *The field artillery journal*, xii, no.5 (Sept-Oct 1922), pp 375-96, p. 378.
[82] At the battle of *Le Cateau* 18-pounders, covering the British retreat, fought closely with the infantry to their cost. The fighting at this stage was still very mobile, but exposed gun batteries suffered heavily, and thirty-seven British guns were captured. Lessons were learned however, and British battery commanders would never again deploy their guns in the open except in an emergency. Shelford Bidwell, *Gunners at war* (London, 1970), p. 31. Bailey, *Field artillery and firepower*, p. 129.
[83] Strong and Marble, *Artillery in the Great War*, 45-6.
[84] Knight, *The 18-pounder field gun in Canadian service*, p. 27.
[85] War Office, *Handbook for the 18-pr Marks I to II guns*, p. 168. Knight, *The 18-pounder field gun in Canadian service*, p. 27.
[86] Festubert was preceded by a 60 hour bombardment, Loos by a four-day bombardment. Strong and Marble, *Artillery in the Great War*, pp 47, 72.
[87] Knight, *The 18-pounder field gun in Canadian service*, p. 23.

during replacement.[88] Headlam blamed inexperienced personnel 'who had forgotten the constant attention that buffers require', and modern historians agree that experienced troops were better at maintenance.[89] But it was recognised that the springs were made from inadequately tempered steel and were simply not up to the job.[90] The fact that the fault was noticed early in 1915, before the massive bombardments that were to come later, shows how imperfect the springs were.[91] Experts from the industry were brought to France to see the problem for themselves and replacement springs and an oil tank on the buffer were offered as the interim solution.[92] The tank kept the buffer topped up and allowed excess oil - caused by heat and expansion - to be bled off, kept and replaced later when the system cooled when firing ceased.[93]

The repair did not entirely solve the problems however, and recoil systems continued to be a 'source of anxiety' during the battle of the Somme.[94] One artillery divisional commander reported that an average of 25 per cent of his guns were out of action due to recuperator trouble, having fired 7,500 rounds in six weeks.[95] A study carried out in the early 1940s that examined 'wave action' in 18-pounder recuperator springs found that firing caused a sequence of waves along the springs, which created friction between the springs and the cylinder and the spring case. It also made the coils of the springs collide. Most interesting was the finding that oscillations occurred during the last ten inches of maximum recoil, which was more likely to be reached when the gun was fired at high elevation as gunners tried to increase range.[96] The guns were being pushed harder in 1914-15 than they ever had been before, and weaknesses were highlighted.

There is evidence to suggest that artillerymen in Ireland at the time were having similar problems with the recoil systems on the small number of 18-pounders that were left in the country during the war. Captain E. Gerrard of the RFA, who was home on leave from the Dardanelles and was stationed in Athlone Barracks remembered that the two, four-gun batteries of field guns stored there were in a bad state. Not one of them, he claimed, 'was in a position

[88] War Office, *Textbook of gun carriages and gun mountings*, pp 46, 123.
[89] Headlam, 'Developments in artillery during the war', p. 312. Strong and Marble, *Artillery in the Great War*, p. 39.
[90] Strong and Marble, *Artillery in the Great War*, p. 39.
[91] Hogg, *Allied artillery of World War One*, p. 21.
[92] Headlam, 'Developments in artillery during the war', p. 312.
[93] War Office, *Handbook for the 18-pr Marks I to II guns*, p. 172.
[94] Ministry of Munitions, *The official history of the Ministry of Munitions, The supply of munitions, Part I, Guns*, x, p. 47.
[95] Headlam, 'Developments in artillery during the war', p. 312.
[96] H. G. Woodhouse Taylor, 'Wave action in gun run-up springs' in *Proceedings of the Institution of Mechanical Engineers*, cxlv, no.1 (June, 1941), pp 150-9, p. 158.

to fire without being oiled and pumped by the artificers'.[97] These were the guns that were used to shell Dublin during the Easter Rising and according to Gerrard it would have taken two days to get them into a proper condition to fire. His claim implies that the guns which were probably not fitted with the new oil tank or replacement springs, were suffering serious neglect and were not being maintained properly. The artillery brigades that were 'permanently stationed' in the country before 1922 (it might be safer to say before 1914) had become 'somewhat rusticated' according to Royal Artillery historian, Maj. Gen. B. P. Hughes, despite having 'their own practice camp…on their doorstep'.[98] An Irish deployment had its distractions and Hughes thought there was no comparison to the hunting and field sports in the country.[99]

When it was accepted that the hydro-pneumatic system was the solution for the 18-pounder recoil trouble a redesigned Vickers' buffer and recuperator were engineered as one block to be retro-fitted inside the original recuperator spring case on top of the gun. Friction was all but eliminated by using air instead of springs and run-out was smoother and more regular. One WO manual comparing the two systems described air as an 'elastic medium which remains practically perfect' once it does not escape.[100] The urgency with which the design and manufacture of these new recoil systems was carried out is apparent in records from the time. Five hundred were ordered in July 1916 before the system was officially accepted, but that order was increased to 1500 one month after the product was finally approved in November that year.[101] The first were delivered early in 1917.[102] Two thirds of the order were to be mounted on guns, the rest kept as spares, but results for the following year indicate that they were struggling to meet demand and by August 1917 only 204 had been fitted to gun carriages.[103] The modification was easily carried out in the field and Mark I 18-pounder carriages were redesignated as Mark I* when converted.[104] Newly built, Mark II gun carriages

[97] Captain E. Gerrard, Bureau of Military History witness statement (MA, BMHWS 348), pp 2-3.
[98] B.P. Hughes, *History of the Royal Regiment of Artillery, between the wars, 1919-39* (London, 1992), p. 44.
[99] Ibid. Guns may have been neglected as gunners were deployed on mounted rifles duties. At the same time practice shoots continued in the Glen of Imaal, the last was conducted in the summer of 1921 shortly after the Truce. Surprisingly hunting was not interfered with during the War of Independence. Brigadier-General W. B. R. Sandys, The last months of 5 Divisional Artillery, Sandys papers, 1920 (RA Archive, AMOT039_WW_MD.211.5), pp 2-3, online through The Ogilby Muster at https://www.theogilbymuster.com/ (27 Oct. 2021).
[100] War Office, *Textbook of gun carriages and gun mountings*, p. 121.
[101] Memorandum on air recuperator, 3 Aug. 1917 (The Churchill Archive, University of Cambridge, CHAR 15/102).
[102] Ministry of Munitions, *The official history of the Ministry of Munitions, The supply of munitions, Part I, Guns*, x, p. 47.
[103] Memorandum on air recuperator, 3 Aug. 1917 (The Churchill Archive, University of Cambridge, CHAR 15/102).
[104] The Mark I** was the Mark I carriage fitted with a new cradle. War Office, *Handbook for the 18-pr Marks I to II guns*, p. 79.

had a slightly longer cradle for extra support during recoil.[105] The most obvious visible difference on a gun with the new system was a longer, torpedo-like bronze cradle cap fitted to the front of the recoil block.

The problems producing the new system continued into 1918 and by March that year around three hundred gun carriages were still waiting to be fitted with recuperators.[106] Intricate machining operations were required to bore out the recoil block and manufacture the pistons, valves and seals and the work was handed out to firms like Hick, Hargreaves and Co., a Bolton factory better known for manufacturing large stationary steam engines for the cotton mills.[107] The company had been producing shells for the ministry, but their expertise in pressurised cylinders and air pumps was better suited to this type of work and the production line was converted in May 1917.[108] Winston Churchill in his role as Minister of Munitions thanked them for their effort towards the end of the war.[109] The surviving Irish 18-pounder mounts a Hick, Hargreaves and Co. recoil system and during the preservation of this piece it was found that after more than fifty years exposed to the elements, and despite evidence of severe corrosion elsewhere on the gun carriage, the buffer cylinder was clear of rust and piston seals were still partially functional.[110]

Both versions of the field gun were handed over to the Irish in 1922 and photographic evidence indicates that those used during the battle for Dublin, were Mark II variants.[111] The other five guns were Mark Is and were fitted with the oil tank. The first two 18-pounders were collected by National Army troops around midnight on 27 June 1922, from the Royal Artillery who, at the time, were based in Marlboro Barracks beside the Phoenix Park.[112] British forces had been withdrawing from the twenty-six counties since January that year and according to their commander-in-chief, Gen. Macready, 'some artillery' and around a dozen weak infantry battalions remained in Dublin.[113] Field artillery batteries had evacuated posts outside the capital by June and many had already left for England, but a large encampment of troops and

[105] Hogg, *Allied artillery of World War One*, p. 21.
[106] W. Churchill to Q. M. G. secret letter, 25 Mar. 1918 (The Churchill Archive, University of Cambridge, CHAR 15/102).
[107] L. T. C. Rolt, *Victorian engineering* (Gloucestershire, 2007), p. 98.
[108] *Scientific American*, lxvi, 19 Mar. 1892, pp 178-9. Ministry of Munitions, *The official history of the Ministry of Munitions, The supply of munitions, Part I, Guns*, x, p. 66.
[109] Letter from J. M. Halsom, Hick, Hargreaves and Co. to W. Churchill, 12 July 1918 (The Churchill Archive, University of Cambridge, CHAR 15/164 A-B).
[110] As the piston was withdrawn from the cylinder it could be heard forcing the air ahead of it, which indicated that the seals were still partially functioning. Author's examination of gun no. 9168.
[111] T. P. Coogan and George Morrison, *The Irish Civil War* (London, 1998), pp 166, 168, 182-3.
[112] Sean Boyne, *Emmet Dalton, Somme soldier, Irish general, film pioneer* (Sallins, 2015), p. 140.
[113] Nevil Macready, *Annals of an active life* (London, 1924), p. 643.

equipment developed in the Phoenix Park formed by those awaiting transportation.[114] Macready may not have been completely honest about the amount of artillery left under his command. A year earlier at the time of the Truce the RFA had eighteen batteries of guns in Ireland, a total of 108 artillery pieces, three quarters of which were 18-pounders.[115] Winston Churchill calculated that there were still nine 18-pounder batteries in the capital when the guns were handed over to the Irish.[116] His figure was calculated whilst carrying out research for his book *Aftermath* and he appears to have been keen to show that Macready was less than willing to deplete supplies in his 'defended camp'.[117] The first four field guns that were 'lent' to the Provisional Government came from the 17 Battery RFA. The battery had evacuated Kildare Barracks in April, but it was one of the few that was still active in Dublin when the guns were handed over and seems to have been held at war strength with three sections (six guns).[118] The majority of field artillery batteries had already handed their 18-pounders over to the Ordnance Depot by then.[119] The records show that the 17 Battery retained at least a pair of Mark IV field guns until September when they were handed over to the 66 Battery as it arrived in Dublin and on 1 October the battery number was given to the 112 Battery serving in India.[120] This, however, is likely to have been an administrative exercise and according to Siân Mogridge of the Royal Artillery archive may only have involved the transfer of the unit's history and silverware, nothing else.[121]

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[114] *Irish Times*, 14 Jan., 26 Jan., 4 Feb., 7 Feb., 7 Apr., 23 Dec. 1922.

[115] Since three out of four batteries had 18-pounders, and with six guns in a battery, there were approximately eighty field guns in Ireland in 1921, see Anthony Kinsella, 'Troops (Regulars) stationed in Irish Command end-June 1921' in *The Irish Sword*, xxvii, no.109 (Autumn, 2010), pp 344-9.

[116] Winston Churchill, Research notes on events in Ireland for his book Aftermath, 1929 (The Churchill Archive, University of Cambridge, CHAR 8/256).

[117] Recent research has given a figure of about eighteen guns in Macready's arsenal. There certainly seems to have been more field guns then indicated by Macready. Winston Churchill, *The world crisis, the aftermath* (London, 1929), p. 344.
John Buttimer, 'The great withdrawal' in *An Cosantoir*, (Dec. 1979), pp 365-8. p. 366.

[118] Images show the trail of the field guns marked with '17 RFA'. Boyne, *Emmet Dalton*, p. 140. Kinsella, 'Troops (Regulars) stationed in Irish Command', pp 344-9. McLoughlin, *Kildare Barracks, from the Royal Field Artillery to the Irish Artillery Corps*, p. 142. The 17 Battery spent a short time in Newbridge Barracks after it evacuated Kildare Barracks. 'The last months of the 5 Division Artillery', Royal Artillery Regimental news, Nov. 1922 (RA, Museum archive, Regimental news, Apr. 1922 – Feb. 1924), p. 271. The attitude towards the British handover is apparent in Sandy's use of the term 'lent'. Sandys, The last months of 5 Divisional Artillery, Sandys papers, 1920 (RA Archive, AMOT039_WW_MD.211.5), p. 5, online through The Ogilby Muster at https://www.theogilbymuster.com/ (27 Oct. 2021).

[119] For example, the 16 Battery handed its weapons over to Ordnance in March and remained in Dublin awaiting return to England. Some of the battery's horses and men were transferred to the 17 Battery. 16 Battery RFA digest, 1 Mar.to 10 July 1922 (RA, Museum archive, Mar. to June 1922, 30 May 1923).

[120] 66 Battery digest, 1 Apr. 1922 to 31 Mar. 1923, (RA, Museum archive, 26 May 1923).

[121] Sian Mogridge, Archivist Royal Artillery Museum, Larkhill has suggested that the transfer of unit designation may only have been a paper exercise, with no transfer of staff or equipment. O. C. 17 Battery RFA, Jubbulpore, India to officer in-charge of records at Woolwich, 27 Mar. 1923 (RA, Museum archive).

Sixty-one batteries of artillery were disbanded in 1922 as part of the British army's post-war demobilisation.[122] The London government did 'not expect the British Empire to be engaged in a great war for at least ten years'.[123] Guided by this 'ten-year rule' they thought the army would only be required to act as a colonial police force and for the defence of the empire's frontiers. It was not considered necessary to maintain a large expeditionary force to fight another European war.[124] The army had operated in the colonial policing role in Ireland during the War of Independence, but the guerrilla tactics adopted by the IRA rendered artillery useless. Royal Artillery troops were consequently formed into Mounted Rifles units because, it was believed they were not being utilised enough during the troubles.[125] There were plenty of occasions however, when artillery was deployed in defence of the empire between 1919 and 1936 along the border between India and Afghanistan and in Mesopotamia, Palestine and Waziristan. A battery of 18-pounders was attached to the British force sent to northern Russia in support of the White Russians and two brigades of RFA were stationed with troops occupying the Rhineland after the war.[126] The field gun had of course been used in a colonial policing role previously in Dublin during Easter Week 1916, when the fixed positions occupied by rebels made easy targets for Royal Artillery gunners, and RFA howitzers were brought into action when the British perceived a threat to the newly drawn British-Irish border at the beginning of June 1922. On that occasion Pettigoe and Belleek were shelled after days of intermittent fighting between Northern Division IRA and British troops.[127] The indignation expressed by the Provisional Government in Dublin after this incident lost some of its vigour when Irish manned field guns opened fire in the capital.[128]

By 1922 the 18-pounder was no longer simply a 'shrapnel gun'. The fighting in France made the British realise very quickly how important it was to have a gun that could fire both shrapnel and high explosive ammunition. It is true that 18-pounders firing only shrapnel held

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[122] B.T. Reynolds, 'The reorganisation of the British Army' in *The military engineer*, xxx, no.172 (July-Aug. 1938), pp 269-73. p. 270.
[123] Winston Churchill to Mr. Balfour, Committee of Imperial Defence correspondence, 1 Dec. 1920 (The Churchill Archive, University of Cambridge, CHAR 25/2)
[124] David French, 'Doctrine and organization in the British Army, 1919-1932' in *The historical journal*, xliv, no.2 (June, 2001), pp 497-515, p. 513.
[125] M. J. O'Donnell, 'Artillery in the midlands' in An Cosantoir, xliii, no.7 (July 1983), pp 231-2, p. 232. Hughes, *History of the Royal Regiment of Artillery*, p. 124.
[126] Hughes, *History of the Royal Regiment of Artillery*, pp 113-55.
[127] Lynch, Robert, 'Donegal and the joint IRA Northern Offensive, May-November 1922' in Irish historical studies, xxxv, no.138 (Nov. 2006), pp 184-99, p. 193. A file marked 'Very Secret' in the Churchill Collection seems to be the orders for the border operation. Lt. Col. Watson ordered that only Imperial troops should be involved (presumably avoiding the utilisation of 'Special Constables') and in such a manner as to inflict the greatest possible loss to the enemy. Artillery was to be brought into action if the necessity arose. For Lt. Col. Watson, Newtownards, 3 June 1922 (The Churchill Archive, University of Cambridge, CHAR 22/13).
[128] *Irish Independent*, 8 June 1922.

back the German advance in 1914 and Royal Artillery officer, Lt. Col. Broad, wrote that 'the masses in which the enemy advanced, made themselves particularly vulnerable to shrapnel and firmly established the 18-pounder in its position'.[129] One of Broad's contemporaries Maj. Gen. Headlam, who was in charge of the 5 Division artillery at La Cateau, later spoke about the devastating effect that British shrapnel shells had on German troops.[130] The shrapnel projectile was designed primarily for use against personnel. Its forged steel body was filled with 375 spherical lead bullets that were dispersed above a target in an expanding cone shape, through the action of a timed fuze and a bursting charge.[131] It was an ideal ammunition for a war of mobility, but lost some of its effectiveness as the armies dug in. Lloyd George was highly critical years later about the War Office's obsession with shrapnel, 'their mental arsenals had no room for anything else' he complained and he noted that as trench warfare progressed 'we found that the shrapnel of our field guns was powerless not only to level parapets, to destroy trenches and to obliterate machine-gun emplacements, but even to tear down barbed-wire entanglements'.[132] Headlam admitted the British had carried their dependability on shrapnel too far and a telling assessment appeared in a letter from an Irish officer at the front, who after the battle of Neuve Chapelle lamented the fact that 'our guns have not the same high explosives' as the Germans.[133]

In Dublin during the Easter Rising an 18-pounder firing shrapnel from Grangegorman forced Volunteers manning barricades on the North Circular Road into cover causing some casualties, although field guns targeting the GPO and the surrounding area proved less effective.[134] On the roof of the GPO one Volunteer, a veteran of the war in South Africa retorted dismissively when a shell went off near him, 'Don't mind that its only b…. shrapnel', and in

[129] Broad, 'The development of artillery tactics 1914-1918', p. 381. Shrapnel proved most effective in 1914. Bailey, *Field artillery and firepower*, p. 122.
[130] Strong and Marble, *Artillery in the Great War*, p. xviii. Bidwell, *Gunners at war*, p. 16. Headlam, 'Developments in artillery during the war', p. 303.
[131] The number of bullets changed according to the Mark of projectile. War Office, *Textbook of ammunition* (London, 1926), pp 114, 118-20. War Office, *Field artillery training 1914* (London, 1914), p. 159.
[132] A post war study of the effects of shrapnel agreed with Lloyd George and maintained that shrapnel was ineffective against troops behind a breastwork or on the rear of a slope. Lloyd George, *War Memoirs of David Lloyd George* (2 vols, London, 1938), i, pp 76, 84. C. Beard, 'Fire and effect of modern artillery' in *Professional Memoirs, Corps of Engineers, United States Army, and Engineer Department at large*, xi, no.58 (July-Aug. 1919), pp 447-94, p. 458.
[133] Headlam, 'Developments in artillery during the war', p. 303. Francis Grenfell to Winston Churchill, 9 Nov. 1914, (The Churchill Archive, University of Cambridge, CHAR 13/45/75-78)
[134] Gerry Golden, Bureau of Military History witness statement (MA, BMHWS 521), p. 19. Patrick J. O'Connor, Bureau of Military History witness statement (MA, BMHWS 608), p. 3.

the buildings nearby where troops had even better cover, Oscar Traynor remembered seeing one of his men picking up shell fragments to keep as 'souvenirs'.[135]

Writing in 1911 Col. HA Bethell of the RFA, admitted that the HE round was more effective than shrapnel against shielded artillery pieces like the German 7.7cm field gun. He acknowledged that it might take twice as many shrapnel shells to have the same effect as high explosive ammunition, but he justified the retention of a shrapnel-only gun by claiming that it simplified the supply of ammunition.[136] Very quickly the fighting in France proved that time and additional ammunition were luxuries that the British artillery could not afford. German field guns were supported at divisional level by 105mm howitzers and as part of their artillery doctrine a section of guns were set aside specifically for counter-battery work – essentially guns firing on guns.[137] German ammunition stocks included HE and 'universal' shells which were projectiles that combined shrapnel with high explosive. The British had been experimenting with a 'universal' projectile, but trials were interrupted by the outbreak of war. Almost immediately though they began to consider the option of a HE round for the 18-pounder and when Maj. Gen. Lindsey, the General Officer Commanding the Royal Artillery in France, was consulted on the matter he replied 'If you have *safe explosives* [author's italics] for field guns by all means proceed to manufacture'.[138] Lindsey's reply was no doubt inspired by the poor reputation that lyddite filled HE shells had earned in the Boer War due to premature detonations.[139]

The reliance on shrapnel was also, partly brought about by pre-war tactical doctrine and the battlefield as it was imagined in 1913. Before the war it was thought the battle would be fast-moving, field artillery would be used at short ranges – the maximum range for the 18-pounder was 6,500 yards - and generally in a direct fire role supporting the infantry, an ideal combat zone for shrapnel.[140] Artillery regulations in 1914 directed that the guns should be moved forward to get 'a clearer view of the infantry fight'.[141] The mass barrages that became

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[135] The British veteran, Michael Boland had served 12 years in the British Army and became a Lieutenant in the Irish Volunteers. Liam Tannam, Account of Easter Week, Bureau of Military History witness statement (MA, BMHWS 242), p. 32. Oscar Traynor, The Rising, Easter Week, Bureau of Military History witness statement (MA, BMHWS 340), p. 16. Sworn statement of Michael Boland, 12 Feb. 1935, Military Service Pension Records (MA, WMSP34REF800).

[136] H. A. Bethell, *Modern artillery in the field, A description of the artillery of the field army, and the principals and methods of its employment* (London, 1911), 133.

[137] Strong and Marble, *Artillery in the Great War*, pp 4-5.

[138] Ministry of Munitions, *The official history of the Ministry of Munitions, Industrial mobilisation, Part I, Munitions supply, 1914-5*, i, p. 27.

[139] Breer, 'British industrial policy concerning the heavy ordnance industry', p. 209.

[140] Bailey, 'Deep battle 1914-1941', p. 23.

[141] Bailey, *Field artillery and firepower*, p. 120.

commonplace later in the war were never envisioned. Fire from a field gun was laid on a target in two ways. Direct laying was used when the target could be seen, indirect laying when the target was out of sight of the gun position and it depended on an observer elsewhere on the battle field for direction.[142] The 1914 *Field Artillery training manual* described indirect laying as 'the normal method employed in the field', in fact it was recommended first in the 1906 training handbook.[143] However, the RFA neglected to make the most of advancements that made indirect firing feasible. Once again, their thinking was influenced by the war in South Africa and what J. B. A. Bailey described as the 'perceived impracticality of indirect fire'.[144] The British guns at Mons in August 1914 had been positioned behind the infantry initially, but as the battle wore on many ended up along the infantry firing line, aiming directly over open sights.[145] Shelford Bidwell, a historian and Royal Artilleryman from the Second World War, defended the deployment of the guns at Le Cateau and Headlam's role during the battle, and he maintained the gun crews were firing indirectly until ordered to fight to the finish.[146] But, by positioning their guns in view of the enemy and in some cases so far forward that they were alongside the British infantry, the Royal Artillery lost any advantage they might have gained firing indirectly.[147] It was perhaps the nature of open warfare, and it suited the RFA who according to Bailey disregarded the scientific approach to gunnery in favour of intuition and subjective judgement until the shock of 1914 forced them and other militaries to accept it.[148] With the introduction of a dial sight (fig. 3) in 1913, indirect firing became more practicable and it became easier for the guns to fall back out of sight and of range of the enemy, whilst still

[142] For direct laying the gun layer set his sight to the elevation that was ordered and the elevation and traverse handwheels were operated to bring the sight onto the target. With the barrel aligned on the target the elevation ensured the correct range would be achieved. Although slightly more complicated indirect laying used a selected aiming point, quite often an aiming post, for direction, the angle of sight was adjusted using the clinometer and the elevation using the range gear.
[143] War Office, *Field Artillery training 1914*, pp 172-6. Knight, *The 18-pounder field gun in Canadian service*, p. 40.
[144] Bailey, *Field artillery and firepower*, p. 120. The Japanese are considered to have been the first military to embrace properly the use of indirect fire during the Russo-Japanese War, 1904-5. The Germans were better prepared to use this new technique in 1914 than the British, see J. M. House, *Combined arms warfare in the twentieth century* (Kansas, 2001), p. 28.
[145] Clarke, *World War I battlefield artillery tactics*, p. 18.
[146] Bidwell, *Gunners at war*, p. 18.
[147] Strong and Marble, *Artillery in the Great War*, p. xix.
[148] Bailey, *Field artillery and firepower*, p. 118-9.

supporting the infantry.[149] Artillery tactics were being developed by trial and error, but indirect fire which was dangerously inaccurate in 1915 became the norm by the last year of the war.[150]

In total, 1,126 field guns had been built in Britain and 99 in India before war broke out in 1914.[151] The original 18-pounder contract was only completed in 1909.[152] Almost half of the barrels and more than one third of the gun carriages for these pieces were manufactured by the Ordnance Factories. The factories' accounts were itemised and they identified individual component parts so they do not give the figure of fully assembled guns that were built, but this corresponds with the concept of parts being produced independently in factories around Britain, before final assembly. The Ordnance Factories also manufactured components for the field gun for Australia, New Zealand and South Africa.[153] (table 2) Canada built a small number of gun carriages and fitted them with Vickers built guns from Britain, but otherwise between 1909 and 1914 the private firms ceased working on government contracts and the government factories were responsible for the manufacture of 80 per cent of all artillery pieces.[154]

[149] The introduction of the dial sight made it necessary to have an aperture in the upper shield and at this time a hinged plate was fitted to cover the aperture for the rockingbar sight on the main shield. Headlam, *The history of the Royal Artillery*, pp 101-2.
[150] House, *Combined arms warfare in the twentieth century*, p. 34. Bailey, *Field artillery and firepower*, p. 142.
[151] The field gun was fitted with a different design axel-tree in Indian service. Headlam, *The history of the Royal Artillery*, p. 92. Hogg, *Allied artillery of World War One*, p. 21.
[152] Ministry of Munitions, *The official history of the Ministry of Munitions, The supply of munitions, Part I, Guns*, x, p. 1.
[153] *Annual accounts of the ordnance factories, for the year 1914-1915; with the report of the comptroller and auditor-general thereon*, pp 194-393, H.C. 1916 (47), xvii, 393-420.
[154] Knight, *The 18-pounder field gun in Canadian service*, p. 57. Scott, *Vickers, A history*, p. 97-8.

Year	Barrels	Barrel Mark	Carriages
1905-1906	144	I	137
1906-1907	35	I	86
	38	II	
1907-1908	47	II	64
1908-1909	43	II	13
	12 (Australia)	II	
1909-1910	5 (India)	Breech Rings (only)	20
1910-1911	6 (India)	A-tubes (only)	
	5 (India)	Breech rings (only)	
1911-1912	21 (Australia)	II	30 (Australia)
	16 (New Zealand)	II	12 (New Zealand)
1912-1913	49	II	1
	39 (Australia)	II	30 (Australia)
1913-1914	4 (South Africa)	II	1
	10	II	

Table 2. Numbers (quantity) of barrels and carriages manufactured in the Ordnance Factories between 1905-1914. Includes components for India. (Parliamentary Papers, *Annual accounts of the ordnance factories, for the years 1905-1914*)

By comparing Doug Knight's register of Canadian field guns and the list of Irish 18-pounders it is possible to estimate the year of manufacture for the Irish guns to within a two- or three-year window revealing that they were all manufactured between 1915-1918. (appendix 3, Knight's and Irish list compared) As might be expected gun production took off as soon as war broke out. The War Office sought eighteen field guns from the Ordnance Factories almost immediately. By the end of the first month 68 18-pounders were ordered, to be completed by the middle of 1915. At the same time the Vickers and Armstrong factories were each instructed to manufacture 78 completed pieces and soon they were producing between three and four times the numbers of guns manufactured at Woolwich.[155] A special meeting was organised in October 1914 to specifically discuss the supply of field guns and Lloyd George determined that 3,000 18-pounders should be manufactured on top of an order that had already increased by that time.[156] By August 1915, five months after the formation of the Ministry of Munitions had paved the way for the mass mobilisation of British industry, Lloyd George promised that 5,107 field guns would be completed in a twelve month period. It was enough to arm 100 divisions with a reserve of 307 guns, ready it was hoped by June 1916 in time for the, as yet unplanned

[155] Ministry of Munitions, *The official history of the Ministry of Munitions, Industrial mobilisation, Part I, Munitions supply, 1914-5*, i, p. 84. Scott, *Vickers, A history*, p. 97-8.
[156] Ministry of Munitions, *The official history of the Ministry of Munitions, Industrial mobilisation, Part I, Munitions supply, 1914-5*, i, p. 93.

Somme offensive.[157] Yet despite these promises, Field Marshall Haig was compelled to complain in June 1917 that 'the supply of 18-prs has not been sufficient'.[158] His words were echoed by another officer who reported 'a considerable shortage, indeed a distressing shortage' of field guns to Churchill.[159]

The end of the shell crisis and increased availability of ammunition brought new problems as gun barrels wore out. Barrel wear is discussed in more detail later, but it was particularly affected by the type and rate of fire. The dump of 1,300 rounds supplied to each gun before operations at Messines in June 1917 gives some sense of how intensely these 18-pounders were being used.[160] On the 'firing line' in France at the time there were 3,328 field guns of all types, but gun casualty rates were high and 1,256 were lost to shell fire, wear, and premature explosions. Nearly one thousand field guns were put out of action due to wear alone between April and July 1917.[161] The life of an 18-pounder gun barrel was determined by the number of rounds that it fired, up to a maximum of 12,000, when the barrel was considered shot-out, but they could also be sentenced unserviceable due to scoring and damage in the bore.[162] The 9 cwt barrel was fixed to the cradle and carriage through a lug on the breech ring and held in place with a large securing nut, which when undone allowed the barrel slide to the rear, as in recoil, out of engagement with the cradle making it easy to replace in the field.[163]

An analysis of gun carriage register numbers and gun serial numbers that were given to the weapons handed over to the Irish in 1922 indicates that one of the 18-pounder barrels manufactured around 1918 was fitted to a carriage built sometime earlier probably before the war.[164] The recoil system on this gun had been modified with an oil tank and since the guns that remained in Ireland between 1914-18 are unlikely to have been converted until all those at the front were done, it is highly likely that this weapon was one that had been used during the Great War. The evidence suggests that the original barrel was rendered unserviceable through combat and the 1918 barrel was its replacement. Gun carriage production fell behind barrel

[157] Report of proceedings at cabinet committee, Downing Street, 18 Aug. 1915, (The Churchill Archive, University of Cambridge, CHAR 21/56), p. 3.
[158] Field Marshall Douglas Haig, GHQ France to Winston Churchill, 29 July 1917, (The Churchill Archive, University of Cambridge, CHAR 15/1).
[159] Charles Hobhouse to Winston Churchill, 7 Sept. 1917 (The Churchill Archive, University of Cambridge, CHAR 15/156).
[160] Compare this to the overall supply of 1,000 rounds per gun mentioned above. US Army War College, *Artillery operations of the ninth British Corps at Messines, June 1917* (Washington, 1917, reprint).
[161] Report on the artillery position on the Western Front, French and British Armies, April-August 1917 (The Churchill Archive, University of Cambridge, CHAR 15/131), p.2.
[162] The 18-pounder fired fixed ammunition so charges for ammunition did not vary, and an 'equivalent full round' was essentially one round.
[163] War Office, *Handbook for the 18-pr Marks I to II guns*, p. 39.
[164] The carriage number suggests it was manufactured early during 18-pounder production.

manufacture before the end of the war. Forecasts made in February 1918 suggest there were 40 per cent less carriages than guns being built.[165] Three hundred and fifteen carriages were required to complete the arming of RFA units with the 18-pounder and complete the stock of the reserve.[166] It made sense therefore to reuse the carriage even though it mounted the older version of the recoil system.

The advancements in 18-pounder design continued and they surpassed production. No sooner had the new recoil system been developed when the demand for increased range led to the development of the experimental Mark III field gun. For various reasons this weapon proved unsuitable and a Mark IV gun on the Mark III carriage quickly followed.[167] To achieve a greater range, it was necessary to increase elevation which was not possible using the earlier variants due to the pole trail.[168] In the field, gunners using the Mark I and II weapon dug the spade into the ground, sometimes by as much as 3 feet, effectively creating a ramp to raise the muzzle of the gun.[169] In June 1916 Haig asked for something to be done to increase the range of his guns.[170] The field marshal's artillery advisor in France, Gen. Birch was driven to declare nearly two years later 'we want longer range field guns'.[171] The general had been asked if his troops felt disadvantaged by the 11,000 yard range on the 18-pounder's German equivalent. That disadvantage became blatantly clear a few days later when the German army launched its March 1918 offensive. During the battle German 7.7cm field guns targeted the British artillery with counter-battery barrages and by the end of the first day the British had lost around 400 guns.[172] Between the 20-31 March, 513 18-pounder guns and 497 carriages were lost along the Western Front.[173] Longer range could have prevented some of that loss. Churchill summed it up at a July cabinet meeting with childlike simplicity when he explained that, for guns 'in defence…it is enormously advantageous to have an increase in range because you can keep

[165] Report by William Napier, Director of Artillery, 4 Feb. 1918, (The Churchill Archive, University of Cambridge, CHAR 15/132).
[166] Ministry of Munitions, *The official history of the Ministry of Munitions, The supply of munitions, Part I, Guns*, x, p. 38.
[167] Hogg, *Allied artillery of World War One*, p. 21.
[168] The pole shaped trail prevented the rear – breech section – of the barrel from lowering enough to raise the muzzle any further.
[169] Notes comparing German and British artillery, the German 7.7cm field gun, 1918 (The Churchill Archive, University of Cambridge, CHAR 15/102), p. 43.
[170] Ministry of Munitions, *The official history of the Ministry of Munitions, The supply of munitions, Part I, Guns*, x, p. 49.
[171] Minutes of proceedings, Conference on Ammunition program for 1919, GHQ, France 19 Mar. 1918, (The Churchill Archive, University of Cambridge, CHAR 15/29), p. 19.
[172] Strong and Marble, *Artillery in the Great War*, pp 165, 172.
[173] Ministry of Munitions, *The official history of the Ministry of Munitions, The supply of munitions, Part I, Guns*, x, p. 40.

your guns away from the immediate danger of capture'.[174] In fact the capture of British Fifth Army field guns in March may well have been prevented if their range had permitted them to be based further back, behind the line.[175]

The loss of guns placed pressure on the planned roll-out of the new 18-pounder.[176] The Mark IV which was in production at the time would extend the field gun's range by 3,000 yards with a maximum elevation of 37.5 degrees.[177] The barrel was almost the same as the one fitted to the earlier variants, but that is where the similarities ended. The breech mechanism, cradle and carriage were completely different. The recoil system, which was an improved version of the one fitted to the Mark II in 1916, was slung beneath the barrel, and it was equipped with a cut-off gear to control recoil when firing at high angles.[178] The weapon proved extremely stable during firing, the carriage body from the old 18-pounder was done away with and the trail traversed directly along the axel allowing a 4.5 degree sweep to each side.[179] A number of features including the box trail had been copied from the British 4.5 inch howitzer, 'the third member of the field artillery family'.[180] (fig. 4) A test shoot on 30 May 1918 proved how stable the piece was, and a month later a battery of six finished guns were proof fired and prepared for France.[181] A number of teething problems were noted when they went into action with the 54 Battery supporting the Canadians in August and one report indicates that two of them were temporarily knocked out by enemy fire.[182]

As the new field gun was being developed, an experiment was carried out by fitting an 18-pounder gun and cradle to a 4.5-inch howitzer carriage. The hybrid gun could elevate to 45 degrees and was found to be as steady as the 'service 18-pounder' when it was test-fired at the

[174] Shorthand notes of twenty-forth meeting of Imperial War Cabinet, London, 12 July 1918 (The Churchill Archive, University of Cambridge, CHAR 15/35).
[175] One battery of four field guns surrendered quietly after the British infantry nearby withdrew during the German attack on 21 March 1918. Strong and Marble, *Artillery in the Great War*, p. 171.
[176] Ministry of Munitions, *The official history of the Ministry of Munitions, The supply of munitions, Part I, Guns*, x, p. 40.
[177] Col. Dreyer, Report on trials of field artillery equipment, 3 June 1918 (The Churchill Archive, University of Cambridge, CHAR 15/102).
[178] This prevented the breech of the gun hitting the ground when recoiling at high angles. War Office, *Handbook for the QF 18-pr gun, Mk.IV on carriages, field, Mks III, IIIT, III* and IV* (London, 1921), p. 18.
[179] War Office, *Textbook of gun carriages and gun mountings*, p. 55.
[180] A howitzer like the 4.5 inch was designed to fire a heavier round a shorter distance although firing at a higher angle. An opening in the box trail allowed for the high elevation. The other gun in the family was the 13-pounder. Hogg, *Allied artillery of World War One*, p. 24.
[181] Member of Council for Ordnance to Minister of Munitions, 27 June 1918 (The Churchill Archive, University of Cambridge, CHAR 15/102).
[182] Report on 18-pdr Mark IV guns on Mark III carriages, 29 Aug. 1918, and letter from General Lewin to Churchill, 8 Sept. 1918 (The Churchill Archive, University of Cambridge, CHAR 15/102).

end of May.[183] Before the German offensive took its toll on the British artillery pieces, Gen. Birch said he would take 100 of these guns for the front, but the order never materialised as the supply of howitzer carriages was 'not sufficient to allow of their use for this purpose' and the priority shifted to the production of the Mark IV.[184] In reality the very manufacture of the Mark IV was threatened by the pressure to keep serving guns in the field. Col. Dreyer expressed concerns that the production of new 18-pounders would 'adversely affect the supply of spare equipments [sic] of other natures, which are urgently required and essential for the conduct of the war'. He asked if the Mark IV was the right solution when 'guns and carriages of the present service pattern must…be made to replace casualties' and he thought it best to carry on manufacturing Mark I and II guns until the spring of 1919.[185] There was clearly no sense that the war would be over before the end of the year and military planners persisted evaluating gun production and developing forecasts for the next twelve months.

The continued production of Mark II 18-pounders at this stage explains why at least two of the Irish guns shared a manufacturing date of 1918. They were amongst the last of that variant to be produced. One of them, manufactured in Leeds, was proof-fired on Mearwood range in July and was subsequently examined by the Inspector of Guns from Woolwich, but the record shows that it was not fired again by the British and may not have gone into service until after the end of the war.[186] In the wake of the German offensive the demand for breech mechanisms reached a critical point, the factories in Britain were losing men skilled in this work to the front, and new centres of production were sought. Belfast proved an ideal place for this type of engineering, and it provided some of the 1,500 18-pounder breech mechanisms that were requisitioned during the last six months of the year.[187] The shortage of breech components makes it worth mentioning the 1921 manufacturing date on the breech mechanism of gun number 9168. The gun was probably manufactured during the first half of 1918 and may have seen action during the war, though the replacement breech screw – with the 1921 date of manufacture - was probably replaced in Irish service with one from a batch that was purchased

[183] Col. Dreyer, Report on trials of field artillery equipment, 3 June 1918 (The Churchill Archive, University of Cambridge, CHAR 15/102).
[184] Minutes of proceedings conference on Ammunition program for 1919, GHQ, France 19 Mar. 1918, (The Churchill Archive, University of Cambridge, CHAR 15/29). Col. Dreyer, Report on trials of field artillery equipment, 3 June 1918 (The Churchill Archive, University of Cambridge, CHAR 15/102).
[185] Col. Dreyer, Report on trials of field artillery equipment, 3 June 1918 (The Churchill Archive, University of Cambridge, CHAR 15/102).
[186] History sheet, Memorandum of inspection, gun number 10756, 1918 (MA, Personal collections, Ivor Noone, PC 625).
[187] Ministry of Munitions, *The official history of the Ministry of Munitions, The supply of munitions, Part I, Guns*, x, pp 41, 67.

by the Free State Army in 1924.[188] Irish inspection reports (examined in detail in Chapter IV) show how the breech mechanism regularly required the attention of the artificer. The only parts made for the Mark II guns in the Ordnance Factories in 1921 – aside from A-tubes and breech rings for India - were related to the breech mechanism and as the British were phasing out the Mark II gun at the time these are likely to have been sold to the Irish.[189] By 1921 production was geared up for the manufacture of the Mark IV gun, though numbers were low, reflecting the new peacetime army. (table 3) The re-arming of the RFA with the new gun seems to have been prioritised however and the Ministry of Munitions sought to speed up the delivery of six hundred 'new' 18-pounders, 'provided that no extra cost is entailed', for the British Army of Occupation in Germany.[190]

Year	**Number of Mark IV guns manufactured**
1920-21	71
1921-22	51
1922-23	4

Table 3. showing the number of pieces of Ordnance QF 18-pr Mark IV produced in the Ordnance Factories after the war. (*Annual accounts of the ordnance factories, for years 1920-23*)

The development of the last version of the 18-pounder, fitted with a split trail, was being examined even as the Mark IV was going into production. This type of trail had been considered during the design stages of the Mark III field gun in 1918. Birch correctly described it as 'the trail of the future' and assessed its capability 'in view of the development of aeroplane and tank fighting' and he was convinced it would allow the gun to elevate and traverse beyond what was then possible.[191] The split trail was originally considered in 1912 by Joseph-Albert Deport for his *Mle 1897*, but the idea was turned down gun by France's Gen. F. G. Herr who

[188] Army finance officer to High Commissioner, schedule of equipment purchased, 13 Oct. 1927 (MA, A. F. O. 16 War equipment – 342 (374))

[189] Unfortunately, the detailed production account for the Ordnance Factories was curtailed during the war 'owing to the impracticability of compiling it'. *Annual accounts of the ordnance factories, for the year 1918-1919; with the report of the comptroller and auditor-general thereon*, p. 10, H.C. 1920 (99), xxx, 242.
29 Breech screws (breech blocks) were made for Mark I and II field guns between March 1920 and March 1921 and 30 in the twelve months that followed.

[190] There were four RFA batteries serving on the Rhine in 1924. *Army estimates for effective and non-effective services, for the year 1924-25*, p.16, H.C. 1924 (18), xiv, 18. Summary of correspondence, Ministry of Munitions, 22 Feb. 1919 (The Churchill Archive, University of Cambridge, CHAR 15/151).

[191] General Birch to Churchill, 24 June 1918 (The Churchill Archive, University of Cambridge, CHAR 15 102). Hogg concurs with Birch's assessment – the trail was subsequently used on guns all over the world. Hogg, *The illustrated encyclopaedia of artillery*, p. 125.

thought it might affect manoeuvrability.[192] Herr's assessment was wrong, the split trail design proved hugely successful as artilleries became mechanised later on. In August 1918 British general headquarters in France asked the War Office to produce designs for a split trail version of the 18-pounder. The decision was probably influenced by Birch's enthusiasm for the development and a version of the trail was constructed in France for testing, but it was a step too far for the British at the time and Gen. Bingham considered Birch's proposal to convert all guns to the split trail type to be a very dangerous proposition 'at this stage of the war'.[193] The March 1918 conference concluded that more 18-pounders were required even if it was at the expense of other guns; at the time the production lines for the Marks I and II variants were up and running, and the line for the Mark IV gun was being set up, but it would not pay to begin setting up a third production line with all the tooling and expertise that it would require.[194]

The Mark V 18-pounder, when it appeared later, had an even greater traverse than its predecessor, 25 degrees to the left and right, and it could be fired with the trail legs open or closed.[195] The necessity for a greater traverse came out of the realisation – noted already by Birch - that it would be necessary to engage tanks in the war of the future.[196] However, the development and production of the gun proceeded slowly, no doubt due to the huge collection of serviceable equipment that remained on the books after the war and the Ordnance Factory account for the year ending March 1921 records the manufacture of only one single split trail carriage.[197] In the years that followed, whilst Mark IV field guns were being built, only a limited number of Mark V carriages rolled off the production line. At the time £65,190 was spent converting Mark III carriages to the 'new pattern'.[198] And from 1923 there were enough guns for the RFA to begin equipping all its batteries in the United Kingdom with a pair of each type.[199]

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[192] General Lyons to Ministry of Munitions Council, 15 July 1918 (The Churchill Archive, University of Cambridge, CHAR 15/164 A-B).

[193] Agenda for conference on munitions, 17 Aug. 1918, by General Lyon, 11 Aug. 1918 (The Churchill Archive, University of Cambridge, CHAR 15/29). Bingham to Minister of Munitions, 26 June 1918 (The Churchill Archive, University of Cambridge, CHAR 15 102).

[194] Ministry of Munitions, *The official history of the Ministry of Munitions, Industrial mobilisation, Part I, Munitions supply, 1914-5*, i, p. 67.

[195] Often described as the Mark V, the field gun was a Mark IV gun on a Mark V carriage.

[196] Hughes, *History of the Royal Regiment of Artillery*, p. 168-9.

[197] At this stage it was not yet designated as the Mark V. *Annual accounts of the ordnance factories, for the year 1920-1921; with the report of the comptroller and auditor-general thereon*, p. 18, H.C. 1922 (111), xii, 558.

[198] It is not clear if the new pattern was the Mark IV or Mark V. *Annual accounts of the ordnance factories, for the year 1907-1908; with the report of the comptroller and auditor-general thereon*, p. 24, H.C. 1923 (48), xiv, 596.

[199] There were 68 RFA batteries serving 'at home' including 12 that were towed mechanically. *Army estimates for effective and non-effective services, for the year 1924-25*, p.16, H.C. 1924 (18), xiv, 18. Hughes, *History of the Royal Regiment of Artillery*, p. 6.

The 4 Brigade RFA arrived in Dublin in September 1922. Two batteries, 7 and 14, were armed with Mark IV guns as 66 Battery took over Mark IVs from the 17 Battery.[200] The deployment in Ireland of these batteries at a time when most British Army traffic was travelling in the opposite direction reveals how the deteriorating situation in the country was being viewed from London. The British Mark IVs of course had a greater range than the Free State Army's 'new' weapons and this would give the British the advantage should things go against them as they completed their evacuation. The artillery brigade remained until the end of the year and were amongst the last to leave clearly forming part of the British rear-guard.[201]

In 1925 the Free State Army enquired about purchasing another battery of field guns from the British War Office and were told initially that they could have four guns from storage as no new weapons had been manufactured by the government factories since 1918.[202] As can be imagined a huge amount of artillery equipment was left behind in France at the end of the war. As late as August 1919 much of this was still there and some urgency was placed on the inspection and repair of the weapons before they were taken back to Britain to be held in storage for any future remobilisation.[203] Yet when the Irish looked further into purchasing weapons, just a few weeks after the initial enquiry, they were told the guns would have to be manufactured.[204] Following some considerable delay it was eventually arranged that four Mark V guns would be completed for the Free State in 1926.[205] In fact they were not delivered until the end of 1927.[206] Further deliveries increased the Irish stock of 18-pounders to a total of thirty-seven guns of all Marks. The last order for eight Mark II guns arrived in two batches in July 1940 and November 1941 and were by then obsolete.[207]

Strangely the Irish government may never have paid for the nine field guns that were received in 1922. British parliamentarians at the time were eager to find out if the 18-pounders

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[200] *Irish Times*, 23 Sept. 1922.
[201] *Irish Times*, 23 Dec. 1922. Kinsella, 'Military forces in Dublin in November 1922', p. 357.
[202] The Irish officers who visited the WO were dealing with Sir Noel Birch, mentioned above, who was then Master General of Ordnance. D. O'Sullivan to Army finance Officer, 3 Feb. 1925 (MA, AFO-16 War Equipment 244).
[203] The Royal Army Ordnance Corps was given the responsibility for the inspection of the weapons and minor repairs. Major repairs were to be sent to a central government-run repair depot. Ministry of Munitions, summary of official correspondence, 2 Aug. 1919, (The Churchill Archive, University of Cambridge, CHAR 15/151), p. 4.
[204] B. B. Cubitt to Irish High Commissioner, 25 Feb. 1925. (MA, AFO-16 War Equipment 244).
[205] Completion dates were given as between March and May 1926, but proof firing and inspection had to take place after that. Demand for stores for 18-pounder Mark V equipment, 6 Mar. 1925 and E Edwards, WO to D. O'Sullivan, AFO, 2 Jan. 1926 (Military Archives, AFO-16 War Equipment 244).
[206] Statement showing the value of stores supplied to, and services rendered for the Irish Free State, Royal Gun and Carriage Factory, 1926-27 (Ma, AFO 16-War Equipment-342 [374]).
[207] Michael Kennedy and Victor Laing (eds), *The Irish Defence Forces 1940-1949, the Chief of Staff's reports* (Dublin, 2011), pp xl, xxxix-xli.

given to the Provisional Government in Dublin were on loan from the Royal Artillery or transferred permanently to the Free State.[208] No official record of the handover exists, though issue vouchers for equipment valued at more than £150,000, covering the months June, July and August 1922 may include the cost of field guns and ammunition.[209] Unfortunately the vouchers are not itemised. During the chaos of the early months of the Civil War there seems to have been only scant records kept about what was being handed over. Churchill maintained that 'all munitions…will be included in the financial settlement to be made later between the two governments'.[210] That settlement dragged on into the 1920s. The Irish Department of Finance persistently asked the British for a breakdown of costs in the estimation of the final bill of £479,325 until, apparently unable or unwilling to do so the British eventually abandoned their claim altogether in 1926.[211]

The development and production of the 18-pounder field gun is represented in the four variants of the weapon that served with the Irish Army between 1922-1945. The first nine guns that were handed over to the Free State mounted assemblies that were the result of modifications fitted because of the intense use of the gun during the Great War, though they were still very much the same artillery piece that was designed at the beginning of the twentieth century. Yet the war had such an impact on the weapon that it was almost completely redesigned by 1919. The tactical deployment of the 18-pounder differed to that for which it was initially designed. The sheer scale of, and the industrialisation of warfare in the twentieth century demanded a very different gun to the one envisioned in the wake of the Boer War. This was demonstrated in the excessive wear on gun barrels and the response was typified by the British adoption of a hydro-pneumatic recoil system when problems occurred with that assembly. The challenge of mass production between 1914-18 saw the amalgam of factories that were involved in the manufacture of the gun since its inception grow, and valued expertise was brought in from specialists in the British – and American – engineering and industrial world. The names of these firms can be seen on the material evidence that has survived and it is of benefit when looking at the 18-pounder and its Irish service to understand the specifics about production, manufacture and modification, details that are relevant to the gun's story. The serial numbers of the guns used during the Civil War and the modification of their recoil

[208] Brigadier General Colvin of the Conservative Party asked Churchill if the artillery would be returned to the British when hostilities ceased. *Hansard parliamentary debates*, 29 June 22, online https://hansard.parliament.uk/Commons (20 Feb. 2017).
[209] British issue vouchers, AFO's letter 3 Dec. 1925, (MA, AFO DFO 182).
[210] *Hansard parliamentary debates*, 13 July 1922, online https://hansard.parliament.uk/Commons (22 Feb. 2017).
[211] Deptartment of Finance to AFO, 27 March 1926 (MA, AFO DFO 182).

systems suggest that some of them may have seen service in the world war. Their deployment in Ireland in 1922 was however unlike anything that went before and is examined next. Finally it is worth noting that an appreciation of the development of the artillery piece does not just help when looking at the 18-pounder and its Irish service but it is also important when placing the Irish weapons into the broader history of the 18-pounder.

Chapter II

The 18-pounder in service with the National Army during the Civil War

The first pair of Irish Q. F. 18-pounder field guns were accepted from the British primarily to clear hard-line Republicans from Dublin's Four Courts in 1922. The bombardment of the Four Courts revealed immediately how incompetent the Free State army was using this unfamiliar weaponry and this caused the operation to drag on longer than it should have done. As the conflict extended countrywide the field gun was employed as a siege breaker to breach anti-Treaty fortifications. It allowed the Free State side to seize towns and begin its advance into Republican held territory. The appearance of an 18-pounder sometimes was enough to force anti-Treaty defenders to retire, though short – and on occasion long – artillery barrages were also sometimes necessary.[212] Single field guns were used to protect and support the Free State infantry column on the move and the weapon had an important role in the simple but nevertheless effective combined arms manoeuvres adopted by the National Army during the conventional phase of the war. Army officers appealed for an 18-pounder to assist them on the ground from the earliest days of the conflict, the gun's portability was without doubt one of its greatest assets and it was transported by almost every means available. The employment of these guns, even on the limited scale that was witnessed in Ireland – there were only nine weapons in the Free State arsenal – contributed to the shape and the nature of the conflict and, with no answer to the artillery bombardment, anti-Treaty Republicans quickly realised that they could not hold fixed positions. This led to the adoption of guerrilla tactics. This chapter uses examples from contemporary military engagements to demonstrate how the 18-pounders were employed during the war and it considers their use in relation to artillery doctrine from the time. The operation and tactical deployment of the field gun improved as the war progressed and some army commanders clearly utilised the artillery piece better than others. Although they were few in number and deployed by an army that was new to artillery, the field gun played a huge part during the Irish Civil War, it helped to shape the conflict and it saw Free State artillery tactics develop and improve as the conventional phase of the war progressed.

Between the 31 January and 26 June 1922, the army of the Provisional Government were supplied by the British with rifles, machine guns, revolvers, and grenades, but no artillery

[212] Film footage of some of these barrages has survived, see below.

was handed over.[213] That March Gen. Macready reported on the developing Free State army noting that 'cavalry and artillery are not contemplated at present'.[214] There is evidence to show that the Free State force tried to purchase trench mortars privately months earlier but no deal took place and the army had no heavy weaponry when the Four Courts were seized by the anti-Treaty Republicans in April.[215] When the talks between the pro- and anti-Treaty sides in Dublin 'showed signs of breaking down' at the beginning of May Michael Collins, chairman of the Provisional Government asked the British for 'guns, mortars and other military equipment' but by then Winston Churchill who was Secretary of State for the Colonies, wanted the supply of weaponry to cease until he saw some action taken against Republicans.[216] The election pact that ensued between Collins and Eamon de Valera clearly worried the British cabinet and Churchill would only agree to lend a trench mortar if it was to be used 'to reduce the Four Courts'.[217] It was a sign of what was to come.

The events that led the Provisional Government to subsequently accept British artillery pieces to be used against former comrades may be beyond the scope of this study, but it is enough to note that British pressure on the Provisional Government increased considerably after the assassination of Sir Henry Wilson on 22 June. An 'ultimatum' of sorts was sent from Lloyd George to the cabinet in Dublin demanding that something be done about Republicans in the Four Courts, and it offered 'the necessary pieces of artillery which may be required' to prevent the authority of the Provisional Government being challenged.[218] Simultaneously the London government was making plans to use British troops against the Four Courts garrison and Gen. Macready believed that 'from a military point of view the operation was comparatively simple' and would require tanks, aircraft and most significantly, howitzers.[219] In Dublin at a secret meeting on 23 June between the Provisional Government's Arthur Griffith and Assistant Under-secretary A. W. Cope 'the continued occupation of the Four Courts' was

[213] The Free State received 79 Lewis machine guns, 11,900 rifles, 4,200 revolvers and pistols from the British. Hopkinson, *Green against green*, p. 127. For more on the Lewis guns and their link with field gun number 9168 see Ken Smith-Christmas, 'The guns aboard the Finnmerchant: Where are they now?' in ICOMAM Magazine, no.21 (Dec. 2019), pp 30-2.
[214] Report by General Macready to British cabinet on situation in Ireland, 16 Mar. 1922 (NAUK Cabinet papers, appendix, CAB 24/134/79), p. 374.
[215] J. F. White to Minister of Finance 23 Feb. 1925 (MA, AFO 16 War Equipment 265).
[216] Conclusions of cabinet meeting, 16 May 1922 (NAUK, CAB 23/30/5), p. 55. Hopkinson, *Green against green*, pp 93-9. Younger, *Ireland's Civil War*, p. 293.
[217] Conclusions of cabinet meeting, 16 May 1922 (NAUK, CAB 23/30/5), p. 58.
[218] Lloyd George to Michael Collins, 22 June 1922 (NAI, Provisional Government Cabinet Minutes, 3 Apr. - 29 June 1922).
[219] Macready, *Annals of an active life*, p. 652. Hopkinson, *Green against green*, p. 115. Charles Townsend, *The Republic, The fight for Irish independence 1918-1923* (London, 2014), p. 405.

discussed and Griffith examined the possibility of borrowing British equipment to attack the complex.[220]

Events in the Irish capital soon took over and after the kidnapping of the Free State Army's Gen. J. J. O'Connell the Provisional Government accepted the British offer of artillery. And so before midnight on 27 June the first pair of 18-pounder quick firers were handed over to Maj. Gen. Emmet Dalton of the Free State army by Maj. Gubbins, from the Royal Artillery.[221] Dalton, an ex-British army officer was Director General of Military Operations and had accompanied Griffith to the secret meeting four days earlier. He was strongly in favour of using artillery to oust Rory O'Connor and his garrison from the Four Courts though there were some who cast doubts on the suitability of the 18-pounder for the job.[222] Collins asked Maj. Gen. W. R. E. Murphy, another officer with British wartime service, what he thought about using the field gun, which at this stage must have been the weapon that the British were offering, only to be told that 18-pounders were 'pip-squeaks'. Murphy argued that gas shells fired from 4.5-inch howitzers in the Phoenix Park would have a better effect.[223] Dalton subsequently admitted that he knew the 18-pounders 'would be quite insignificant' against the 120 year old, three foot thick granite façade of the Four Courts, but he believed they 'would have a very demoralising effect upon a garrison unused to artillery fire'.[224] In truth the point-and-shoot capability of the 18-pounder in the direct fire role must have appealed to Irish officers planning the attack, and it must be remembered that it was only six years since a single RFA 18-pounder firing from the quays forced rebels in the Courts to 'retire'.[225]

There were four principal effects caused by shell fire, the impact on an enemy's morale was one of them and the Provisional Government hoped it would persuade Republicans inside the Four Courts to surrender.[226] (table 4) The speed with which anti-Treaty defenders abandoned positions later in the war when facing just a small artillery barrage indicates that the morale effect worked, though in Dublin, Limerick, Waterford and Drogheda it required a

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[220] *Manchester Guardian*, 24 June 1922, report quoted in Dorothy Macardle, *The Irish Republic* (Dublin, 1999), p. 739. Hopkinson, *Green against green*, pp 63, 116.
[221] Boyne, *Emmet Dalton*, p. 140.
[222] Ibid., p. 138-9.
[223] Karl Murphy, 'General W. R. E. Murphy and the Irish Civil War' (M. A. thesis, Maynooth University, Maynooth, 1994), p. 4.
[224] Younger, *Ireland's Civil War*, p. 321.
[225] Liam O'Carroll, Bureau of Military History witness statement (MA, BMHWS 314), p. 15.
[226] Bailey, *Field artillery and firepower*, p. 16. US Army command and General Staff College, *Tactics and techniques of field artillery* (Leavenworth, 1927), pp 154-5. Paddy Griffith, *The battle tactics of the Western Front, the British Army's art of attack, 1916-1918* (New Haven and London, 1994), p. 142.

significant number of shells to clear Republican positions, and a determined enemy in the Four Courts forced the National Army to change tactics during the operation.

Effect	**Result**
Neutralising	to stop the enemy from fighting back, to prevent him from operating or manoeuvring.
Material	the destruction of the enemy's position and equipment.
Lethal	the artillery's killing ability.
Morale	the demoralisation of enemy troops through bombardment.

Table.4 The effects of shellfire. (Bailey, *Field Artillery and Firepower*)

The first shots of the conflict were fired by one of the 18-pounders, serial number 10756, at 0415 on 28 June from a position at the corner of Winetavern Street and Merchant's Quay.[227] For nearly two hours, shells raked the front of the building and around 0600 the second gun was positioned on Bridge Street to shell the facade from a different angle.[228] To affect a surrender it was believed that shells should be directed against as many parts of the building as possible to ensure the maximum number of defenders experienced the shock of the bombardment.[229] (fig. 5) At 1000 one of the guns was sent to Chancery Street and Gen. O'Duffy predicted that 'with simultaneous fire from the front and the back, the garrison will be forced to surrender in a few hours' time'.[230] He was wrong. In fact heavy machine gun fire from the Courts prevented the gun crew from digging the Chancery Street 18-pounder in. A second more successful attempt to emplace the gun was made at 1430 using Lancia armoured cars to shield the crew as they worked but that evening it was finally accepted that the bombardment was not having the desired effect and army HQ began to seriously consider how an infantry assault might be carried out.[231] This change of tack saw the field guns employed in a different role as breach makers in order to make a gap in the wall for the infantry to get through.

[227] Daily Report of situation, 28 June 1922 (UCDA, Mulcahy papers P7/B/106), p. 1. Niall Harrington, 'The Four Courts guns' in *An Cosantóir*, xxxix, no. 11 (Nov. 1979), pp 348-9.
[228] *Evening Herald*, 28 June 1922. *Offaly Independent*, 1 July 1922. *Irish Times*, 8 July 1922. *Irish Independent*, 29 June 1922. Daily Report of situation, 28 June 1922 (UCDA, Mulcahy papers P7/B/106), p. 1.
[229] Fewer, *The battle of the Four Courts*, pp 148-9, 160.
[230] Daily report of situation, 28 June 1922 (UCDA, Mulcahy papers P7/B/106), p. 1.
[231] *Irish Times*, 1 July 1922. Liz Gillis, *The fall of Dublin*, p. 55. Fewer, *The Battle of the Four Courts*, p. 194. Daily report of situation, 28 June 1922 (UCDA, Mulcahy papers P7/B/106), p. 1.

Dalton received a second pair of 18-pounders the next morning and the arrival of a new supply of ammunition seems to have coincided with the efforts to make a breach.[232] A breaching operation was essentially siege work and was better suited to heavier artillery.[233] Bidwell considered the 18-pounder to be an inferior siege weapon.[234] Yet following an intense and concentrated barrage the Free State artillery successfully penetrated the walls of the Four Courts in two places by the evening of the second day of the attack.[235] One gun fired from Phoenix Street down Hammond Lane at Record House on Church Street where a breach the height of the ground floor was made.[236] It was simple, but effective gunnery. (fig. 6, map 1) The gun was afterwards marked with white paint on the upper shield identifying it as 'Hammond Lane No.4'.[237] Another massive opening was made on Morgan Place. This was a more challenging target due to the narrow arc of fire and was made more difficult by the presence of friendly troops waiting for the off, in the Four Courts Hotel. (fig. 7.) The results nevertheless dispelled doubts about the capability of the 18-pounder.

As friendly troops entered the building and began fighting in front of the artillery it became necessary to adopt a Great War tactic and 'lift' fire to a different area of the Courts, and during the last phase of the battle the 18-pounders concentrated their barrage on the east wing where it was known Republicans had retreated. The Bridge Street gun had been repositioned on Winetavern Street the night before and now the two guns moved onto the quays to get a better aim.[238] One account claims heavy shelling from a gun to the north of the Courts caused a fire in the block at the rear of the main building where the anti-Treaty headquarters was located.[239] Fewer has cast doubt on there being a gun positioned there at this stage of the battle but a hastily drawn map from the Mulcahy papers shows a gun positioned on Greek Street.[240] (map 2)

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[232] Some accounts claim the second pair of field guns arrived on the afternoon of the first day. Michael Fewer, *The Battle of the Four Courts*, (London, 2018), p. 186 Townsend, *The Republic*, p. 407.
[233] Army Command and General Staff College, *Tactics and technique of field artillery*, pp 158-9.
[234] Bidwell, *Gunners at war*, p. 38.
[235] Fewer, *The Battle of the Four Courts*, pp 195-6. Niall Harrington, 'The Four Courts guns' in *An Cosantóir*, xxxix, no.11 (Nov. 1979), pp 348-9, p. 349.
[236] Michael MacConnoran, photograph album and notes, 1922 (NLI, ALB161).
[237] Riccio, *The Irish Artillery Corps*, p. 8
[238] *Irish Times*, 1 July, 8 July 1922.
[239] Tom O'Reilly mentioned shelling from the Bridewell area behind the Courts, quoted in Younger, *Ireland's Civil War*, p. 329.
[240] Fewer, *The Battle of the Four Courts*, pp 222, 224. Rough map, undated (UCDA, Mulcahy papers, P7/B/107), p 232.

The discussion about the massive explosion that followed has raged for a century. Shellfire is unlikely to have been to blame, instead the most likely cause was the detonation of a store of anti-Treaty munitions in the headquarters block which was burning rapidly, although the Free State propaganda machine attributed the devastating blast to a mine detonated by the anti-Treaty side.[241] There is evidence that indicates Dalton believed the munitions factory was mined which caused him to delay the infantry assault to allow one of the 18-pounders to 'get' it before the troops went in.[242] However its position made it a difficult target, but this might explain a bizarre story recollected by Niall Harrington later which claimed the officer in charge of one of the guns on Winetavern Street raised 'his cap in a gesture of salute' having fired a shot 'the moment…the great explosion took place' as if he had accomplished his mission to destroy the munitions factory.[243] In truth, neither of the guns firing from the quays would have been able to hit the area where the munitions were stored.

The battle for the Four Courts was the only time during the war when 18-pounders were used together and it is likely that the four field guns that were taken from the British were deployed in some way. (map 3) A conservative estimate would suggest that between four and five hundred rounds were fired during the three days, at rates of fire that were the highest of the entire conflict.[244] Why then did the operation take so long? One of the main reasons was of course the poor-quality of gunnery. The officers who accompanied Dalton to collect the first pair of field guns from the British, as a group had extensive combat experience in the Great War and the War of Independence, but none of them were artillerymen.[245] (table 5) One, Col. A. T. Lawlor, had been training his men in Athlone with an old 15-pounder field gun, but Lawlor's knowledge was limited, his wartime service was with the Royal Flying Corps.[246] (fig. 8) The most qualified amongst the group was Captain Johnny Doyle, an Ordnance officer who had served in the Royal Navy as an armament artificer.[247] Lawlor, Doyle and some of Lawlor's men crewed gun number 10756, but they made elementary mistakes and sent the first round over the Four Courts as the gun skidded across the cobbles on Winetavern Street because they

[241] 'Irregulars explode mine' see *Irish Times*, 1 July 1922. *Irish Independent*, 5 July 1922.
[242] Richard Mulcahy, Attack on the Four Courts report, 30 June 1922 (UCDA, Mulcahy papers, P7/B/107), p. 229.
[243] Niall Harrington, 'The Four Courts guns', p. 349. Townsend, *The Republic*, p. 409.
[244] *Irish Times* 1 July 1922. History sheet, Memorandum of inspection, gun number 10756, 1918 (MA, Personal collections, Ivor Noone, PC 625). For images showing a large number of empty shell cases see Coogan and Morrison, *The Irish Civil War*, p. 168. Michael MacConnoran, photograph album and notes, 1922 (NLI, ALB161).
[245] *Irish Times*, 1 Nov. 2012. Harrington, 'The Four Courts guns', p. 348.
[246] Military Service Pension Record, Anthony Lawlor (MA, MSP, 1924A2). Boyne, *Emmet Dalton*, p. 140.
[247] Letter from Anna Palmer, daughter of John Doyle to author, 25 May 2020. Official notification of the promotion of John Doyle to Captain, Chief Armourer, 27 Feb. 1923, (Curragh Museum, Doyle family papers).

failed to dig in the spade.[248]

It has been claimed the gunners aimed by simply looking down the barrel with the breech open, though film footage shows layers using the open sights.[249] In any case fire was direct, ranges were short, the facade of the Four Courts was 450 yards long, 120 yards away across the Liffey from the guns. Although damage to the quay walls in front of the gun positions indicates that on occasion barrels were aimed too low.[250] (fig. 7) On Little Strand Street gunners failed to check for a clear line of sight in front of their 18-pounder and launched their first and only shell into a lamp post.[251] And in an incident that shows how naive some of the men were, shells were sent over the Courts to land in the grounds of the British HQ in the Royal Hospital when Captain Ignatius O'Neill began using the field gun to target a sniper near the dome of the building.[252] Like the Boers in South Africa, O'Neill was using the 18-pounder like a rifle, a characteristic perhaps of a soldier proficient in the use of small calibre weaponry but unused to artillery.[253]

Name	**Rank/previous experience**
Emmet Dalton	Major General, ex-Royal Dublin Fusiliers
Tony Lawlor	Commandant General, ex-Royal Flying Corps
Peader McMahon	Irish Volunteers 1916, IRA War of Independence
John Doyle	Captain, ex-Royal Navy
William Mullen	Private Free State army

Table 5. List of those who collected the guns from the British in the Phoenix Park on 27 June 1922. Mullen is the only soldier from the other ranks who was identified. (Harrington, 'The Four Courts guns', *Irish Times*, 1 Nov. 2012.)

What these incidents demonstrate is the haphazard way in which the 18-pounders were deployed. Dalton seems to have positioned the guns before he left them in the charge of an

[248] Harrington, 'The Four Courts guns', p. 348.
[249] Pathé Newsreel footage, Irish Film Institute Player online at https://ifiplayer.ie/battle-of-the-four-courts/ (28 Feb. 2020).
[250] Fewer, *The Battle of the Four Courts*, p. 145. Younger, *Ireland's Civil War*, p. 327. *Irish Times*, 1 Nov. 2012.
[251] *Irish Independent*, 1 July 1922.
[252] Younger, *Ireland's Civil War*, p. 326.
[253] Gudmundsson, *On artillery*, p.12.

officer – like O'Neill.[254] There was no fire plan, and the barrage was uncoordinated primarily due to hesitancy surrounding the infantry assault. Troops became weary, some were found asleep at their posts and by Friday 30 June the men were red eyed, deafened and exhausted.[255] At one point during the first day Dalton spent three hours manning one of the 18-pounders and as ammunition ran low that evening he ordered shells to be fired at a rate of one every fifteen minutes to 'make a noise', fearing 'his men would get disheartened and clear off' should the guns go silent.[256] Contemporary images show shrapnel and HE rounds mixed together and left rather carelessly on the street behind gun positions. (fig. 9) RFA gunners were instructed to group ammunition by type on the firing line so the haphazard way that rounds were left behind the Irish guns suggests that Free State gunners were not concerned about the type of ammunition they were firing.[257] After the bombardment the Provisional Government were keen to stress to the public that the gunners firing on the Courts were Free State soldiers.[258] But Republicans claimed the guns were crewed by Royal Artillerymen and this assertion has been repeated since.[259] The recent discovery of a RFA gunner's memoir suggests rather oddly that a single British howitzer fired two shots during the battle.[260] It is true that the British government were keen to throw everything at problem when it looked like the Free State was failing in its endeavour, but no mention of this incident appears in the London cabinet record. In fact when the huge numbers of rounds fired by the Free State guns are taken into account it simply does not make sense that one RA piece should risk involving the British in the conflict by firing two rounds.[261] There are claims also that the Free State gunners received some instruction from British officers on the ground.[262] British cabinet papers show that an officer of the Royal Artillery was giving Free State troops 'such information as they required in regard to the use of the 18-pounder guns'.[263] Still, it failed to speed up the operation. Macready may have

[254] Ibid., pp 148-9.
[255] Maurice Walsh, *Bitter freedom Ireland in a revolutionary world 1918-1923* (London, 2015), p. 357. *Irish Times*, 1 July 1922. Macready, *Annals of an active life*, p. 655.
[256] Boyne, *Emmet Dalton*, p. 148-9. Macready, *Annals of an active life*, p. 655.
[257] War Office, *Notes on gunnery* (London, 1918), p. 5.
[258] *Irish Times*, 3 July 1922.
[259] Neeson, *The Civil War in Ireland*, p. 117. Macardle, *The Irish Republic*, p, 749
[260] Mike Thompson, 'The British gunner and the Irish Civil War', 'Document' series, BBC Radio 4, 29 Oct. 2012, online at https://www.bbc.co.uk/programmes/b01nl67c (14 Oct. 2021). *Irish Times*, 30 Oct. 2012.
[261] The Creek claim caused some controversy amongst historians in 2012. *Irish Examiner*, 1 Nov. 2012. *Irish Times*, 1 Nov. 1922. *Irish Examiner*, 1 Nov. 1922. *Irish Independent*, 1 Nov. 1922.
[262] Fewer, *The Battle of the Four Courts*, pp. 130-1. Macardle, *The Irish Republic*, p. 749. Charles Townsend, 'Britain and the Irish Civil War' in Tommy Graham, Brian Hanley, Darragh Gannon and Grace O'Keeffe (eds), *The split, From Treaty to Civil War, 1921-3* (Dublin, 2021), pp 45-8, 47.
[263] Conclusions of conference of ministers, 2150 28 June 1922 (NAUK, CAB 23/39/34), p. 270.

thought it was a comparatively simple operation for British troops, but it did not turn out that way for the Irish.

Ammunition shortages caused problems also and Gen. O'Duffy made frantic calls to the British on the first day fearing 'the enterprise was lost' unless they got a resupply.[264] The shortage of ammunition was compounded by supplies of the wrong kind of shell. Shrapnel was of course completely unsuitable for this type of engagement and was 'ineffective against personnel behind cover…and', according to US Army instruction had 'no effect against material'.[265] It would have caused members of the defending garrison to be unimpressed by the initial barrage. The use of HE rounds later probably inspired one newspaper to report that the bombardment had resumed with 'renewed vigour' as heavier guns went into action.[266] Photographs taken during the early hours of the attack show where rounds struck the walls causing only minimal damage.[267] (fig. 10) Specialists in the Irish Defence Forces have concluded that this type of damage was consistent with the use of shrapnel.[268] On the other hand the HE shell was designed to cause damage to material through the force of its burst.[269] It struck the target with a greater 'kinetic energy density' than the shrapnel round and depended on its striking energy and detonation to cause destruction.[270] (appendix 4, Ordnance Young Officers' Course analysis) Photographic evidence shows that some shells penetrated the stone fabric of the building, probably before fragmenting inside.[271] (fig. 6) It is not clear when the first HE rounds arrived on the scene. It may have been during the afternoon of the first day of the battle.[272] Afterwards a reporter watched as the Chancery Street gun blew 'several large holes' in one of the walls.[273] O'Duffy was almost certainly exaggerating when he claimed that shells fired between 0700-0830 on the first morning shattered 'the entire front of the Courts' creating 'openings in the walls...as large as 7ft square'.[274] Only twenty rounds – probably of

[264] Macready, *Annals of an active life*, p. 655. Younger, *Ireland's Civil War*, p. 322.
[265] Army Command and General Staff College, *Tactics and technique of field artillery*, p. 38. .
[266] *Weekly Irish Times*, 8 July 1922.
[267] *Irish Independent*, 29 June 1922.
[268] 'The 25 & 26 Young Officer's Course, Analysis of the use of the 18-pounder field gun during the Battle of Dublin (unpublished, Ordnance School, DFTC, 2020), pp 8, 18.
[269] War Office *Textbook of ammunition*, p. 108. Army Command and General Staff College, *Tactics and technique of field artillery*, p. 37.
[270] The 25 and 26 Young Officer's Course, Analysis of the use of the 18-pounder field gun, p. 11. C. Beard, 'Fire and effect of modern artillery', p. 482.
[271] The 25 and 26 Young Officer's Course, Analysis of the use of the 18-pounder field gun, p. 8. G. Backstein, et. al., *Rheinmetal, Handbook on weaponry*, (Dusseldorf, 1982), p. 48.
[272] McLoughlin, *Kildare Barracks, from the Royal Field Artillery to the Irish Artillery Corps*, p. 154. Riccio, *The Irish Artillery Corps*, p. 11. Townsend, *The Republic*, p. 407.
[273] *Irish Times*, 1 July 1922.
[274] O'Duffy, Daily report of situation 28 June 1922, (UCDA, Mulcahy papers, P7/B/106), p. 1.

shrapnel - were handed over initially with the first two guns.[275] The arrival of a second pair of field guns on 28 June possibly coincided with a supply of ammunition though Dalton was still desperate for the fifty rounds of shrapnel he got from Macready that night.[276] Winston Churchill's research notes for his book *Aftermath* indicate that he believed Macready was unwilling to hand over large amounts of ammunition to the Free State.[277] By handing over shrapnel Macready held the advantage – with HE in reserve – should the guns get turned on his troops.

The 18-pounder quickly achieved notoriety after the Four Courts and the press accredited it with a role in the defeat of the Republican garrison holding the hotels on Gardiner Street on 2 July, but this position was more than likely neutralised with fire from a Stokes Mortar fired from the Loop Line railway bridge.[278] A field gun was deployed on O'Connell Street. A battle had been raging there for two days and Rolls Royce Whippet armoured cars, incendiaries, and rifle grenades were all employed in abundance. By Monday 3 July the anti-Treaty stronghold in 'the Block' was burning and Dalton was reporting that the army's cordon was tightening.[279] At around 1900 the next day an 18-pounder opened fire from a position on the corner of Henry Street facing 'the Block'. The object seems to have been to destroy completely the Republican position and avoid the need for an infantry assault.[280] Capitalising on the destructive effect of shellfire at exceptionally close range the barrage continued until the afternoon of 5 July.[281]

Within ten days of the first shells crashing against the walls of the Four Courts the Provisional Government had 18-pounders attached to military columns advancing from Dublin towards Drogheda, Blessington, Wexford and Roscommon.[282] It is of note that the headquarters of this onetime guerrilla army did not hesitate to send their new weapon into the field some distance from the capital.[283] The rapid nationwide descent into civil war saw anti-Treaty troops

[275] Riccio, *The Irish Artillery Corps*, p. 11. Younger, *Ireland's Civil War*, p. 322.
[276] Winston Churchill, *The world crisis, the aftermath* (London, 1929), p. 344.
Gillis, *The fall of Dublin*, p. 55.
[277] Winston Churchill, Research notes on events in Ireland 1919-24 (The Churchill Archive, University of Cambridge, CHAR 8/256).
[278] *Rounding up the Rebels*, Pathé Gazette, Issue 891, 6 July 1922. *Irish Times*, 8 July 1922. Neeson, *The Civil War in Ireland*, pp 126, 130. Sean Prendergast Bureau of Military History witness statement (MA, BMHWS 802), p. 25.
[279] Reports by Dalton at 1645 and 1830, Mon. 3 July 1922 (UCDA, Mulcahy papers, P7/B/106), pp 48, 55.
Gillis, *The fall of Dublin*, p. 97.
[280] 'The Block' included the Gresham, the Hamman and the Granville Hotels on the east side of O'Connell Street.
[281] *Irish Times*, 8 July 1922. *Offaly Independent*, 8 July 1922.
[282] Neeson, *The Civil War in Ireland*, p. 203.
[283] Riccio, *The Irish Artillery Corps*, p. 14.

seize ground in areas where Provisional Government forces were only thinly spread. To gain a foothold in these areas the Free State side had to capture major towns. Whilst artillery was not used on every occasion, battles for the cities of Limerick and Waterford and towns like Drogheda, Boyle, Collooney were quickly decided, often after days of fighting, once the 18-pounder arrived.

Field guns engaged anti-Treaty targets in 'deliberate' and 'encounter' attacks approximately thirty times during the first three months of the war. The deliberate attack was planned and used the artillery for cover whilst the encounter attack generally occurred when an enemy position was encountered as the force advanced.[284] From early on commanders in the field appreciated the potential that artillery offered. A 'field piece' was listed amongst the requirements for the 2 Southern Division in the Tipperary area as early as 1 July and Mulcahy received a request for artillery three days later from officers planning an assault on the anti-Treaty-held barracks in Tullamore.[285] An appeal from Donegal begged that 'urgent representations' be made to the British in Derry to have an 18-pounder handed over to a Free State officer from Buncrana; a few days earlier O'Duffy reported that it was not necessary to send artillery to the county.[286] And nearer Dublin, Commandant Bishop sent a message to headquarters looking for one of the field guns in order 'to succeed' when he partially surrounded a large body of Republicans at Blessington.[287] Bishop got his 18-pounder, but there is no evidence to suggest that it was used. A similar sense of desperation was apparent in Commandant McCarthy's requests for a gun to clear anti-Treaty troops from an area around Windgap, Co. Kilkenny.[288] In the end he made do without artillery. Sometimes simply having a gun in the column was enough. The Wexford expeditionary force left Dublin on 6 July armed with a field gun and armoured cars. Republican garrisons in Enniscorthy and Wexford town evacuated before the Free State column got there, in fact the very presence of an 18-pounder in the county caused anti-Treaty commanders some concern.[289] From the outset the Republicans knew that 'the Free State people can reduce any position with artillery' and during

[284] War Office, *Field service regulations 1920, vol. II, Operations* (London, 1920), pp 170-9.
[285] Requirements for 2 Southern Division, 1 July 1922 (UCDA, Mulcahy papers, P7/B/63), p. 151. Artillery was not required at Tullamore. 3 Southern Division Reports, 4 July 1922 (UCDA, Mulcahy papers, P7/B/106), p. 135.
[286] 1 Northern Division and 2 Southern Division Reports, 3, 4, 7, July 1922 (UCDA, Mulcahy papers, P7/B/106), pp 62, 129, 298.
[287] *Irish Times* reporter, reporting to Beggars Bush Barracks, 7 July 1922 (UCDA, Mulcahy papers, P7/B/106), p. 293. Duggan, *A history of the Irish army*, p. 86.
[288] Report from Col. Prout, Waterford, 24 July 1922 (UCDA, Mulcahy papers, P7/B/63), p. 129.
Report by adjutant Kilkenny Barracks, 3 Aug. 1922 (UCDA, Mulcahy papers, P7/B/109), p. 97.
[289] Hopkinson, *Green against green*, p. 144. Memo from Con Maloney to Ernie O'Malley, 13 July 1922 in in O'Malley and Dolan (eds), *'No surrender here!' The Civil War papers of Ernie O'Malley*, p. 52.

the fighting in Dublin some wanted to avoid that possibility by pursuing a guerrilla campaign.[290]

The shelling of Millmount in Drogheda on 4 July stands out because it was the first time an 18-pounder was deployed outside the capital. It took two days to transport gun number 10756 to the town. Republicans who had been holding the barracks on the hill since February were given a chance to surrender before any shots were fired.[291] Captain Johnny Doyle was once again in charge of the field gun, which was positioned on Dominic Street on the north side of the River Boyne, 1300 yards from the target.[292] He recorded that forty rounds were expended during the ten hour battle.[293] The long range and the elevated position of the target made this the most difficult shooting that Free State gunners had yet attempted, though Dalton, who was present, informed army HQ that the firing 'was splendid'.[294] In truth it was a clear shot, but problems engaging a target at such a height caused at least one of the ranging rounds to overshoot and land in the fields behind.[295] The division adjutant's report summed up the operation, 'breech blown in the outer wall. A storming party then entered but found the garrison had gone through a small gate in the rear'.[296] The deliberate attack neutralised Millmount, the outer wall was destroyed, and most impressively a gap twelve-feet-wide was opened in the ten-foot-thick wall of the Martello tower, which would indicate that HE shells were used. (fig. 11)

Another breaching operation took place in Limerick which was more straightforward than at Drogheda and mirrored the Four Courts attack with the 18-pounder positioned across the River Shannon from the Strand Barracks, firing directly and at very short range. Free State troops had been attacking the barracks for days before the field gun arrived in the city, but once the shelling began at 1100 on 20 July the battle was decided.[297] The front and rear of the building were holed by the same gun which had to take a 'circuitous route' to avoid enemy

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[290] Maurice Twomey to Liam Lynch, 3 July 1922 in O'Malley and Dolan (eds), *'No surrender here!' The Civil War papers of Ernie O'Malley*, p. 40.
[291] S. O'Sullivan to E. Command Intelligence officer, Occupation of barracks report, 18 July 1925 (MA, Truce Liaison Papers 15 Sept 21-25 May 1923, LE/18). Report from Division Adjutant, 1 Eastern Division, 5 July 1922 (UCDA, Mulcahy papers, P7/B/106), p. 189. *Irish Independent*, 16 June 1972.
[292] *Irish Independent*, 16 June 1972.
[293] History sheet, Memorandum of inspection, gun number 10756, 1918 (MA, Personal collections, Ivor Noone, PC 625).
[294] Report from Dalton, Drogheda P.O. 1835 4 July 1922, (UCDA, Mulcahy papers, P7/B/106), p. 189. .
[295] *Drogheda Independent*, 9 June 1972.
[296] Report from Division Adjutant, 1 Eastern Division, 5 July 1922, (UCDA, Mulcahy papers, P7/B/106), p. 189.
[297] *Irish Times*, 29 July 1922. Hopkinson, Michael, 'The guerrilla phase and the end of the Civil War' in John Crowley, Donal Ó Drisceoil and Mike Murphy (eds), *Atlas of the Irish revolution*, (Cork, 2017), pp 703-15, p. 730. P. J. Ryan, 'The fourth siege of Limerick: Civil War, July 1922' in *The old Limerick journal*, xxxviii, (winter, 2002), pp 4-35.

contact as it was transported through the city.[298] Photographs taken after the action verify that specific areas of the barracks' wall were targeted, and it is no coincidence that images from the Four Courts, Millmount and the Strand Barracks reveal similar ruptures in the masonry. (figs. 12 and 13) The 18-pounder was positioned that night ready to fire on the Castle Barracks the next morning but after nine days of severe fighting it was clear to Republicans that they could not holdout against artillery and they began to evacuate their remaining strongholds.[299]

The gun crew firing on the Strand Barracks were named as Col. Fraher, Jim Leddin and brothers, John and Michael McNamara, all Great War veterans who had served with the Royal Artillery.[300] The four were from Limerick and their recruitment is likely to have followed the Provisional Government's 'Call to arms' on 6 July.[301] The inexperience that was so much in evidence at the Four Courts caused Collins to seek gunners who had served during the Great War.[302] An army memo to divisional commandants on 4 July wanted to establish, amongst other things, 'full instructional staffs and [a] standing force in' artillery, and when Dalton opened communications with Mr. Walker of the British Legion he gave him a list of troops required that included 500 qualified artillerymen.[303] The improved use of the 18-pounder as the war progressed is explained by the enlistment of ex-Royal Artillerymen. At the same time small numbers of recruits were being trained in the Curragh for the volunteer reserve as artillery. About one hundred soldiers were made ready for service before the changing nature of the war caused training to be postponed and the volunteers were deployed 'on mounted service duties'.[304] They may have completed their horsemanship training, but 'the absence of a gun for instructional purposes' meant they could only have received the most basic gunnery instruction.[305] The guns were of course deployed throughout the country at the time. The army census, taken in November 1922 classified 124 soldiers as 'artillery', located in seven different barracks.[306] It is of note that they were in barracks that were the primary post in the areas where

[298] Younger, *Ireland's Civil War*, p. 381.
[299] Hopkinson, *Green against green*, p. 150. .
[300] Ryan, 'The fourth siege of Limerick: Civil War, July 1922', p. 18.
[301] Carlton Younger, *A state of disunion* (London, 1972), p. 153.
[302] Hopkinson, *Green against green*, p. 120.
[303] Richard Mulcahy, Memo to Divisional Commandants, 4 July 1922 (UCDA, Mulcahy papers, P7/B/50), p. 80. Michael Whelan, *Allegiances compromised, Faith honour and allegiance ex-British soldiers in the Irish Army 1913-1924* (Dublin, 2010), p. 90
[304] Report on condition of training, 12 Aug. 1922 (UCDA, Mulcahy papers, P7/B/41), p. 5. Report on condition of training, 9 Dec. 1922 (UCDA, Mulcahy papers, P7/B/50), p. 10.
[305] Report on condition of training, 5 Aug. 1922 (UCDA, Mulcahy papers, P7/B/50), p. 42.
[306] The author was gratefully assisted with this research by Jack Kavanagh, Maynooth University. See Irish army census collection online at https://census.militaryarchives.ie/, (May-July 2020).

the field gun had been deployed earlier in the conflict which probably identifies the location of the 18-pounders at that time.[307] (table 6)

Location	**Number of personnel identified as artillery**	**Ranks**	**Distribution of 18-pounders in army commands, Aug. 1922**
Engineers Barracks, Curragh Camp	87	13 x NCOs, 74 x 'Volunteers'	Training only in the Curragh in Aug. 1922, no gun available
Portobello Barracks, Dublin	6	2 x NCOs, 4 x 'Gunners'	2 guns in Eastern Command
Custume Barracks, Athlone	5	1 x officer, 1 x NCO, 3 x 'Privates'	2 guns in Western Command
Victoria Barracks, Cork	15	1 x officer, 6 x NCOs, 8 x 'Volunteers'	3 guns in South-Western Command
New Barracks, Limerick	9	3 x NCOs, 6 x 'Gunners'	
Tralee Barracks	10	1 x officer, 2 x NCOs, 7 x 'Gunners'	
Clonmel Barracks	17	1 x NCO, 13 x 'Gunners'	1 gun in 2 Southern Command

Table 6. Showing the post and number of personnel identified as artillery in November 1922 and the positions of the 18-pounders four months earlier. (Information from 1922 Army Census and Mulcahy papers)

Limerick was at one end of the hypothetical line that discerned the frontier of the loosely named 'Munster Republic', Waterford was at the other and the deployment of an 18-pounder there revealed gunners with some experience in the way they operated the weapon. Waterford was the only citywide bombardment of the war. Technically the shelling of the two military barracks, Ballybricken Gaol, and other Republican positions was a more difficult task than the breaching operations mentioned above, but the failure by the anti-Treaty occupiers to secure Mount Misery on the north bank of the Suir River left them vulnerable to an artillery attack by providing the perfect position for the field gun. Col.-Comdt. John Prout was in charge of the column that left Kilkenny for the southern city with an 18-pounder and 100 rounds.[308]

[307] Approximate dispositions of post-Treaty supplies, 4 Aug. 1922 (UCDA, Mulcahy papers, P7/B/41), p. 67.
[308] Col.-Comdt. Frank Thornton, report for adjutant general, 20 July 1922 (UCDA, Mulcahy papers, P7/B/63), pp 139-41.

Commandant Patrick Paul, an ex-Royal Artillery officer was in charge of the gun. He was confident the morale effect would work believing 'the effects of high-explosives on men who had never known them can be imagined'.[309] He was wrong; the fight lasted for three days, and the gun had to be repositioned twice to provide close support for the infantry. Interestingly the piece was positioned first on the reverse slope of Mount Misery on the morning 19 July, to fire indirectly into the city. This would suggest the weapon was at least fitted with a clinometer and was laid using the ranging gear.[310] However after a few shots it was realised that this action would cause a massive amount of damage to private property, so the gun was moved to the crest of the hill where the towers of the prison were used as reference points.[311] Shrapnel was fired for adjustment before HE was fired for effect to destroy the enemy positions, though there were accounts of homes and other buildings being struck by shellfire.[312] Whilst the gun crew appeared competent, the preliminary bombardment – used to soften up the enemy before an attack - was lengthy. The next day the gun had to be moved to support the infantry assault on the town. Six shells were 'pumped' into the post office at 250 yards. In this way the gun was deployed in a role that was described in US artillery doctrine as an 'emergency' weapon, to assist the attacking infantry.[313] On the last day of the battle the 18-pounder was moved into another dominant position on the railway bridge to fire on the anti-Treaty post in the gaol, this time with just five rounds.[314] By then Republicans were withdrawing from the city.

Maj. Gen. Seán McEoin's force in the west was one of the first to receive a field gun. He used it to secure Boyle in a simple yet effective combined arms manoeuvre on 5 July, supported by the Rolls Royce armoured car the *Ballinalee*. In the week that followed the 18-pounder took on a new significance when McEoin's firepower was drastically reduced with the loss of the *Ballinalee* to the enemy during an ambush.[315] The artillery piece was used next during the Free State assault on Collooney on 15 July.[316] As McEoin positioned the gun on the edge of the town his gunners came under fire from an anti-Treaty machine gun position in the tower of St. Paul's Church.[317] At a range of 300-400 yards Sergeant Cassidy,

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[309] Riccio, *The Irish Artillery Corps*, p. 14. Neeson, *The Civil War in Ireland*, p. 167.
[310] The gun was laid for elevation using the sight clinometer and range drum, and for line using an aiming point. Bethell, *Modern artillery in the field*, pp 151-2.
[311] Neeson, *The Civil War in Ireland*, p. 166. Riccio, *The Irish Artillery Corps*, p. 14. *The Munster Express*, 29 July 1922.
[312] *Munster Express*, 29 July 1922.
[313] US Army command and General Staff College, *Tactics and technique of field artillery*, p. 201.
[314] *Munster Express*, 29 July 1922. *Irish Times*, 24 July 1922.
[315] Hopkinson, *Green against green*, p. 159.
[316] Collooney's civilian population were allowed leave before the attack.
[317] A pair of Lewis machine guns were controlling the southern approach to the town. Michael Farry, *The aftermath of revolution, Sligo 1921-23* (Dublin, 2000), p. 78.

> levelled the gun…the first shell went straight through a window in the belfry and exploded. Every bell rang and the whole of the top of the tower was blown up into the air, sandbags, machine guns, Irregulars and all, and it landed and got jammed in its usual place, just as if nothing had happened.[318]

The damage to the church suggests that McEoin was exaggerating slightly but Cassidy's shot neutralised the position.[319] The gun was not used again although the fight continued for several more hours, but its brief deployment must have helped to convince the local anti-Treaty commander Frank Carty, to order the evacuation of all towns in his brigade area after the loss of Collooney.[320] Tactically the use of the gun in the west was unambitious, there was a shortage of ammunition, and only a limited number of rounds were fired during engagements. McEoin's depiction of the piece as 'an old 18-pounder' suggests he failed to grasp the true potential of the weapon.[321] In reality, due to the large area of operations under his command, the Maj. Gen. could have deployed a second artillery piece.[322] An 18-pounder was attached to the first seaborne force to land behind enemy lines at Westport on 24 July, but that gun was immediately recalled for duty elsewhere after the landing was made without opposition.[323] The fall of Crossmolina and Ballina to a Free State column towing McEoin's 18-pounder in the preceding days might have assured army commanders that one piece of artillery was enough in the west.[324]

To the north the 'repeated' requests for an 18-pounder from the British in Derry made by Donegal Free State commander Joe Sweeney, were answered when the *Helga* arrived from Dublin on 15 July with a resupply that included an artillery piece and two Rolls Royce armoured cars.[325] The field gun was put into action almost immediately firing a short preliminary bombardment at Inch fort from Fahan on Inishowen. Sweeney appears to have been keen to deal with the enemy-held position before turning south to face Republicans in

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[318] Younger, *Ireland's Civil War*, pp 364-5.
[319] Joseph McCormick Western Comd HQ Athlone, Compensation Repair to Protestant Church at Collooney damaged by artillery (MA, DOD-A-07233).
[320] Hopkinson, *Green against green*, p. 159.
[321] Younger quotes McEoin a lot. On another occasion the gun is described as 'a very ancient 18-pounder'. Younger, *Ireland's Civil War*, pp 364, 466-7.
[322] Hopkinson, *Green against green*, pp 212, 216.
[323] P. V. Walsh, 'The Irish Civil War, 1922-1923: A military study of the conventional phase, 28 June-11 August, 1922' paper delivered to New York Military Affairs Symposium, online at http://bobrowen.com/nymas/irishcivilwar.html (4 Jan. 2020).
[324] Sinéad Mitchell, 'County Mayo in the Irish civil war: 1922-3' (M. A. Thesis, Maynooth University, 2003), p. 32.
[325] General Macready, Report on situation in Ireland, 15 July 1922, (NAUK, CAB 24/138/21), p. 108.

Glenveagh.[326] At 3,000 yards this was one of the longest ranges taken on by Free State artillerymen during the war and although the target was distant it was clearly visible on the headland of Inch Island and with sea on three sides the risk of collateral damage from shellfire was greatly reduced.[327] However just four rounds were fired before the gun was put out of action by mechanical trouble and the attack was left to the infantry.[328] To rectify the problem Sweeney had to seek assistance from the British in Fort Dunree which delayed his advance towards Glenveagh.[329] (see chapter II for condition of gun) There are no reports that the field gun was fired again in the county and Sweeney seems to have lost confidence in the weapon preferring instead to get another Whippet.[330]

Sweeney's 18-pounder was one of a pair of Mark I variants that were handed over in early July. By the end of the month there were eight field guns in the Free State arsenal, four of each variant.[331] A fifth Mark I arrived before the end of August.[332] Their distribution was dictated by the expectation of stiff resistance, but also by availability, whilst on the ground tactically their deployment depended on the threat that was encountered. Army headquarters can be seen shunting artillery around as required. After the battle for Waterford, the 18-pounders were deployed almost entirely as accompanying artillery, supporting Free State columns advancing into enemy territory.[333] In this role they saw more action during encounter attacks. Most commanders, though generally ignorant about artillery tactics, seem to have understood the potential of the field gun and deployed it as one of their weapon options when necessary. Battle fronts generally were not wide which meant the 18-pounder was never 'remote' in relation to the force it was supporting, and this makes the Irish situation somewhat unique.[334]

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[326] Hopkinson, *Green against green*, p. 161. Younger, *Ireland's Civil War*, p. 360. Robert Lynch, 'Donegal and the joint IRA Northern Offensive, May-November 1922' in *Irish historical studies*, xxxv, no.138 (Nov. 2006), pp 184-99, p. 192.

[327] *Irish Times*, 17 July 1922.

[328] Secretary of state for war, Report on the situation in Ireland week ending 22 July 1922, 28 July 1922 (NAUK, Cabinet Papers, CAB 24/138/34), p. 2.

[329] Phone message received from Commandant-General Sweeney, 24 July 1922, (UCDA, Mulcahy papers, P7/B/107), p. 154. Secretary of state for war, Report on the situation in Ireland week ending 22 July 1922, 28 July 1922 (Cabinet Papers, CAB 24/138/34), p. 2.

[330] Phone message received from Commandant-General Sweeney, 24 July 1922, (UCDA Mulcahy papers P7/B/109), p. 159.

[331] Approximate dispositions of post-treaty supplies, 4 Aug. 1922 (UCDA, Mulcahy papers, P7/B/43), p. 56.

[332] Townsend, *The Republic*, p. 423.

[333] US Army command and General Staff College, *Tactics and techniques of field artillery*, pp 198-201.

[334] Griffith uses the term 'remote' to describe how the artillery during the Great War remained separated from the infantry. Griffith, *The battle tactics of the Western Front*, p. 24.

British military doctrine was eager to establish command-and-control between the arms, this was not relevant to the Free State commander whose artillery piece was always close by and directly under his control.[335] This was evident in the way the guns were used in Ireland. The small, localised engagements made direct fire more practicable and the close support of the artillery more intimate.[336] In west Limerick Brigadier Tom Keogh refined a combined arms strategy to take the towns of Adare, Rathkeale and Newcastle West using the infantry to secure a position for the field gun, which then neutralised the main resistance before the armoured car led the infantry assault on the town.[337] Leaving Waterford for Clonmel, Prout followed British *Field Service Regulations* by positioning the 18-pounder at the rear of the advance guard, the perfect place when expecting an encounter attack, and on hand to deal 'with hostile machine guns'.[338] One of McEoin's more daring uses of the field gun took place during a massive operation to clear Republicans from an area north of Sligo in September. The gun was attached to one of the columns that was halted at the bridge at Drumcliffe which had been destroyed. On the far side of the river the *Ballinalee* waited menacingly, so the gun was 'ordered up'. It was an interesting standoff, the first where pro-Treaty artillery faced anti-Treaty armour, though without a shot being fired the *Ballinalee* backed off, to McEoin's 'pleasant surprise'.[339] Further up the road the artillery piece was employed again when at Milltown 'a well-placed shell' forced the withdrawal of Republican troops with the *Ballinalee*.[340]

The intimacy between the lone Free State 18-pounder and the rest of the force was well demonstrated on two occasions when small columns of National Army troops used the artillery piece against an enemy ambush. On 8 August at Killasser, County Mayo the gun was used in a counteroffensive manoeuvre against a Republican force lying in wait to attack a Free State column. In charge of the operation was McEoin's second-in-command, Four Courts veteran A. T. Lawlor.[341] The evidence suggests the fight opened with a couple of rounds from the 18-pounder taking the ambushers completely by surprise on the flank, sending them fleeing across nearby bogland.[342] Ten days later in Kerry along the Killarney-Rathmore road a motorised Free

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[335] War Office, *Field service regulations 1920*, pp 145-6, 171, 218. Headlam, *The history of the Royal Artillery from the Indian Mutiny to the Great War Vol. II, 1899-1914* (Woolwich, 1937), pp 222-3. H. Rowan-Robinson, *Artillery today and tomorrow* (London, 1928), p. 24.
[336] In some ways this was a reversion to the tactics of an earlier pre-WWI age, see Bailey, *Field artillery and firepower*, p. 120.
[337] Keogh's strategy showed how close the three arms were working together. Michael Dore, 'The taking of Newcastle West in the Civil War' in *Newcastle West Historical journal* (1987), p. 10.
[338] *Irish Times*, 4 Aug. 1922. War Office, *Field service regulations 1920*, pp 121, 171.
[339] Younger, *Ireland's Civil War*, p. 467.
[340] Ibid.
[341] Dominic Price, *The flame and the candle, War in Mayo 1919-1924* (Cork, 2015), p. 217.
[342] *Irish Independent*, 10 Aug. 1922.

State column was attacked, but once the source of the incoming fire was identified it was swiftly dealt with, first with the Rolls Royce's machine gun, then with a few shells from the 18-pounder. It was a perfect combined arms operation, and compares – though on a much smaller scale - to the Horse Artillery's cavalry-style employment of the field gun where quick actions and direct fire were not unusual.[343] In Kerry Republicans would proudly claim it was the only time artillery was used in the east of the county.[344] Both incidents occurred as the anti-Treaty side was turning to guerrilla tactics, but they demonstrated that there was still a role for artillery in the Free State Army's battle plan at this stage of the war.

One of the primary targets for the accompanying field gun, according to field artillery doctrine was the enemy machine gun position.[345] There are plenty of accounts about the Free State advance stalling before anti-Treaty machine guns which were subsequently neutralised with fire from the 18-pounder. The infantry assault on Bruree was delayed by a Republican machine gunner near the railway line.[346] An artillery piece was dragged by hand into a field and dug in about 800 yards from the enemy.[347] The first shell landed 30 yards short but, was correct for line, the second was 'Bang on the target' according to a newspaper correspondent who thought there had been too long a gap between shots, which allowed the machine gunner time to escape.[348] It was enough however and Free State troops entered the town soon after. In the east of the country a National Army column clearing the area north of Dundalk came under fire from a machine gun on Trumpet Hill near Ravensdale. In response, the 18-pounder – a Mark I variant - fired six rounds, an excessive number that must have included ranging shots.[349] In Waterford Prout was attacked on his right flank during his march between Carrick-on-Suir and Clonmel on 8 August by a machine gun positioned in the ruin of Kilcash Castle.[350] The Waterford 18-pounder was brought into action covered by fire from a Free State Lewis gun, and two shrapnel rounds at a range of around 2000 yards were exploded above the building. They were followed by one HE which went right through the wall where the anti-Treaty gunner

[343] E. L. Sibert, 'Campaign summary and notes on horse artillery in Sinai and Palestine' in *The field artillery journal*, xviii, no.3 (May-June 1928) pp 263-5, pp 268-9.
[344] Tom Doyle, *The Civil War in Kerry*, pp 147-8. Tom Doyle, *The summer campaign in Kerry*, pp 70-1.
[345] US Army command and General Staff College, *Tactics and techniques of field artillery*, p. 201. Sibert, 'Campaign summary and notes on horse artillery in Sinai and Palestine', p. 268. C. T. Beckett, 'The close support of infantry' in *Royal United Services Institution Journal*, lxxvi, no.501 (1931), pp 137-44, p. 139.
[346] Pinkman complained that the gun had to come from Bruff. John Pinkman, *In the Legion of the vanguard* (Cork, 1998), p. 156.
[347] *Irish Times*, 31 July 1922. Neeson, *The Civil War in Ireland*, p. 227. Murphy, 'General W. R. E. Murphy and the Irish Civil War', p. 10.
[348] *Irish Times*, 31 July, 5 Aug. 1922.
[349] Report from Dundalk Barracks, 20 Aug. 1922 (UCDA, Mulcahy papers, P7/B/109), p. 49.
[350] Younger, *Ireland's Civil War*, p. 400.

had been, provoking a cheer for Sergeant Kavanagh, who proved himself to be a capable layer.[351]

Incoming machine gun fire from the Protestant church tower outside Adare held up the three Free State commanders Michael Keane, Jim Slattery and Tom Keogh during the advance into west Limerick on 4 August. Republicans in the town had established their defences in depth, the 'finest you could possibly get' with positions in the church, the Dunraven Arms Hotel and in woods on both sides of the road.[352] Keane and Keogh were convinced they had to shell the town to avoid high casualties on their side, but the machine gun made it difficult to position the 18-pounder.[353] A combination of sources which includes film footage of the gun in action show that the 18-pounder deployment was almost flawless. The gunnery officer selected the firing-point, and the weapon was towed into place by the Whippet.[354] The gun crew operated with skill, footage shows each member in the correct position, and the layer relaying using the open sight.[355] The church tower was hit and holed, three rounds hit the Dunraven Arms and another two were fired at the town hall.[356] However in the rush to get into action a fence post in front of the gun went unnoticed and before a shot was fired one of the crew had to run forward with an axe under fire to clear the obstruction.[357] The after-action report exclaimed that 'Lt. Treacy was in great form with the big gun. He never missed his object even once'.[358]

It was inevitable that guns and gunners should become targets during the war. One member of the gun crew at the Four Courts was hit by small arms fire and Lawlor remembered the bullets hopping off the cobblestones 'flying in all directions'.[359] Another gunner, Captain MacNabola, was wounded by a gunshot at Boyle.[360] The Irish 18-pounders were deployed so close to the enemy that they were frequently within range of small arms fire (appendix 5 list of engagements, Civil War, see for ranges at which the guns were fired) and gun crews quickly learned to take cover behind the field gun's shield with its upper and lower hinged attachments

[351] *Irish Independent*, 12 Aug. 1922. *Irish Examiner*, 14 Aug. 1922. Neeson, *The Civil War in Ireland*, p. 189.
[352] The report on the operation is unsigned but it is likely to have been written by Keogh. Report on Adare operation, 7 Aug. 1922 (UCDA, Mulcahy papers, P7/B/68), pp 16-8.
[353] Ibid.
[354] *Irish Times*, 12 August 1922.
[355] *Mopping up. Battle of Adare*, (Pathé Gazzette, 10 August 1922) online at Irish Film Archive https://ifiarchiveplayer.ie/mopping-up/ (1 Dec. 2021).
[356] Hopkinson, *Green against green*, p. 152. O'Callaghan, *The battle for Kilmallock*, p. 129.
[357] *Irish Times*, 12 August 1922.
[358] Report on Adare operation, 7 Aug. 1922 (UCDA, Mulcahy papers, P7/B/68), pp 16-8.
[359] Younger, *Ireland's Civil War*, p. 324. Nevil Macready, *Annals of an active life*, p. 656.
[360] *The Sligo Champion*, 22 July 1922. *Irish Times* 7 July 1922.

in place. (fig. 14) The armoured plated shield was designed to protect against a rifle bullet at 500 yards - another design stipulation that came from the bitter experience of the Boer War - though there were claims that gun shields at the Four Courts were dented and pierced by incoming fire.[361] A thorough examination of the shield on gun number 9168 has indicated that though it was one of the guns that was handed over in June 1922 it was not damaged by small arms fire.[362] In Waterford 'Gunner Kavanagh' was unlucky enough to be wounded when a bullet passed through the sighting aperture of the shield.[363] Newsreel from Limerick shows gunners cowering behind the shield as they fired, and footage of the Bridge Street gun at the Four Courts suggests the gun crew were being fired upon at the time as officers and men can be seen taking cover behind the armoured Lancia whilst the firer (normally the number three in the crew) operated the trigger with the lanyard from a position well behind the piece where it was safer.[364]

The Lancia was used on numerous occasions to protect gunners. At the Four Courts O'Malley watched as 'two cars made a V slit, a loophole through which the muzzle of the gun protruded', recoiling between the gap as it fired.[365] It required two Lancias to protect the gunners on Chancery Street as they dug in and once the gun on O'Connell was positioned correctly to hit 'the Block' a second Lancia was parked to protect its right flank.[366] Prout's gun, firing on Waterford was also shielded by an armoured car and the operation order for the fighting at Kilmallock specifically stated that a Lancia was to 'act as escort' for the field gun.[367] The Lancia was the prime-mover for the 18-pounder during the war and as such it was fitting that it should provide cover just as the limber wagon did for RFA gun crews.[368] (fig. 15) Republicans in the Four Courts tried to get around the these protective measures by spattering 'bullets off the paved roadway...in front of the cars…to make the bullets ricochet and zing upwards towards the gunners'.[369] This is probably how Captain Johnny Doyle got shot in the

[361] Bethell, *Modern artillery in the field*, p. 31. Len Trawin, *Early British Quick Firing artillery* (Hertfordshire, 1997), p. 248. *Irish Times*, 1 July 1922. O'Duffy, Daily report of situation 28 June 1922, (UCDA, Mulcahy papers, P7/B/106), p. 1.
[362] This would indicate the gun was deployed – if at all - in an area and at a time when anti-Treaty small arms fire could not hit it.
[363] *The Munster Express*, 29 July 1922.
[364] 'The shelling of the Four Courts' (Topical Film Company, 1922) online at Irish Film Archive https://ifiarchiveplayer.ie/shelling-of-the-four-courts/ (12 Jan. 2022). It was recommended that the lanyard be used only for emergencies. War Office, *Handbook for the 18-pr Marks I to II guns*, p. 48.
[365] O'Malley, *The Singing Flame*, p. 134.
[366] Coogan and Morrison, *The Irish Civil War*, p. 183.
[367] *The Munster Express*, 29 July 1922. General W. R. E. Murphy, Operation Order No.6, for the attack on Kilmallock, 3 Aug. 1922 (UCDA, Mulcahy papers, P7/B/68), p. 65.
[368] Riccio, *The Irish Artillery Corps*, p. 10
[369] O'Malley, *The Singing Flame*, p. 134.

leg.[370] The gun commander on Chancery Street, Phil Hyde, had a low wall of sandbags placed in front his weapon to prevent this happening; he was determined not to expose his men to any more enemy fire.[371] During the retaking of Dundalk on 17 August, shots were fired on the Lancia towing the 18-pounder as it worked its way through the town and an attempt was made to explode a mine near it, killing a civilian but causing no damage to the gun or its prime mover.[372]

Official doctrine recommended that field guns operating at battery level should provide cover for each other when moving position during an engagement, but the single-gun actions in the Civil War left the Irish gunners dependent on other arms.[373] On the railway bridge in Waterford the 18-pounder could only be emplaced with the help of a sergeant manning a Lewis gun on the back of a Lancia, and the Rolls Royce armoured car was the only way to get the Adare 18-pounder into position due to the heavy fire from the church tower.[374] Republicans knew once the field gun opened fire their position would become untenable and their chief objective at Rathkeale was to prevent that happening.[375] At Newcastle West the whole operation dragged on for twelve hours because the pro-Treaty Dublin Guard struggled to secure a firing position for the artillery.[376]

Early in the war the anti-Treaty commander Liam Lynch was provided with information about the 'movements of the big guns and a means of taking them', but nothing seems to have come of it.[377] Afterwards he appeared eager to make some form of demonstration by capturing or destroying a store of 18-pounder ammunition in the hope that the British would be forced to openly hand over a new stockpile to the Provisional Government.[378] The supply of shells was never interrupted but the intention to embarrass the government was clear in Republican propaganda that described 'the Free Staters in Dublin…using England's big guns'.[379] Lynch hankered after artillery, even later in the war when his side were fighting a guerrilla campaign

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[370] Letter from Anna Palmer, daughter of John Doyle to author, 25 May 2020.
[371] Extra sandbags were sent for. Frank O'Connor, *An only child* (London, 1961), p. 97.
Fewer, *The Battle of the Four Courts*, p. 187.
[372] *Irish Times*, 18 Aug. 1922.
[373] US Army command and General Staff College, *Tactics and technique of field artillery*, p. 207.
[374] Sergeant Howlett paid the ultimate price for his action. *Irish Times*, 24 July 1922. Neeson, *The Civil War in Ireland*, p. 172.
[375] *Irish Times*, 12 Aug. 1922. O'Callaghan, *The battle for Kilmallock*, p. 129.
[376] Michael Dore, 'The taking of Newcastle West in the Civil War' in *Newcastle West Historical journal* (1987), pp 10-11. *Limerick Chronicle*, 8 Aug. 1922.
[377] Report by D. O'C (M/O Blessington) to Liam Lynch, 10 July 1922 in O'Malley and Dolan (eds), *'No surrender here!' The Civil War papers of Ernie O'Malley*, p. 47.
[378] Memo from Lynch to O'Malley, 3 Aug. 1922 in O'Malley and Dolan (eds), *'No surrender here!' The Civil War papers of Ernie O'Malley*, p. 84.
[379] *Irish Examiner*, 7 July 1922.

and he was convinced that if they could get even 'one piece of artillery now…which could be moved round amongst our strong force' it would demoralise the enemy and end the war.[380] There were attempts to manufacture mortars on the Republican side, but they were not particularly successful and some were captured before they made it into the field.[381] One was used during an impressive anti-Treaty attack on Macroom in September and the subsequent deployment of an 18-pounder from Cork to support Free State troops in the town may have been the only time during the war that a field gun could be said to have been involved in an artillery duel.[382] At the time it was claimed that there were casualties on the Republican side but there is no evidence to suggest that the 18-pounder actually engaged the mortar position.[383]

It is important to mention at this point the casualties that are known to have occurred due to shell fire. Considering the number of shells fired at the Four Courts casualties there were extremely low, though shrapnel wounds are mentioned and some of those involved suffered with shell shock later.[384] The only Republican fatality at Collooney surprisingly was not due to the artillery strike on the church tower.[385] The shelling of the quarries outside Kilmallock caused 'severe casualties' according to locals and at least one Republican was wounded during the brief engagement at Ravensdale near Dundalk, but surprisingly it seems that most of those on the receiving end of the 18-pounder's fire survived.[386] The only death that is specifically attributed to an artillery attack was that of Mary Hartney, a member of Cumman na mBan who was stationed in the Republican aid post in Adare.[387] The lethal effect of shell fire tragically left her two daughters without a mother.[388]

Republicans regularly used woodland for cover during the war which is unsurprising considering their previous guerrilla activities against the British, but it was ineffective in the face of an enemy armed with artillery. On two occasions in the west anti-Treaty garrisons evacuated big houses and sought sanctuary in woods nearby only to be subjected to a mini

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[380] Ryan, *The real chief*, p. 184. Liam Lynch to Joseph McGarrity, 5 Feb. 1923 (NLI, McGarrity papers, MS 17455/5).
Seán Moylan to McGarrity, 24 May 1923 (NLI, McGarrity papers, MS 17466/1/8). O'Halpin, *Defending Ireland*, pp 28-9.
[381] It was reported that a workshop where the mortars were being made was discovered in Cork. *An tÓglach*, 26 Aug. 1922, p. 3.
[382] *Westmeath Independent*, 9 Sept. 1922.
[383] *Evening Echo*, 4 Sept. 1922. Newspaper report on the battle at Macroom, 6 Sept. 1922 (UCDA, Mulcahy papers, P7/B/10), p. 79.
[384] It is not clear if the shrapnel wounds were from 18-pounder shrapnel bullets. Military service pension record, John Salinger (MA, DP2506). Fewer, *The battle of the Four Courts*, p. 161.
[385] Townsend, *The Republic*, p. 429.
[386] Narrative of Kilmallock operations (UCDA, Mulcahy papers, P7/B/68), p. 22. Report from Dundalk Barracks, 20 Aug. 1922 (UCDA, Mulcahy papers, P7/B/109), p. 49.
[387] Hopkinson, *Green against green*, p. 152. O'Callaghan, *The battle for Kilmallock* (Cork, 2011), p. 129.
[388] Statement Madge Daly (MA, Bureau of Military History, BMHWS0855).

barrage. In the first instance the town of Castlerea was taken without much difficulty on the morning of 21 July by a Free State force under Lawlor who allowed the 18-pounder to lag behind due to the number of roadblocks, but the gun was brought up later to deal with Republicans who had retreated to the Clonalis estate, the local 'headquarters of the Irregulars'.[389] Reports suggest they quickly fled from the big house as the gun approached and 'retired under shellfire' into woodland nearby.[390] Rahelly House, the anti-Treaty HQ for the area north of Sligo, was also abandoned when the 18-pounder was brought up during McEoin's massive operation to clear the area in September. On that occasion *The Sligo Champion* recorded the scene with a clear bias,

> The wooded heights on which the Irregulars had taken shelter were shelled by the 18-pounder gun and for the first time in history the picturesque hills around echoed to the sound of artillery fire. A few shells were discharged, and at the time it could not be ascertained what damage if any had been done. The fire may have been more awe-inspiring than destructive, but it certainly was very much the former.[391]

In truth McEoin at the time only had a few shells left in his arsenal.

A news correspondent at Adare described the scene there as the Free State gun crew loaded 'shrapnel instead of explosives' and consequently '"watered" the woods with a fountain spray of round bullets'.[392] His flippant observation failed to depict the real effect of shrapnel fire on wooded areas. A contemporary source described how the bullets glanced off the trees and flew in all directions.[393] This might explain how the casualty occurred on Trumpet Hill. During the Civil War woodland barrages were always brief, and it is likely those on the receiving end melted away after the first round. A whole section of Prout's force was held up with a flank attack from Cregg Wood outside Carrick-on-Suir by an extended line of snipers spread out between the trees armed with rifles and Thompson sub-machine guns.[394] The fighting was intense, but surprisingly the 18-pounder was not brought up till the next day. Fire was directed by an observer in a tree and a few shells were enough to end the attack.[395] The same field gun fired into Ballyknockan woods on the slopes of Slievenaman when Republicans

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[389] The taking of Castlerea was described in the after-action report as 'an outpost affair'. Report No.1 Column, 0530 21 July 1922 (UCDA, Mulcahy papers, P7/B/109), p. 191. Hopkinson, *Green against green*, p 160.
[390] *Irish Times*, 22 July 1922. Newspaper correspondents made all kinds of assumptions about why the big house was undamaged during the engagement, even suggesting that the artillery was firing blank ammunition. *Westmeath Independent*, 5 Aug. 1922. *Irish Times*, 25 July 1922. Commandant-General Lawlor's dispatch 2115, 21 July 1922 (UCDA, Mulcahy papers, P7/B/109), p. 179.
[391] *The Sligo Champion*, 23 Sept. 1922. Hopkinson, *Green against green*, pp 215-6
[392] *Irish Times*, 12 August 1922.
[393] Bethell, *Modern artillery in the field*, p. 367.
[394] Neeson, *The Civil War in Ireland*, p. 183. Duggan, *A history of the Irish army*, p. 92.
[395] *Irish Times*, 5 Aug. 1922. *Irish Independent*, 22 Sep. 1922.
Prout to GHQ, Carrick-on-Suir, 4 Aug. 1922 (UCDA Mulcahy papers P7/B/63), p. 97.

retreated there after an attack on the Free State column from the village of Ballypatrick. The attackers were trying to delay Prout's advance into Clonmel, but once again a few shells were all that was required and the engagement ended almost as soon as it began.[396]

By far the most coordinated and proficient deployment of an 18-pounder during the war was during the battle for Kilmallock. It was part of a larger operation, that included the attack on Adare, to commence on the 4 August. It has been described as one of the most prolonged and possibly the most decisive battles of the entire field campaign.[397] Maj. Gen. W. R. E. Murphy was tasked with clearing the Kilmallock-Bruff-Bruree triangle. The 18-pounder had been used already to take Bruree on 31 July, but Kilmallock was always going to be a more difficult affair.[398] The operation order for the attack detailed the gun crew to be in position on Dromin Hill two miles north of Kilmallock by 0545 on 4 August.[399] Another – possibly earlier - plan indicates that two guns were to be used, but the after-action report only mentions one 18-pounder, the need for a second piece was probably alleviated by the commanding position at Dromin.[400] Footage shows two field guns being towed on the Limerick road from Bruff around this time, but the second gun was probably the one deployed at Adare.[401] There simply were not enough 18-pounders; that week there were seven attached to units in the south of the country. (table 7)

[396] The Republican attack was launched from the village of Ballypatrick. *Irish Independent*, 12 Aug. 1922. Younger, *Ireland's Civil War*, p. 401.
[397] Neeson, *The Civil War in Ireland*, p. 221.
[398] Murphy, 'General W. R. E. Murphy and the Irish Civil War', p. 9.
[399] General W. R. E. Murphy, Operation Order No.6, for the attack on Kilmallock, 3 Aug. 1922 (UCDA, Mulcahy papers, P7/B/68), p. 65. Murphy, 'General W. R. E. Murphy and the Irish Civil War', p. 11.
[400] Operation Orders (UCDA, Mulcahy papers, P7/B/68), p. 103.
[401] The release of this film pre-dates the main fight for Kilmallock. Two field guns appear, as they were towed along the road out of Bruff heading for Limerick in an area known as 'the pike'. One gun is towed by a Foden steam lorry the other by a Lancia. 'Somewhere in Ireland' (Pathé Newsreels, 3 August 1922) online at British Pathé https://www.britishpathe.com/video/somewhere-in-ireland (10 Jan. 2022).

18-pounder variant/nickname	Location/area of operations
Mark I	Adare to Newcastle West
Mark I	Kilmallock
	Carrick-on-Suir to Clonmel
Mark I	Landed Passage West
Mark II serial no.10756, 'Four Courts, Drogheda'	
'Rose of Tralee'	Landed Fenit
	Landed Youghal

Table 7. 18-pounders in operation in the south of the country early August 1922. (Military Archives and contemporary images)

The start time for the Kilmallock attack was delayed because the gun crew failed to properly reconnoitre their position on Dromin, and then they had problems hauling the gun into place, so the first shot was only fired at 0830 announcing the beginning of the battle.[402] From then on however there was the most professional display of gunnery yet seen. First the gun targeted the Stafford house where a machine gun position lay directly in front of the form-up point for Murphy's Southern Division. Next the Walsh house, another machine gun position, was shelled.[403] It was textbook warfare, an artillery barrage – albeit a small one – to soften up the enemy's front line before the infantry assaulted. Descriptions of the artillery fire indicate the gun was firing indirectly and it may have been fitted with a sight.[404] This idea is supported by an urgent request, made that day, to have artillery sights provided.[405] Fire was directed by the observation officer, Captain Casey with signal flags when newly discovered enemy positions slowed down the advance, and to avoid hitting friendly troops the front line was indicated every hour using Bengal lights.[406]

Kilmallock Hill was taken in a well-co-ordinated combined arms attack, the infantry were supported by the Whippet as the 18-pounder shelled Republican positions in the old quarries in the foreground to prevent a flank attack. The shooting 'was particularly accurate,

[402] Murphy, 'General W. R. E. Murphy and the Irish Civil War', p. 11. O'Callaghan, *The battle for Kilmallock*, p. 112. Narrative of Kilmallock operations (UCDA, Mulcahy papers, P7/B68), p. 22.
[403] Narrative of Kilmallock operations (UCDA, Mulcahy papers, P7/B68), pp 21-2. O'Callaghan, *The battle for Kilmallock*, p. 112.
[404] Urgent requirements for South-Western Command, 4 Aug. 1922 (UCDA, Mulcahy papers, P7/B/68), pp 5-7.
[405] Ibid., p. 5.
[406] General W. R. E. Murphy, Operation Orders for the attack on Kilmallock, 3 Aug. 1922 (UCDA, Mulcahy papers, P7/B/68), pp 21-4, 103-4.

two out of the three shells dropping nicely in the quarry and the third bursting just over it'.[407] The defenders had prepared a series of redoubts that would have been costly to clear without shrapnel.[408] Indirect fire meant that '…shots were over-bursting on the reverse slope'.[409] Thompson machine gun and rifle fire from a cluster of houses on the Kilmallock-Bruff road was silenced by a couple more shells before 'attention was turned to a house on the outskirts of the town which was reputed to be held by the enemy, as a result the hedges around it were 'searched with shrapnel'.[410] By 1530 Murphy called a halt to allow his weary men consolidate their position, but the field gun was again called into action at 0600 the next morning as the attack resumed. In response to rifle fire a single shrapnel shell was sent over the outskirts of the town and was followed in quick succession by ten more rounds fired at targets in Cleeve's factory, in a quarry on the north-east of the town and in woodland nearby. But the rifle fire was from the anti-Treaty rear-guard and soon afterwards a local inhabitant informed the Free State side that the town was clear.[411] A reporter summed up the work of the artillery, 'had it not been for the timely assistance of the guns it is likely the troops would still be held up before Kilmallock Hill' halted by 'the enemy's deadly machine gun and rifle fire'.[412]

Five field guns were shipped on four of the seven landings – Westport, Fenit, Youghal Passage West - that were made during the war. At just over one ton the 18-pounders were unloaded using gangplanks and with considerably less difficulty than the accompanying armoured vehicles, the only exception was one that was lifted ashore at Passage West by crane.[413] None of the guns were required for action immediately on landing and the image of an 18-pounder positioned to fire from the deck of the *Arvonia* was clearly staged.[414] The Youghal artillery piece does not appear to have been used at all, whilst the Fenit gun nicknamed the *Rose of Tralee* surprisingly was not required to take Tralee though it was attached to a force that took Farranfore and Castleisland on the 5 August. A few shells fired at a Republican outpost at Castleisland ended a meagre defence there and has been described by the historian Doyle as 'a psychological strike…a warning salvo to future enemy encounters'.[415]

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[407] *Irish Times*, 5 Aug. 1922.
[408] *Freeman's Journal*, 7 Aug. 1922.
[409] *Irish Times*, 5 Aug. 1922.
[410] Ibid.
[411] *Freeman's Journal*, 7 Aug. 1922.
[412] *New York Times*, 5 Aug. 1922.
[413] 'Gun is hoisted ashore from Lady Wicklow after being landed at Cork' (NLI, Hogan and Wilson collection, HOGW25). 'Free State troops removing a heavy gun from the boat at Passage West' (NLI, Hogan and Wilson collection, HOGW161).
[414] Coogan and Morrison, *The Irish Civil War*, p. 219.
[415] Doyle, *The Civil War in Kerry*, p. 129.

After landing at Passage West Emmet Dalton led the advance to Cork city, but it was stalled by a line of defensive positions established quickly by retreating Republicans in the wooded hills around Rochestown and Douglas. There was intense fighting, and the artillery pieces were employed during these encounter-attacks to neutralise well protected positions. Yet accounts about the deployment of the guns are scarce. The Republican commander Seán Murray watched as one 18-pounder was positioned on a hill about 1,000 yards from his heavily fortified post at a local cottage that was defended with three machine guns. A shell was dropped onto the small building and the emergence of the owners of the cottage from a cloud of dust to berate the Free State gunners, confirmed the shot was not lethal.[416] Another account mentions an attack that dragged on for hours and including ranging shots took a dozen artillery rounds.[417] The battle lasted for nearly three days and one journalist remembered that the 'threatening presence of the 18-pounder' which though used only a couple of times 'was probably responsible for the evacuation of their strong positions by the Irregulars undercover of darkness'.[418] It is not clear if the two 18-pounders were used around Rochestown and Douglas. The Mark II variant – one of each was landed - fired 25 rounds during the fighting.[419] On Wednesday one of the guns was used to shell the Fota demesne. In the preceding weeks the estate had been made into 'a kind of fortress' complete with trenches on the landscaped grounds and its command of the river meant Republicans could pour continuous fire on the docks at Passage West where the Free State reserves were held.[420] The heavy shellfire, at a range of between 3000-4000 yards, surprised the defenders and reportedly inflicted casualties.[421] It is not recorded what type of ammunition was used though experienced gunners would have known that shrapnel was best against entrenched personnel.

Prior to the landings the 18-pounders were transported on long journeys by rail or carried portée-style on the back of a lorry before being towed mechanically for shorter distances. O'Duffy brought two field guns to Nenagh by train before taking them by road to his HQ at Killaloe in advance of the Strand Barracks bombardment.[422] To regain control of Dundalk a field gun was brought as far as Drogheda by 'Armoured train no.1', arriving there

[416] John Borgonovo, *The battle for Cork, July-August 1922* (Cork, 2011), p. 92.
[417] *Evening Herald*, 14 Aug. 1922.
[418] *Irish Examiner*, 14 Aug. 1922.
[419] History sheet, Memorandum of inspection, gun number 10756, 1918 (MA, Personal collections, Ivor Noone, PC 625).
[420] Fota was made into 'a kind of fortress' according to one report. Report by J. J. Walsh, 13 July 1922 (UCDA, Mulcahy papers, B7/P/109), p. 321. Borgonovo, *The battle for Cork*, p. 101. Boyne, *Emmet Dalton*, p. 192.
[421] *Irish Times*, 19 Aug. 1922.
[422] Pinkman, *In the Legion of the vanguard*, p. 148.

in the early hours of the 16 August.[423] It is unlikely that it was ever intended that the gun should be fired from the train, instead it was probably the most efficient way of getting the weapon into the field. In Limerick according to one frustratingly vague report 'an armoured plated truck' was built for an 18-pounder at the same time as an armoured train was being worked on but there is no record of it ever being used.[424]

There were only two occasions during the conflict when it was recorded that horses were used to pull the guns into combat. The first was when the mechanical gun-tower got damaged during the landing at Fenit and a plough horse named Dolly was used to haul the 18-pounder the eight miles to Tralee. The gun crew's previous experience is suggested by the fact that they hitched the gun to a 'common cart' and hitched the horse to the cart creating a configuration like that achieved with the limber wagon though in this case with plough chains.[425] The horse proved extremely excitable however and was managed better when hitched directly to the gun. The animal may not have been entirely to blame. Complex research led to the design of the hitching arrangements between the field gun, the limber and the team of horses, and the weapon's centre-of-gravity was positioned to ease the pressure on the animals.[426] The rigidity or flexibility of the link between cart and gun, the height of the connection and the different diameter wheels on each would all have come into play to make it an awkward towing configuration for Dolly. In the end she pulled a lot more than was recommended for an army horse.[427] There was nothing here of the 'dash of hot blood' required to make the 'ideal artillery horse', instead it was sheer strength.[428]

The gun that was deployed at Kilmallock was carried portée as far as Dromin three miles north of the Limerick town and unloaded with some difficulty before it was hitched to a pair of horses to be drawn up the hill. By chance one of the horses was a retired RFA animal and apparently 'there was no mistaking its delight as it backed into the traces and cast a knowing look over its shoulder at the familiar scene'.[429] The second animal, a 'frightened and unwilling' cart horse, was eventually unhitched to leave the more experienced beast pull the

[423] Commandant General's report for Chief of Staff, 16 Aug. 1922 (UCDA, Mulcahy papers, P7/B/60), p. 127. The gun was unloaded at Drogheda and - towed by a Lancia - was attached to one of a number of columns that continued northwards by road to Dunleer taking in 'suspicious places' along the coast.
[424] Daily report, South-West Command, Special services, Engineering, 4 Aug. 1922, (UCDA, Mulcahy papers, P7/B/68), p. 75
[425] Letter from Dan King to Niall Harrington, 1977 (NLI, Harrington papers, MS 40680/1).
[426] War Office, *Textbook of gun carriages and gun mountings*, p. 80-2.
[427] Harrington, *The Munster Republic*, p. 122. Bethell, *Modern artillery in the field*, p. 100.
[428] Sibert, 'Campaign summary and notes on horse artillery in Sinai and Palestine', p. 267. C. L. Scott, 'Remounts: breeding, purchase, issue and training' in *The field artillery journal*, viii, no.5 (Sept.-Oct. 1928), pp 467-80, p. 477.
[429] *Irish Times*, 5 Aug. 1922.

gun into position on the hill, which probably goes some way to explaining why the start time for the operation was delayed.[430]

The use of the 18-pounder during the Civil War in Ireland was not exceptional, but it was distinctive due to the limited number of guns involved and the nature of the conflict. The poor-quality gunnery at the Four Courts improved somewhat as the war progressed, the improvement clearly facilitated by an influx of Royal Artillery personnel into the Free State force, though the general use of the field gun continued in the main to be uncomplicated. Fire was often direct, ranges were usually short, and numbers of rounds and rates of fire were never high, except when a target was being bombarded. At the same time nothing came close to the large quantity of ammunition expended at the Four Courts, which can be partly explained by the lack of competence in the 18-pounder and the shortage of HE shells. The use of both ammunition types, shrapnel and HE, in County Waterford and at Kilmallock demonstrated that skilled gun crews were operating the weapons by then. They understood not to use HE when ranging the gun, and to use shrapnel when firing on enemy positions in woods. Kilmallock of course saw the most conventional use of the 18-pounder with the co-operation of a forward observation officer, signalling equipment and a possibly a sight which was very different to the system used at the Four Courts five weeks earlier. The evidence confirms that the guns were at times fired indirectly, which could only mean that experienced men were in charge.

The Irish deployment of a field gun depended on the conditions and the type of target. The mini bombardments, the breaching operations and the siege work resulted from the deliberate attack, whilst encounter attacks saw the artillery operating in the support role, backing up the infantry advance and as column protection, and most interestingly for anti-ambush work. The role of the accompanying gun was acknowledged in artillery doctrine, the single gun action was not extraordinary, but the Irish war saw artillery deployed almost always as single guns, the Four Courts and Cork being the exceptions. This meant the 18-pounders were more accessible to the commander in the field, but it also meant they were vulnerable to attack and were denied the cover that another gun might provide when moving under fire. It made them reliant on the other arms and the Lancia armoured car performed an important role as a platform to provide covering fire – the Rolls Royce did the same outside Adare – but also to shield the gunners emplacing the piece. In truth doctrine was unimportant, instead simple on-the-ground pragmatism was depended upon. The field gun was the Free State officer's

[430] Ibid.

heavy weapon to be used when it was deemed fit. The most common target was the Republican machine gun position, a couple of rounds were usually enough. The morale effect was employed easily against an enemy unused to shell fire – except at the Four Courts – sometimes without firing a shot. This may have limited the number of casualties caused by the artillery. When the anti-Treaty side put up a more determined opposition the destructive effect was exploited with heavier fire, as seen on O'Connell Street and against Republican positions in Waterford. Enemy machine gun positions were neutralised, and often abandoned once the shelling started. Overall the lethal effect of the artillery shell was not really experienced during the war, though the death of Mary Hartney was testament to its existence.

During the conventional phase of the conflict it was the field gun more than anything else that forced Republicans to retire and as they pulled out of the fixed positions they held, they recognised the need to turn to guerrilla tactics. For this reason, the 18-pounder must be recognised as one of the catalysts that changed the shape of the war. Interestingly the guns continued to have a role during the guerrilla phase accompanying Free State columns and providing support as a heavy weapon. Logistically every means available was used to move the guns, it was a simple matter of expedience, this changed when the Artillery Corps became formerly established and gunners became horse soldiers (see chapter II), but the methods of conveyance used in 1922 showed just how easily the 18-pounder could be handled. Its versatility made it an ideal weapon for column protection and in many ways, it was an ideal weapon for a force like the Free State's fledgling army.

Chapter III
The 18-pounder in the Defence Forces 1923-1942

This chapter examines the 18-pounder's use in the Defence Forces between the end of the Civil War and the arrival of the last batch of field guns in 1941. By then 'Emergency' army had expanded so much that it was able for the first time to mirror other longer established artilleries and deploy the 18-pounders and other artillery pieces accordingly. The use of the gun before that makes an interesting study because it exemplified the Free State army as it moved from the leviathan that it became during the Civil War to the badly equipped, and poorly resourced force that it was let become by 1930. The establishment of the Artillery Corps in 1923 saw the 18-pounders assembled for the first time, but experience was lacking, and the entire Corps had to undergo a massive programme of training. Consequently, Irish officers attended courses in artillery schools abroad, improving the Irish artillery capability and allowing the notion of an artillery doctrine to be developed. At the centre of all this was the 18-pounder. And whilst horsemanship took on a new, previously unknown, significance, gunnery became the creed. Artillery training culminated in the exercises in the Glen of Imaal, the training ground where everything to do with gunnery, the 18-pounders, and horsemanship, was put into practice. There was another side to the artillery however and the 18-pounders had a role in establishing the presence of the new peacetime army with the Irish public, appearing regularly at ceremonial and state occasions. It was at these events that the strict discipline and attention to detail, so prevalent in the Corps was on display by means of the condition of the field guns. The Irish artillery during the period remained small and the lack of resources made it almost irrelevant militarily. Yet the Artillery Corps staff never wavered from the conventional field artillery doctrine. It was perhaps the only path to follow, but it was seriously hampered by budget restrictions that were only eased with the outbreak of war on the continent in 1939.

There were nine 18-pounders in the arsenal of the Free State army at the end of the Civil War. Located in barracks around the country to support infantry units since August 1922, they were not brought together until March 1923 when the Artillery Corps was established.[431] The

[431] The field guns were last deployed, though not used during the clearance of anti-Treaty IRA from the Arigna Mountains. A battery of 18-pounders was deployed according to *The Cologne Post*, 15 Feb. 1923. This was extremely unlikely and the artillery fire that was reportedly heard was probably Free State troops using explosives to blow up coal mines that had been occupied by Republicans. Operation Report, 20 Feb. 1923 (MA, CW/OPS/07/12, Reports and statistics, Operation Reports 12/2/23-20/3/23), p. 13. *Connaught Tribune*, 17 Feb. 1923. The war ended before the final showdown between National Army troops and Republicans in the

guerrilla phase of the war generally seems to have left the guns lying-up unused and they did not receive the 'proper care and attention' they required which caused the mechanical condition of the weapons to deteriorate.[432] It was up to the battery commander to make sure his equipment was fit for service and one of the principal aims of the artilleryman's training was the care of his weapon, so the neglect that the Irish 18-pounders suffered at this stage indicates that those charged with such duties either did not understand what should be done or were not given the time to do it.[433]

The 18-pounders and their gun crews were ordered to Dublin's Islandbridge Barracks on the establishment of the Artillery Corps on 23 March 1923. Col. Patrick Mulcahy, brother of the Minister of Defence, was given charge of the new unit. He had served with the Royal Engineers during the Great War and had joined the IRA after he was demobbed in 1919. When he was tasked with the job of commanding an artillery unit he admitted to the Free State army's Chief of Staff Gen. Seán McMahon that he knew nothing about artillery only to be told 'neither do any of us'.[434] The General's statement summed up the army's artillery capability at the time. From the start Mulcahy struggled to fill officer vacancies though he later remembered that there were sixty-two other ranks, 'stout-hearted prospective gunners' under his command and ten horses.[435]

The ten horses are worthy of consideration. It is difficult to examine a history of field artillery without acknowledging the role that the horse played as gun-tower and ammunition-hauler. The design of the 18-pounder dictated that its weight should be restricted to that which could be hauled by a team of six horses and it was calculated that 18 horses were required to support one gun in action before the Great War.[436] The Irish later reckoned that 125 animals were required for two batteries of guns.[437] The horse according to one British captain writing at the end of the war provided the British Army with the 'easy mobility' and the 'flexibility in rapid movement' that 'modern' warfare required.[438]

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west. Artillery might have been necessary to support the Free State advance. For the lingering Republican threat in the west see Hopkinson, *Green against green*, pp 242-3.

[432] Memo by Captain J. J. Keenan, 10 June 1932, (MA, DOD-2 29995).

[433] War Office, *Field artillery training 1914*, pp 8-9.

[434] Patrick Mulcahy, 'At the beginning' in Tom Clonan, (ed.), *Artillery Corps 1923-1998* (Dublin, 1998), p. 9. R. P. O'Leary, 'The foundation of the Artillery School' in Tom Clonan, (ed.), *Artillery Corps 1923-1998* (Dublin, 1998), p. 36.

[435] Mulcahy, 'At the beginning', p. 9.

[436] War Office, *Textbook of gun carriages and gun mountings*, p. 45. See also p. 46 for how this list was developed for the design of the 18-pounder. Knight, *The 18-pounder field gun in Canadian service*, p.28.

[437] O'Leary, 'The foundation of the Artillery School', p. 37.

[438] S. Galtrey, 'The horse and the War' in *Country Life* (London, 1918), pp 14-5, quoted in Jane Flynn, 'Sense and sentimentality: The soldier-horse relationship in the Great War' (P. H. D. thesis, University of Derby, 2016), p. 40.

It must be assumed that the ten horses that Mulcahy took charge of included the six animals that were purchased from the British for the purpose of drawing the gun carriage – 18-pounder and limber – that was used for the funeral of Michael Collins. According to Gen. Macready the men of the Royal Artillery were 'aggrieved that their horses should be employed on such a service'.[439] Contemporary film footage of the occasion confirms that the horses and the artillery drivers who rode them were experienced, notwithstanding the Royal Artillerymen's pique. The lead man, who was responsible for speed and direction of travel, can be seen visibly controlling his pair in the team with the stock of the whip.[440] It was the only time during the war that an 18-pounder was filmed drawn by a team of six horses and limbered correctly. Though one week into the conflict the remains of Free State Army Capt. Condron were borne on a gun carriage, complete with limber, drawn by six horses.[441] It must be assumed these animals too were Royal Artillery horses, probably handed over with the limber. A vet's bill for attending to a team of 'artillery horses' indicates that they were used during an operation in the Westport/Achill area at the end of 1922 though there is no suggestion that they were hauling artillery.[442] The mechanisation of the Irish field artillery is examined below, but the establishment of the Artillery Corps at the end of the Civil War was a defining moment that signalled the end of mechanical haulage and the introduction of the horse for this role. It was the point at which the artillery would distinguish themselves as horse soldiers and it marked the beginning of an affectionate relationship between gunner and horse that would last nearly two decades.[443] A description of a gun battery arriving at new quarters in Kildare Barracks in 1925 shows how, in just two years, the Irish artilleryman had become proficient in horse draught and could impress with his handling of the horses and gun carriage. The battery of guns rode from the train station 'with increasing speed…around Graham's corner at full tilt, with outriders on the lead horses urging them on, drivers shouting, whips cracking, horses galloping and gun and limber wheels crashing on metalled road'.[444]

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[439] Macready, *Annals of an active life*, p. 662-3.
[440] Three drivers controlled the team of six horses, one on each of the horses on the left. The lead driver was responsible for speed and direction of travel. British Pathé, Historical Collection, *Funeral of Michael Collins* (31 Aug. 1922), film ID 280.18 Knight, *The 18-pounder field gun in Canadian service*, pp 14, 42.
[441] *Freeman's Journal*, 7 and 8 July 1922.
[442] M. J. Ryan to Officer Commanding National Troops, Westport, 12 Feb. 1923 (MA, AFO-05-Medical-72). *Sligo Champion*, 30 Dec. 1922.
[443] Tom Maher, 'Walk/march, An affectionate look back at the horse days' in Clonan, (ed.), *Artillery Corps 1923-1998* (Dublin, 1998), pp 19-25, p. 23.
[444] Ex-RFA, Sergeant William Bonar, quoted in Mark McLoughlin, *Kildare Barracks, from the Royal Field Artillery to the Irish Artillery Corps*, p. 158.

The first home of the Artillery Corps at Islandbridge Barracks in Dublin was an interesting choice. It had formerly been an Ordnance Depot for the British Army but was never used for artillery until the Irish gunners got there in 1923.[445] Mulcahy admitted it was wholly unsuitable and had no space for training on horseback.[446] It was however the site where the Free State Army's Ordnance service was located, and perhaps initially it was deemed appropriate to locate the artillery in the place where the field guns could be maintained. Nevertheless, by September 1924 the artillery moved to Marlborough Barracks which, with access to the Phoenix Park was better suited for training purposes.[447]

On 10 July 1923 the four Mark II field guns were brought together to form Number 1 Battery with a strength of 116 personnel.[448] A second battery, planned as early as December that year did not in fact come into being until January 1925.[449] In reality it made sense to organise one battery at the outset as the whole unit 'from the O. C. down to the latest recruit' had to undergo training during the first year.[450] What is more there were serious deficiencies in horses and saddlery equipment in the corps, in fact a shortfall of forty-five animals continued to exist even after Number 2 Battery was established.[451] By adopting the four-gun battery the Artillery Corps was copying its British peacetime counterpart. This size battery was commonplace at the time though there was still much controversy about whether the six- or four-gun battery was better.[452] Before the Great War, Bethell considered the issue to be 'practically a financial question', the four-gun battery he claimed was more efficient, gun for gun, which made it particularly suitable for smaller armies.[453] With a mere nine guns in the Irish arsenal, it was not surprising that the Artillery Corps settled for the smaller battery. In common with the British battery the Irish 18-pounder battery was divided into two sections with a pair of guns in each whilst a single field gun was known as a sub-section.

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[445] *Belfast Newsletter*, 15 Dec. 1922.
[446] Mulcahy, 'At the beginning', p. 9.
[447] Tom Clonan, 'History of the 1 Fd. Arty. Regt.' in *Artillery Corps 1923-1998* (Dublin, 1998), pp 50-2, p. 51. This is now McKee Barracks.
[448] O'Leary, 'The foundation of the Artillery School and a brief history of its development', p.36. Riccio, *The Irish Artillery Corps*, p. 23.
[449] Statement of strength, Dec. 1923 (UCDA, P7/B/145, Artillery Corps). Mark McLoughlin, *Kildare Barracks, from the Royal Field Artillery to the Irish Artillery Corps*, p. 157.
[450] *Freeman's Journal*, 13 Aug. 1923.
[451] QMG's Department to AFO, 5 May 1925 (MA, AFO 14-Animals-6 Purchase of horses for Artillery Corps). QMG's Department to Acting QMG, 29 May 1924 (MA, AFO-15 General Stores-12 13624 Purchase of harness stalls equipment).
[452] Britain, France and the USA all adopted the four-gun battery. Bethell, *Modern artillery in the field*, p. 217. US Army command and General Staff College, *Tactics and technique of field artillery*, p. 40. Between 1919-38 the War Establishment for the British field battery was six guns in three sections. Hughes, *History of the Royal Regiment of Artillery*, pp 4, 6.
[453] Bethell, *Modern artillery in the field*, p. 217.

Equipment was one issue during the formation of the Artillery Corps, qualified personnel was another. It was inevitable that Royal Artillery officers and NCOs would play a large part in the Irish Corps' formation. In fact, the reliance on British artillerymen was very evident in the Chief of Staff's General Routine Order No.30 which announced the appointment of Captain H. F. Caulfield as training instructor for the new corps.[454] Caulfield had served in the RFA between 1900-1907 and was brought back into the British Army reserve during the war. He would have witnessed the introduction of the 18-pounder and probably worked with the field gun during its early years, but he does not appear to have seen action during WWI and the Irish Artillery Corps replaced him that November with Captain Garret Brennan who was an ex-Royal Garrison Artillery officer.[455] The Royal Artillery had been divided into the Horse, Field, and Garrison Artillery in 1899 and during the Great War the Royal Garrison Artillery operated heavy calibre weaponry.[456] But garrison artillerymen were unlikely to have been proficient in the use of a field gun and although there was some crossover in relation to artillery theory which was common to all gunnery, the tactical difference between a large, sometimes fixed piece like the 9.2-inch coastal gun and the 18-pounder was immense.[457] For one the guns were conveyed in very different ways. Mulcahy summed it up when he remembered that Brennan 'gently taught us a certain amount of gunnery, but we were eager and soon surpassed his limited knowledge.'[458] In spite of the difference another garrison artillery officer Capt. James McLoughlin was kept on and given command of Number 1 Battery.[459]

Officer candidates, who were 'coming forward in great numbers' to join the Artillery Corps required a certain standard of education and a high proficiency in mathematics.[460] Only three out of twenty-three passed the first entrance exam.[461] Further down the chain of command, gunners who had crewed the 18-pounders in 1922 were found to be unfit for service during the 1923 training period and a high number of ex-British servicemen were left in NCO

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[454] O'Leary, 'The foundation of the Artillery School and a brief history of its development', p.36
[455] Mark McLoughlin, *Kildare Barracks, from the Royal Field Artillery to the Irish Artillery Corps*, p. 157.
[456] Hughes, *History of the Royal Regiment of Artillery*, p. 7. Clarke, *World War I battlefield artillery tactics*, p. 9. For a description of garrison artillery in general see Hogg, *Allied artillery of World War One*, pp 12-3.
[457] For similarities and differences between field and garrison artillery see Headlam, *The history of the Royal Artillery*, pp 3-4, 258-64.
[458] Mulcahy, 'At the beginning', p. 10. McLoughlin had served on the gun crew of a rail mounted 12-inch howitzer during the war. He would eventually go on to become Director of Artillery 1949-55. Neil Richardson, *A coward if I return, a hero if I fall, Stories of Irishmen in World War I* (Dublin, 2010), pp 331-2.
[459] McLoughlin had performed well in the exam to get into the Corps. Mark McLoughlin, *Kildare Barracks, from the Royal Field Artillery to the Irish Artillery Corps*, p. 157.
[460] *Freeman's Journal*, 13 Aug. 1923.
[461] O'Leary, 'The foundation of the Artillery School', p. 36. Exams were held periodically for new staff and were advertised in General Routine Orders. It was the only way that an officer could get into the corps. *An tÓglach*, i, no.9 (26 June 1923), pp 8-9, p. 8. *An tÓglach* changed editorship and style from Oct. 1927 and this is reflected here in the way the journal is referenced. Scholarly articles appeared from named authors from 1927.

appointments in the unit.[462] The specialised skillsets that were required in a unit like the Artillery Corps meant that the recruitment of personnel who had served with the RA was an expedient approach when filling the ranks of the corps. There was no shortage of experienced soldiers as the British Army was slimming down and it has been estimated that up to 50 per cent of the Free State force at the time was made up of ex-British servicemen.[463] In fact it is likely that the presence of high numbers of ex-British army personnel in the Artillery Corps helped to ensure the unit was not adversely affected by the army 'mutiny' in 1924. Only one of Mulcahy's officers, Comdt. Edward O'Leary appeared on the list of officers that resigned following the subsequent enquiry into the crisis and it is worth noting that there was no attempt made to seize and an artillery piece by the 'mutineers'.[464]

With so many British gunners in the unit it is not surprising that the Corps copied the Royal Artillery model for training and gunnery. The Irish 'gun crew' from the Civil War became known as a detachment and like the RFA example it was made up of NCOs and men who were numbered one to ten to identify their position behind the gun and duties that they were expected to carry out.[465] (table 8) Many of the crew were cross trained to perform the duties of other detachment members. Officers learned how to operate the gun before they learned how to command a battery. A key hallmark of the Irish Artillery Corps at the time was strict discipline.[466] One veteran remembered that only the highest standards of dress, training and drill were tolerated, essential requirements for a unit that was responsible for deploying four pieces of heavy machinery using a team of horses.[467]

[462] McLoughlin, *Kildare Barracks from the Royal Field Artillery to the Irish Artillery Corps*, pp 156, 157.
[463] Whelan, *Allegiances compromised*, pp 137-8, 142.
[464] A list of army officers who resigned between 9 Mar. and 29 Apr. 1924 in Lisa Dolan, (ed.), *Guide to the papers of the Army Inquiry Committee* (Dublin, 2020), p. 28.
[465] For a breakdown of the positions in the gun crew and a good description of their duties see Knight, *The 18-pounder field Gun in Canadian service*, pp 38-9.
[466] Mulcahy, 'At the beginning', p. 11.
[467] Pal Byrne, 'Early days' in Tom Clonan, (ed.), *Artillery Corps 1923-1998* (Dublin, 1998), pp 13-5, p. 14.

Number	Duties
No. 1	Usually a sergeant. Detachment commander. Responsible for all operations of the gun, maintenance and servicing of the weapon.
No. 2	Operation of breech, setting of range by elevating and depressing barrel.
No. 3	Responsible for laying and firing.
No. 4	Planted aiming posts. Loading gun.
No. 5	Preparation of ammunition.
No. 6	Preparation ammunition. Operated the fuze indicator.
Nos. 7-9	Remained in wagon lines and assisted with ammunition supply.
No. 10	Detachment second in-command. In charge of ammunition wagon.

Table 8. Gun detachment members and their duties. (Knight, *The 18-pounder field gun in Canadian service*)

The daily routine of the Irish artillerymen primarily consisted of horsemanship training, driving (the horses, field gun and limber), and gun drill.[468] During the Great War gunnery had become a science that required complex calculations to bring a battery's fire onto the target.[469] In Dublin an early attempt was made to qualify officers in trigonometry and survey work with the assistance of the Ordnance Survey Office. These innocent sounding subjects were 'absolutely necessary for gun calibration and firing'.[470] The instruments required for this work, including general-service drawing sets were subsequently purchased from the British.[471] The Irish were also purchasing military equipment to lay the field gun such as directors (the military version of a theodolite), rangefinders and signalling telescopes.[472] The inclusion of a sight illuminating apparatus on the list of purchases indicates that the artillery were preparing to conduct night firing exercises with the 18-pounder.[473] It was perhaps no coincidence that at the same time a series of articles appeared in *An tÓglach* about night operations.[474] For training in the barracks an air rifle was obtained from the War Office. It was attached to the field gun as a teaching aid for laying, essentially a sub-calibre training device and it meant the layer received immediate feedback on his adjustments without leaving the drill-shed.[475]

[468] *Freeman's Journal*, 13 Aug. 1923.
[469] Bidwell, *Gunners at war*, pp 40-1. For the type of maths required see J. K. Whittemore, 'Collegiate mathematics for war service' in *The American mathematical monthly*, xxv, no.8 (Oct. 1918), pp 360-72.
[470] It was proposed that officers should receive instruction in 'trig. survey', the use of a theodolite, the measurement of base lines and computation of triangles, heights, latitude and longitude. Col. Smith, Office of Chief of Staff to Secretary, Department of Defence, 25 Sept. 1923 (MA, DOD-A-10045 Courses of instruction Officers of Artillery Corps).
[471] Schedule 1, Purchase of warlike stores through WO London, 1926-7 (MA, AFO 16-War Equipment-342 [374]).
[472] The Barr & Stroud rangefinder that was purchased by the army was of the most up to date design. Equipment voucher, Army form G982, 16 Mar. 1926 (MA, AFO 16-War Equipment-342 [374]). War Office, *Handbook of the range-finder artillery No.2* (London, 1926).
[473] Voucher, Army form G 982, 16 Mar. 1926 (MA, AFO 16-War Equipment-342 [374]).
[474] *An tÓglach*, v, no.8 (28 Aug. 1926), p. 9. *An tÓglach*, v, no.9 (4 Sept. 1926), p. 6.
[475] Schedule 1, Purchase of warlike stores through WO London, 1926-7 (MA, AFO 16-War Equipment-342 [374]). This is an unusual item and rare. One survives in the Imperial War Museum collection. See 'The air-

In Dublin the Phoenix Park's Fifteen Acres were used as a training ground.[476] This large open area had always been used by the British garrison in the city for exercising troops and it was perfect for drilling a battery of 18-pounders. A feature in the army's *An tÓglach* in June 1923 described a battery training there and revealed a high level of competency even at this early stage. Gun teams were portrayed sweeping over the training ground, wheeling, circling, exercising as one, until the order 'Halt Action rear!' was given. These were standard manoeuvres for the RFA and the responses of the Irish gun detachments proved they were able to bring the 18-pounder into action with some speed.[477] It certainly seemed that Mulcahy's claim that the Corps was 'in readiness for any emergency that may arise' had some truth in it. The Maj. was speaking to journalists from the *Freeman's Journal* who did a piece on the army in August 1923. In the article the reporter made the point that the artillery had a special establishment and was separate from the infantry.[478]

The new peacetime Free State army was big news and every chance available was taken to show it off during the ceremonies that were used to legitimise the new state.[479] The 18-pounders appeared on all these occasions. The first official public appearance was at Bodenstown during the annual Wolfe Tone commemoration on 24 June, and the next day the field guns were part of the two-thousand-strong force that marched through the capital.[480] An even larger parade took place at the end of August 1923 on the anniversaries of the deaths of Arthur Griffith and Michael Collins. The parade formed up on the Fifteen Acres and included an 18-pounder battery. Before it proceeded to the cenotaph on Merrion Square one of the field guns fired a salute nearby.[481] Elsewhere Mulcahy asserted that the Corps was in its infancy, but the sources show that it was developing well with gunners and drivers capable of hauling and operating the 18-pounder with some skill.[482]

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rifle's history in weapon's training' at UK Historic arms resource centre, online at https://www.rifleman.org.uk/Air-rifles.html (4 Oct. 2021). Headlam described how valuable these air-rifles were as a training-aid for a single gun or a battery. Headlam, *The history of the Royal Artillery*, p. 327.

[476] The Fifteen Acres would continue to be used into the 1930s for gun drill and preparation for displays like the Spring Show. Secretary, Department of Defence to secretary, Office of Public Works, 5 Apr. 1935 (MA, DOD-2 41428, Training Artillery Corps, use of Fifteen Acres).

[477] For the procedure for a battery going into action see Bethell, *Modern artillery in the field*, p. 267. *An tOglach*, i, no.9 (6 June 1923), p. 8.

[478] *Freeman's Journal*, 13 Aug. 1923.

[479] J. P. Duggan, *A history of the Irish army* (Dublin, 1991), p. 141. John Prendergast, 'History is not was; history is' *in Defence Forces Review 2013* (Dublin, 2013), pp 17-9, p. 18. For the commemorations connected with the Civil War see Ann Dolan, *Commemorating the Irish Civil War, history and memory 1923 2000* (Cambridge 2003).

[480] *Irish Times*, 25 June 1923. P. O'Farrell, 'Plaiting the lanyard, An artillery *rechauffe*' in *An Cosantóir*, xlvii, no.4 (Apr. 1988), pp 26-8, p. 27. *Irish Examiner*, 22 June 1923. *Irish Independent*, 26 June 1923.

[481] *Irish Times*, 23 Aug. 1923. *Irish Times*, 1 Sept. 23. *An tÓglach*, i, no.14 (1 Sept. 1923), p. 12-3.

[482] *Freeman's Journal,* 13 Aug. 1923.

Along with the Saint Patrick's Day parade these ceremonies would become part of the Artillery Corps' annual calendar of events throughout the 1920s and 1930s. The assignments appear to have been alternated between the two batteries, but commentary was always favourable and detachments were regularly photographed as they passed the review stand.[483] The condition of the field guns always impressed and the following description was typical, 'the artillery with all the fittings of the guns burnished to perfection, came in for the lion's share of admiration'.[484] (fig. 16 and 17) It meant that on the sad occasion of a military funeral one of the guns was readily available with only a minimum amount of preparation.[485] (fig. 18) The artillery took a prominent role during the military display that welcomed the Dáil president W. T. Cosgrave back from his visit to the USA in 1928. The furore that marked the occasion of the Irish leader's American trip captured the imagination of the people, according to the *Irish Independent* and on his arrival at Dun Laoghaire No. 1 Battery's 18-pounders fired a nineteen-gun salute, the appropriate number for a prime minister.[486] (fig. 19)

The gunner's introduction to the 18-pounder and his basic gunnery training lasted about six months.[487] Lessons on laying followed, and time in the barracks was 'devoted to the perfection of fire discipline and training in battery tactics and manoeuvre'.[488] The result of this instruction only became clear when the artillery went to the Glen of Imaal for live firing exercises, the first of which only took place in 1925.[489] The Glen of Imaal had been used by the British for artillery training since the late 1890s.[490] The camp there could accommodate three 18-pounder batteries each with its full complement of horses whilst the area nearby was ideal for artillery shooting, the western side of the mountain range acting as a butt stop. The Royal Artillery had built splinter proof shelters and laid armoured cables to maintain communications between observation dugouts and firing-points and there is evidence to show that the British were improving a moving-target system before the camp was abandoned.[491]

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[483] *Irish Times*, 23 Aug. 1924. *Irish Times*, 18 Sept. 1928. *An tÓglach*, iii, no.17 (22 Aug. 1925), p. 12. *An tÓglach*, iii, no.7 (28 Mar. 1925), p. 6.
[484] *Irish Times*, 20 Mar. 1926.
[485] *An tÓglach*, ii, no.14 (16 Aug. 24), p. 11.
[486] The battery was photographed for the newspaper whilst firing. *Sunday Independent*, 12 Feb. 1928.
[487] *An tÓglach*, iv, no.24 (26 June 1926), pp 12-3.
[488] Mulcahy, Artillery Corps training 1930, 25 Mar. 1930 (MA, DOD-2 22712).
[489] The march to the Wicklow camp with field guns and limbers and wagons loaded with ammunition was part of the exercise and required a stop along the way to rest the horses. Comdt. P. Maher, Operation Order, No.3 26 May 1930 (MA, DOD-2 22712). Elsewhere Maher remembered an overnight stop in parkland along the way. Maher, 'Walk/march, An affectionate look back at the horse days', p. 24.
[490] Headlam, *The history of the Royal Artillery*, pp 52-3.
[491] Duggan, *A history of the Irish army*, p. 107. Mulcahy to Chief Staff Officer, 26 June 1928 (MA, DOD-2 15082). The British pulled out of the Glen of Imaal camp on 19 Feb. 1922. Sandys, The last months of 5 Divisional Artillery, Sandys papers, 1920 (RA Archive, AMOT039_WW_MD.211.5), p. 3, online through The Ogilby Muster at https://www.theogilbymuster.com/ (27 Oct. 2021).

The area was also perfect for putting a battery through its paces. Drivers were tested by 'taking their team and guns through places which try their patience, coolness, efficiency and daring…' and gunners got to use their advanced knowledge of range-finding, director work and laying.[492] (fig. 20)

The delay in getting to the range seems to have been due to a lack of ammunition. The entire stock seems to have been depleted during the Civil War. In December 1924 the Army Finance Officer looked for 1,000 rounds from the War Office.[493] But the order took more than six months to fulfil, partly because the Irish were looking for the latest version of shrapnel shell, which the War Office could not supply and the Irish Quartermaster General was still wondering where his ammunition was in July 1925.[494] The Free State army's first artillery shoot finally took place on 1 September that year and the honour of firing the first round was given to Maj. Mulcahy. The history sheet for gun number 10756 indicates that individual guns fired only around ten rounds per day as newly learned skills were honed though it would have been a long and probably a tedious exercise with such low rates of fire. On 10 September a live firing demonstration was staged for the Ministers of Defence and Finance (Peter Hughes and Ernest Blythe) and senior army staff.[495] The ten rounds recorded in the history sheet for 10756 were probably accompanied by thirty more from the rest of the battery which would have impressed the guests if fired in a short space of time and for effect targets were placed out on the hillside 5,000 yards away to simulate enemy troops.[496] The gunnery was impressive enough to bring the Minister of Defence back the following year with President Cosgrave and other members of the government.[497]

The evidence suggests that the artillery continued to fire only modest numbers of rounds during firing practices in the 1920s.[498] In 1928 an allotment of just 200 rounds was issued to each battery for its three-week stint in the Glen, approximately 50 rounds per gun for the entire period.[499] (appendix 6, for rounds fired by gun number 10756) A shortage of ammunition for

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[492] *An tÓglach*, v, no.5 (7 Aug. 1926), p. 11. *An tÓglach*, iv, no.24 (26 June 1926), p. 13. Photographs in *An tÓglach* showed the difficult terrain that drivers had to negotiate. *An tOglach*, i, no.1 (Oct. 1927), pp 36-40.
[493] AFO to QMG, 12 Dec. 1924 (MA, AFO 16 War equipment 225). Demand for stores, 6 Mar. 1925 (MA, AFO-16 War Equipment 244). P. O'Farrell, 'Plaiting the lanyard, An artillery *rechauffe*', p. 28.
[494] E. Edwards, WO to D O'Sullivan, AFO 27 June 25 (MA, AFO-16 War Equipment 244). D O'Sullivan to E. Edwards, 15 July 1925 (MA, AFO-16 War Equipment 244). *Irish Times*, 8 Aug. 25
[495] P. O'Farrell, 'Plaiting the lanyard, An artillery *rechauffe*', p. 28. *An tÓglach*, iii, no.9 (19 Sept. 25), p. 14.
[496] Gun number 10756 fired 43 rounds over 6 days between 1-11 Sept. History sheet, Memorandum of inspection, gun number 10756, 1918 (MA, Personal collections, Ivor Noone, PC 625).
[497] Cosgrave held the position of President of the Executive. *An tÓglach*, v, no.6 (14 Aug 1926), p. 19.
[498] History sheet, Memorandum of inspection, gun number 10756, 1918 (MA, Personal collections, Ivor Noone, PC 625).
[499] Report on artillery firing practice and training, Glen of Imaal, 1928 (MA, DOD-2 15082).

the 1930 summer camp sparked a discussion about ammunition allowances in general (see below) and it was not until the mid-1930s that the allotment for 18-pounder batteries increased.[500] In 1934 an impressive 1,180 rounds, HE, shrapnel and smoke were made available for shooting.[501] However, by then the newly formed Volunteer Reserve battery was attending the camp which meant that ammunition had to be distributed between a greater number of firing practices. Large numbers of personnel had to qualify to fire the 18-pounder every year. Serving artillery officers were allotted 20 rounds for their annual assessment and NCOs training on the anti-tank range were given between 5-10 rounds. On top of that 20 rounds were allowed to calibrate each gun at the beginning of a shoot.[502] 'Foreign armies' supplied their officers with 50 rounds for annual training, and while the US Field Artillery had been examining their allowances with a view to lowering quantities, it is difficult to overlook the constraining authority of the Department of Finance in the Irish case.[503] Ammunition expenditure continued to follow the same pattern until 1938 when war clouds on the continent seriously affected firing.[504] Restrictions were put in place to allow the stock of ammunition to increase and by 1940 there were nearly 40,000 rounds of 18-pounder ammunition in stores whilst another 12,100 rounds were expected from the British.[505] Concerns were raised however that the cessation of firing practice would bring about a drop in standards and it was agreed to return to the range properly from 1942.[506]

From the start Maj. Mulcahy understood that the most effective way to make use of the 18-pounder and achieve the level of professionalism that he pursued for the corps was to send selected officers overseas for training and in 1926 a 'Military Mission' went to the United

[500] Mulcahy to Chief staff Officer, GHQ, 24 May 1930 (MA, DOD-2 22712). History sheet, Memorandum of inspection, gun number 10756, 1918 (MA, Personal collections, Ivor Noone, PC 625). Reduced allowances of ammunition were made in 1932 due to the large number of artillery personnel involved in the Eucharistic Congress. Peadar MacMathgamhna, Department of Defence to W. Doolin, Department of Finance, 5 Dec. 1932 (MA, DOD-2 22712).
[501] Mulcahy, Artillery ammunition entitlement for 1934 practice, 4 Apr. 1934 (MA, DOD-2 36802).
[502] Mulcahy to Chief of Staff, 14 May 1931 (MA, DOD 2-22712 Ammunition for range practices).
[503] Mulcahy to Director of Training, 27 June 1930 (MA, DOD 2-22712 Ammunition for range practices). 'Annual report of the Chief of Field Artillery' in *The field artillery journal*, xvi, no.6 (Nov.-Dec. 1926), pp 553-87, p. 564.
[504] The Glen of Imaal Diary indicates that the Glen of Imaal camp was not occupied in 1939 and only occupied briefly in 1940 when work was carried out on the anti-tank range. A paranoia seems to have surrounded the safety of the ammunition in 1940 probably after the IRA raid on the Magazine Fort the previous December. Entries for 1939-40 (Artillery School, Glen of Imaal diary, 1936-41).
[505] There were 23,838 HE, 13,625 shrapnel and 1,817 smoke shells in stock. Chief of Staff, General report on the expansion, organisation, training, equipment and defensive preparations of the army, 1 May 1940-30 Sept. 1940 in Michael Kennedy and Victor Laing, The Irish Defence Forces 1940-49, The chief of staff's reports (Dublin, 2011), p. 26.
[506] Mark McLoughlin, *Kildare Barracks, from the Royal Field Artillery to the Irish Artillery Corps*, p. 240.

States.[507] Lt. Charlie Trodden was selected by Mulcahy as the artillery representative to undergo training at the US Army's Field Artillery School at Fort Sill, Oklahoma.[508] Trodden completed the Battery Officers Course between September 1926 and June 1927 and he spent a further two months at the Coast Artillery School at Fort Munroe.[509] The choice of the US army's artillery school was not as unusual as might at first be considered. The American's were using a variant of the 18-pounder, the M1917 (British) field gun which was fitted with a 75mm barrel. The 18-pounder had been manufactured in the US for the British during the Great War so when the Americans entered the war in 1917, the production lines were readily available and it was easy to replace the British 3.3 inch barrel with the US 75mm version for their own army.[510] The American gun was fitted with a different dial sight and was mounted with the old recoil system, but otherwise it was similar to the weapon that Trodden had trained on. The US Artillery still considered it to be an 'efficient' field gun and had 800 in service.[511] Furthermore the US Field Artillery's method of instruction probably suited the Irish. There was an emphasis on the light field artillery unit and its ability to rapidly occupy a position and open fire, and its 'simplicity in its communications and the necessity of observation' were objectives that were achievable for a force like the Artillery Corps operating in a limited capacity.[512]

Trodden was the only non-American to complete the course that year.[513] Closer to home Mulcahy began a long standing connection with the Royal Artillery's training school at Larkhill on Salisbury Plains when he went on the month-long Battery Commander's Course and was followed, on his own recommendation, by two officers who attended the year-long Gunnery Staff Course.[514] As each student returned from training abroad they brought with them new and

[507] Other countries had been considered for training including Switzerland, but in the end an English-speaking country was deemed best, though for a time the Swiss model of a small standing army and large reserve was considered the best way to go for the young Free State Army. O'Leary, 'The foundation of the Artillery School', p. 37. Josh Honan, 'The pursuit of excellence' in *An Cosantóir*, xliv, no.1 (Jan. 1984), pp 3-6, p. 3. Tom Hodson, 'Establishing the Irish Military College' in *Defence Forces Review* (2016), pp 103-10, p. 105.
[508] P. D. Kavanagh, 'The Artillery School 1931-73' in *An Cosantóir*, xxxiii, no.11 (Nov. 1973), pp 397-9, p. 397.
[509] Trodden would go on to become the first commanding officer of the Artillery School in 1931. O'Leary, 'The foundation of the Artillery School', p. 37.
[510] Hogg, *Allied artillery of World War One*, pp 50-2.
[511] The US Field Artillery was also armed with the *Mle 1897* and the M1916 75mm field guns. US Army command and General Staff College, *Tactics and technique of field artillery*, p. 5. 'Annual Report of the Chief of Field Artillery' in *The field artillery journal*, xxi, no.6 (Nov.-Dec. 1931), pp 577-99, p. 588.
[512] 'Annual Report of the Chief of Field Artillery' in *The field artillery journal*, xvi, 6, (Nov.-Dec. 1926), pp 553-87, p. 584.
[513] 'Annual Report of the Chief of Field Artillery' in *The field artillery journal*, xxvii, no.6 (Nov.-Dec. 1927), pp 547-70, p. 560.
[514] Lieutenants Cody and Farrell attended the Gunnery Staff Course. The Artillery Corps periodically sent officers on other courses to Larkhill. Mulcahy, 'At the beginning', p. 10. Mulcahy to Chief of Staff, 2 June 1931 (MA, DOD-2 24553, Courses of instruction).

improved tactics and techniques for the developing Artillery Corps. However Irish artillery doctrine at the time was governed – like defence doctrine in general - primarily by the limitations of expenditure.

Between 1924 and 1932 army spending was cut from £11 million to £1 million and the Department of Finance continued to have the final approval on all army purchases.[515] Defence Force files show that the military were keenly aware of the role of the department in these matters, and this was probably the reason the Minister of Finance was invited to the first 18-pounder shoot. Something of the relationship between the soldier and the civil servant was discernible in the Chief of Staff, Maj. Gen. Brennan's remarks during discussions about artillery ammunition allowances in the 1930s. Whilst Brennan admitted that he was prepared to accept cuts to the allowance 'on the grounds of financial stringency', he thought it unwise to give the Department of Finance too much information on the matter which would give the civilians the power to decide how much ammunition should be used.[516] The Irish military were not the only ones facing this problem and field artillery units in armies as big as those in Britain and America were experiencing defence cuts and budget restrictions.[517]

The first problem encountered when looking at artillery doctrine and the use of the 18-pounder in the post-Civil War Irish Free State is the meagre size of the Artillery Corps; it simply does not compare to the same units in the armies of nations that were providing the Irish with training and equipment. Yet the Artillery Corps still developed along conventional lines. The introduction of the horse as the gun tower, the adoption of the four-gun battery, and the use of RFA drills for tactics and ceremonial displays all mirrored the British system. Vehicular transport was disposed of and the number of horses increased to 'de-mechanise' the Irish artillery.[518]

The Free State army predominantly copied the British army model, and whilst this made sense during the Civil War when there was neither time nor expertise to take another path, it

[515] Theo Farrell, ''The Model Army': Military imitation and the enfeeblement of the army in post-revolutionary Ireland, 1922-42' in Irish studies in international affairs, viii, no.8 (1997), pp 111-27, pp 111, 114.
[516] Maj. Gen. Brennan to Secretary Department of Defence, 7 Oct. 1932 (MA, DOD 2-22712 Ammunition for range practices).
[517] The Royal Artillery were cutting the number of artillery camps for training. M. J. Costello, 'Notes on other armies' in *An tÓglach*, iv, no.4 (Dec. 1931), p. 89. Knight, *The 18-pounder field gun in Canadian service*, p. 30. B. L. Dastrup, 'Travails of peace and war: Field Artillery in the 1930s and early 1940s' in *Army History*, 25 (Winter, 1993), pp 33-41, p. 33. B.P. Hughes, *History of the Royal Regiment of Artillery, Between the wars, 1919-39* (London, 1992), p. 99. The French spent money on the Maginot Line whilst neglecting its field artillery. Jeff Kinard and T. C. Spencer, *Artillery: An illustrated history of its impact* (Oxford, 2007), p. 270.
[518] Minister of Defence, Peter Hughes, Dail debate, 6 May 1926 (Houses of the Oireachtas, xiii, no.11).

need not have become the norm afterwards; remember there were plenty in the force who had experience fighting a guerrilla war. A decade later, the 1934 War Plan (see below) would find a place for guerrilla operations in the army's defence strategy - though the plan itself would be shelved – but army officers in the 1920s believed there was no place for guerrilla tactics in the professional army they were trying to build.[519] A recent claim has suggested that in the effort to establish a conventional force the army became 'overly professional' in its outlook.[520] At the same time the Irish government wanted the Defence Forces to be in a position to be able to cooperate with a British force should an outside aggressor attack '*Saorstat* territory' and an army report in 1928 proposed that the 'British Tactical Establishment and…Tactical Doctrines' should be adopted.[521]

For Mulcahy taking charge of the artillery five years earlier there was no other template to follow but the conventional British model. The Civil War use of the 18-pounder was amateurish, even unprofessional, the Royal Artillery model would make the Corps more proficient. At a time when the General Staff's pleas for a defence policy from the government were going unanswered, Mulcahy established the Artillery Corps as best he could, assuming the structure and doctrine of field artillery units in other armies. The eagerness with which the task was taken in hand must be admired but it created a situation whereby the only ones with the know-how were those in the specialist units like the artillery. This became very clear when a secret memo in 1926 admitted that there were 'no artillery experts on the General Staff' thereby making it essential that 'the Artillery Corps must advise and co-operate…in preparing plans and making decisions' for matters relating to artillery.[522]

The army was very much an infantry-based force.[523] Artillery doctrine at the time stated that one of its fundamental missions was the support of other arms and appropriately the 18-pounder batteries were designated as supporting arms to infantry battalions, Number 1 Battery to the 4 Battalion in Cork and Number 2 Battery to the 5 Battalion in Dublin.[524] It meant that when the battalion went on manoeuvres the battery had to go too. The logistical difficulties for

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[519] Theo Farrell, 'Professionalisation and suicidal defence planning by the Irish army, 1921-1941' in *The journal of strategic studies*, xxi, no.3, (1998), pp 67-85, p. 67.
[520] John Prendergast, 'History is not was; history is' *in Defence Forces review 2013* (Dublin, 2013), pp 11-9, p 16.
[521] Theo Farrell, 'Professionalisation and suicidal defence planning by the Irish army, 1921-1941' in *The journal of strategic studies*, xxi, no.3 (1998), pp 67-85. Hodson, 'Establishing the Irish Military College', p. 109.
[522] Chief staff officer, General Staff to Mulcahy, 31 Dec. 1926 (MA, Coastal Defence Artillery CDA-78).
[523] Patrick Keating, *A place among the nations, Issues of Irish Foreign Policy* (Dublin 1978), p. 84. Duggan, *A history of the Irish army*, p. 147.
[524] US Army command and General Staff College, *Tactics and technique of field artillery* (Leavenworth, 1927), p. 220. Tom Clonan, 'History of the 1 Fd. Arty. Regt.' in *Artillery Corps 1923-1998* (Dublin, 1998), pp 50-2, p. 50.

the Number 1 Battery can be imagined. Field guns, limbers, horses, and men had to be moved by train to Cork. The first time the Irish army transported its artillery by rail after the Civil War was when the Corps in its entirety moved from Dublin to take up residence in the old RFA barracks in Kildare town in 1925.[525] The British Army regularly used the train to move its artillery in Ireland and had guidelines to do so correctly.[526] Later the Irish organised special trains with flat wagons for the field guns, enclosed wagons for horses, and carriages for troops, and platforms on the Curragh were used for loading and unloading. In 1936 a battery marched to Cork from Kildare under its own power. The eight-day journey by horse draught proved how essential the railway was.[527]

The Irish field guns were never going to fire mass barrages like those in France during the Great War, their role instead would always be infantry support. Examples of this type of deployment were seen during the annual manoeuvres, and in September 1926 the batteries were each attached to one of the wargaming 'armies' in the east of the country supporting three infantry battalions. On that occasion the success of one of the batteries in a defensive position was lauded in the military and civilian print media.[528] The 18-pounders were camouflaged 'most effectively and whilst doing good work' remained undiscovered by 'enemy' aircraft.[529] The exercise revealed an interesting level of insight into the problem of concealing an artillery battery, but it failed to highlight a glaring problem. The 18-pounders had only recently been painted grey, moving away from their original Royal Artillery green, and it took an inordinate amount of foliage to camouflage the gun, so much in fact that it would have been extremely difficult to lay and fire the weapon.[530] What is more a contemporary American study that examined the best way to conceal a battery from the air found that the blast from the muzzles of the guns marked the ground in front of the position, revealing the battery location.[531] (figs. 21 and 22) It was a level of detail that seems to have been lost on the Irish gunners.

[525] O'Leary, 'The foundation of the Artillery School', p. 36.
[526] Bethell, *Modern artillery in the field*, p. 211.
[527] Tom Clonan, 'History of the 1 Fd. Arty. Regt.' in *Artillery Corps 1923-1998* (Dublin, 1998), pp 50-2, p. 50.
[528] *Irish Independent*, 21 Sep 26.
[529] *An tÓglach*, v, no.12 (25 Sept. 1926), p. 12.
[530] During the restoration work on gun number 9168 various layers of grey paint were uncovered, but so was a small amount of the Royal Artillery green. Duggan, *A history of the Irish army*, p. 144. *An tÓglach*, v, no.13 (2 Oct. 1926), p. 11.
[531] The American study found that to limit the visible effect of the blast from the muzzle, it was better to position the guns in a wood so that they were firing over an unmetalled road that could be dampened from time to time. Homer Saint-Gaudens, 'Training in field artillery camouflage' in *The military engineer*, xv, 15 (Sept.-Oct. 1923), pp 417-9.

The type of action that the Irish 18-pounder batteries – and the army in general - should train for was not easily discernible during the period.[532] In 1926 the Minister of Defence declared that the army must be 'capable…of assuming responsibility for the defence of the territory of the Saorstát against invasion or internal disruptive agencies or against violation of neutrality on the part of an enemy'.[533] The army was confident that it could handle any threat to internal security involving:

- a serious disturbance in the six counties
- a return to hostilities with anti-Treaty elements
- a major riot.

The deployment of an 18-pounder in one of those scenarios was comparable to the way the gun was deployed in 1922, though the likelihood that they would be needed was low. The guns were not massed along the border with other engines of war as was claimed by some in Belfast.[534] With no obvious danger it was therefore logical for the artillery to adopt a course of training that followed a recognised strategy like the one used by the Americans or indeed the British. Later the tactical doctrines for arms like the artillery were examined by the Defence Plans Division which was formed following the Military Mission to the USA. Trodden was the division's representative in matters that related to artillery whilst Mulcahy was retained for his advice. In 1928 a detailed report was drawn up that considered amongst other things preparation, organisation and tactical doctrine for war, and establishments and education in peacetime.[535] Whilst the plan was broadly accepted by the Minister of Defence, and in its wake the Artillery School was established in 1931, there were no sweeping changes. The Artillery Corps got new 'war equipment', including Mark IV and V field guns in 1928 and 1930 respectively, but there was no real governmental commitment to the plan.[536]

In 1934, under the Fianna Fáil government, the general staff examined 'the situation that would arise in the event of an armed conflict between Great Britain and the Saorstát' and drew up the first war plan for the army which described how field artillery should be

[532] Army commanders asked the government in 1925 what was the nature of the aggression that might be expected and what was the identity of the potential aggressors. The vague answer came a year later. Duggan, *A history of the Irish army*, p. 148.
[533] Minister of Defence, Peter Hughes, Dail debate, 6 May 1926 (Houses of the Oireachtas, xiii, no.11).
[534] Although the claim that 'emanated from Belfast' and expressed concerns about the 'enemy' in the south was absurd, the Minister of Defence, Richard Mulcahy still felt the need to explain that the army's artillery and other equipment was based a lot further south in Dublin or the Curragh. *Irish Times*, 1 Feb. 1924. See also Eunan O'Halpin, *Defending Ireland, The Irish state and its enemies since 1922* (Oxford, 1999), p. 70. The authorities in the six counties were keeping an eye on the army in the south.
[535] For an assessment of the Defence Plans Division see Duggan, *A history of the Irish army*, pp 153-5.
[536] Peter Young, 'The way we were' in *An Cosantóir*, il, no.9 (Sept. 1989), pp 33-38, p. 34. O'Leary, 'The foundation of the Artillery School', p. 36.

deployed.[537] Realising that the army could not possibly resist such an attack in the conventional way the planners considered a mobile, guerrilla style defence that would wear down an enemy whilst 'avoiding the commitment of our own main forces to any decisive engagement' until the risk was justified.[538] A cross between orthodox and guerrilla warfare, the plan used delaying tactics which were followed by local offensive actions and committed six field batteries and one light battery to the operation, a total of 28 guns.[539] The planners concluded that three batteries were sufficient for the eastern section of the frontier, four in the centre, though none could be spared for the west.[540] 'Delaying positions' afforded excellent observation and fields of fire for the artillery whilst there were warnings about areas where the close nature of the countryside might restrict the power of the field gun.[541] The scarcity of artillery meant that it was necessary to advise that weapons should be withdrawn south of the River Boyne once they were taken out of action.[542] It was a novel strategy that could have made use of sections of artillery (two guns) in the 'light mobile formations' that were essential to make it work but it never materialised as a doctrine of war and there is no evidence to suggest that the Artillery Corps changed its training programme to be compatible with the plan.[543]

The conclusions of the Defence Plans Division coincided with the introduction of a new invigorated *An tÓglach* that became a platform for examining the state of the nation's defence system. It is a useful source when investigating the role of the 18-pounder in that system.[544] The great topic of the age, the mechanisation of artillery and of the military in general was discussed continuously in the Irish and foreign military journals at the time and is examined

[537] Department of Defence, General staff, The defence of the frontier zone, Sept. 1934 (MA, PC 1050-03-03 Report GS 1934 war plan), p. 1.
[538] The General Staff, 'Estimate of the situation that would arise in the eventuality of a war between Ireland and Great Britain', No.1, Oct. 1934, (MA, DP/00020), quoted in Theo Farrell, 'Professionalisation and suicidal defence planning by the Irish army, 1921-1941' in *The journal of strategic studies*, xxi, no.3 (1998), pp 67-85, p. 70.
[539] The light battery was made up of 3.7-inch howitzers.
[540] Department of Defence, General staff, The defence of the frontier zone, Sept. 1934 (MA, PC 1050-03-03 Report GS 1934 war plan), pp 30, 36, 67.
[541] Department of Defence, General staff, The defence of the frontier zone, Sept. 1934 (MA, PC 1050-03-03 Report GS 1934 war plan), pp 30, 50.
[542] Department of Defence, General staff, The defence of the frontier zone, Sept. 1934 (MA, PC 1050-03-03 Report GS 1934 war plan), p. 30.
[543] In the report these were called 'light brigades'. The General Staff, 'Estimate of the situation that would arise in the eventuality of a war between Ireland and Great Britain', No.1, Oct. 1934, (MA, DP/00020), quoted in Theo Farrell, 'Professionalisation and suicidal defence planning by the Irish army, 1921-1941' in *The journal of strategic studies*, xxi, no.3 (1998), pp 67-85, p. 70.
[544] Maj. Gen. McNeill, the director of the Defence Plans Division acknowledged that the army was still very much a work in progress and was in the process of developing its 'doctrine of war' which was 'the theory of the use of the nation's forces under particular conditions'. He was not claiming that the American - or British - systems were the best for the Free State, but the study of them allowed the army to acquire 'some uniformity in general training' and the scope to develop a system that was particularly suited to the Irish scenario. Hugo McNeill, 'The defence plans division' in *An tÓglach*, i (Apr. 1928), pp 7-17, pp 9-10, 13.

below, but there were other articles that related to artillery theory. One Irish officer considered the application of sound ranging, a system of target acquisition to find the location of enemy guns using the sound of the shot, but there is no indication that the artillery were preparing specifically for the counter-battery fire that would have been necessary once the guns were found.[545] The relationship between the artillery and the infantry was far more relevant to the Irish situation and was considered by Maj. Dunne shortly after he returned from the US Infantry School.[546] Col. O'Connell examined this subject in more detail and made the point, presumably for the infantryman, that 'the artillery has not an unlimited supply of ammunition' and should only be called upon when dealing with enemy strongpoints that were particularly difficult for the infantry.[547] Related to that subject Col. Costello looked at the problem of supply which was determined by the nation's 'doctrine of war'. He explained that an 18-pounder required 300 rounds per day in combat, so that number should be multiplied by the number of days it was to be in action.[548] The difficulties with the supply of 18-pounder ammunition in the Free State make these considerations somewhat superfluous though the theorizing was genuine.

One subject that was receiving an increasing amount of attention with artillery units in foreign armies was the deployment of field guns in the anti-tank role. One of the first accounts of a field gun taking on a tank came from the Great War battle at Flesquiéres in France where German artillery firing in the direct role defeated British armour.[549] It was not clear at that time however what weapon should be used against the tank and although Gen. Bingham recommended using 6-pounders on pedestals he acknowledged that the general question about anti-tank guns might 'be a subject for useful discussion'.[550] The discussion continued after the war and it was argued that a gun should be designed specifically for anti-tank defence.[551] The far-sightedness of men like Gen. Birch who supported the development of the split trail carriage

[545] Sound ranging was developed by the French during World War I. It determined the position of the enemy guns by using the sound them firing. A. J. Quirk, 'Some theoretical aspects of sound-ranging' in *An tÓglach*, i (Jan. 1928), pp 86-102.
[546] J. Dunne, 'United States Infantry School, Fort Benning, Georgia' in *An tÓglach*, i (Apr. 1928), pp 28-35.
[547] J. J. O'Connell, 'Lecture on liaison with artillery during the attack' in *An tÓglach*, i (Apr. 1928), pp 65-7.
[548] M. J. Costello, 'Some features of our defence problems' in *An tÓglach*, i (Jan. 1928), pp 4-13, p. 12.
[549] Shelford Bidwell, *Gunners at war* (London, 1970), p. 43. For the use of German 77mm guns against tanks at the battle of Cambrai see Palazzo, Albert, 'Plan 1919 - The other one' in *Journal of the Society for army historical research*, lxxvii, no.309 (Spring, 1999), pp 39-50, p. 41.
[550] General Bingham, Agenda for conference on munitions, 17 Aug. 1918 (Churchill papers, CHAR 15/33), p. 47.
[551] It was not until 1938 that the British created specialised anti-tank units, the delay explained partly by the lack of a suitable anti-tank gun. B. P. Hughes, *History of the Royal Regiment of Artillery, Between the wars, 1919-39* (London, 1992), p. 8. J. B. A. Bailey, *Field artillery and firepower* (Oxford, 1989), p. 159.

meant the Mark V 18-pounder could take up this role.[552] The split trail increased the arc of fire on the US Army 75mm field gun by fourteen times allowing it to 'make many more hits on a moving target such as a tank'.[553]

US artillery officers who were developing anti-tank tactics during the 1920-30s, feared they might be resigned to fighting in a purely defensive role on the battlefield, but the changing shape of war brought the artillery forward once again to the frontline to confront enemy armour, whilst firing directly.[554] During an exercise at Fort Sill a battery of field guns engaged tanks at ranges that were less than 3000 yards and a 'roving gun' was deployed as a tank hunter.[555] The exercise took place a few months after Trodden finished his training at the American artillery school, so he must have encountered US doctrine on the subject and the single gun deployment probably appealed to an officer who understood the limitations imposed by shortages of equipment.[556] In Britain RFA batteries were using moving targets to simulate tanks, so it was inevitable that Mulcahy should arrive back to Ireland from his training at Larkhill with plans for an anti-tank range which was subsequently constructed in the Glen of Imaal.[557] The simple system used a large ball for a target that was moved by a pair of horses.[558]

The 'big question' that Mulcahy was asked during the 1923 *Freeman's Journal* interview was what type of gun was most suitable for the Irish?[559] In 1927 the editor of *An tÓglach* asked 'do we require [amongst other things] anti-tank weapons…?'[560] The questions were not so unusual when compared to the conjecturing done by other armies after the Great War. The pole trail and limited traverse on the Mark I and II 18-pounders made these guns unsuitable for anti-tank work, and the purchase of Mark V guns in 1927 shows the artillery were thinking ahead. Cost for once does not appear to have been a deciding factor as the four Mark V 18-pounders were considerably more expensive than the other versions of the field gun.[561] (table 9)

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[552] For Birch's farsightedness see chapter I. The split trail offered a wide angle of traverse and was considered during the development of the 25-pounder. Terry Gander, 'The development of the 25-pounder in *Journal of the Ordnance Society*, xxvi (2019), pp 49-57, p. 56.
[553] The American 75mm M1897 (French) Based on the French *Mle 1897* field gun. G. M. Barnes, 'Our superior modernized 75's' in *Scientific American*, clxii, 1 (Jan. 1940), pp 16-8, p. 16.
[554] Dastrup, 'Travails of peace and war: Field Artillery in the 1930s and early 1940s', p. 35.
[555] E. F. Hart, 'Portée march by Battery "A", First field Artillery' in *The field artillery journal* xvii, no.6 (Nov.-Dec. 1927), pp 592-622, p. 605.
[556] The exercise at Fort Sill took place one month after Trodden returned from the USA.
[557] Hughes, *History of the Royal Regiment of Artillery*, p. 8.
[558] Mulcahy, 'At the beginning', p. 11.
[559] *Freeman's Journal*, 13 Aug. 1923.
[560] M. J. Costello, 'Mechanisation' in *An tÓglach*, i, no.1 (Oct. 1927), p. 5.
[561] The 1927 order was accompanied by a requisition for a large number of ancillary items and equipment that, according to the War Office, was necessary for an 18-pounder battery in peacetime. WO to Irish High Commissioner, London, 25 Feb. 1925 (MA, AFO-16 War Equipment 244 Purchase of Warlike stores).

Item	Cost
18-pounder Mark II	£1,355
18-pounder Mark IV	£1,725
18-pounder Mark V	£1,950
Carriage Limber	£200
Wagon Body	£220
Wagon Limber	£215

Table 9. The cost of 18-pounder equipment offered by the WO in 1925. (Military Archives)

The British field battery which at the time deployed Mark IV and V guns, always located the Mark Vs on the flanks of the gun position.[562] Along with the improved elevation and traversing capability, this variant had the advanced breach mechanism that appeared on the Mark IV which meant the gun could be loaded more rapidly, and the extended cradle ensured the whole thing was extremely steady when firing.[563] It was 'admirably suited' to anti-tank fighting according to Col. Rowan-Robinson and was, at the time, the most suitable weapon in the Irish arsenal for the work, though the Irish batteries did not merge variants of the field gun the way that the RFA did.[564] Nevertheless, Mulcahy as Director of Artillery realised that anti-tank training was 'of the greatest importance' and on the range gun detachments were allotted ten rounds specifically for that purpose.[565] The Irish were not using the armoured piercing shell that was developed for the 18-pounder.[566] Instead for safety they fired shrapnel during training because the ranges were so short. However when the ammunition shortage in 1930 meant no shrapnel was available, HE was used 'to give the battery a chance to carry out its programme as far as possible', though for safety the practice was limited to single gun actions and spectators were not allowed.[567] The Corps in fact only fired one anti-tank shoot that year and Mulcahy complained that he was unable to give 19 NCOs who had completed training, a chance to fire the field gun in the anti-tank role as he had hoped.[568]

The Artillery Corps' Glen of Imaal diary reveals that anti-tank firing was a regular module in the annual training programme by 1936 and generally passed off successfully,

Secretary for the Irish High Commissioner to AFO, Dublin, 2 Sept. 1927 (MA, AFO 16-War equipment 513 List of accessories for 18-pounder batteries Peace Scale).

[562] Hughes, *History of the Royal Regiment of Artillery*, p. 8.

[563] Hogg, *Allied artillery of World War One*, pp 21-4.

[564] Rowan-Robinson, *Artillery today and tomorrow*, p. 29.

[565] Report by Maj. Mulcahy, 30 Sept. 1932 (MA, DOD-2 22712 Ammunition for range practices). Mulcahy's signature, dated Oct. 1929, on a copy of Rowan-Robinson's *Artillery today and tomorrow* suggests that he was reading the Col.'s book.

[566] War Office, *Handbook for the QF 18-pr mark IV gun on marks IIIT, IIITR, IV, IVR, V & VR field carriages* (London, 1932), p. 165.

[567] Mulcahy to Chief Staff Officer, GHQ, 24 May 1930 (MA, DOD-2 22712 Ammunition for range practices).

[568] Mulcahy to Director of Training, 27 June 1930 (MA, DOD-2 22712 Ammunition for range practices).

though the firing range required regular maintenance.[569] Captains Cody and Collins were the anti-tank experts and oversaw most of the practices.[570] Static and moving targets were engaged at ranges between 500 and 1200 yards.[571] It was not simply about shooting and the detachment was assessed on its preparation to meet a tank or AFV attack. Speed and good teamwork were of course essential and commentary from the assessing officers summed up the outcomes of practices. The work of one Volunteer battery was described thus, 'Preparation good. Bad teamwork between No.1 and layers. Detachments very slow to get on to targets'.[572] The regular army, 1 Field Battery gunners fared better, 'Big improvement noticed in manner of taking on AFVs. Shooting very effective. Ten rounds per minute fired by detachments. All moving targets rapidly disposed of.'[573] Their greater experience was evident.

The anti-tank capability of the 18-pounder should have become more relevant at the outbreak of the Second World War. The Artillery Corps had only one 2-pounder anti-tank gun at the time and although the arrival of artillery equipment from Britain late in 1942 led to the establishment of seven artillery regiments, each with an anti-tank battery, the shortage of guns meant that in reality there was only one proper anti-tank gun in each battery.[574] The Chief of Staff, Lt.-Gen. Daniel McKenna was concerned that the army had no capability to deal with tanks and 'the thought of enemy armoured fighting vehicles…really worried him'.[575] The stark reality was laid bare in an army memo from the time, in which the then Director of Artillery, Col. Maher admitted that 18-pounders were 'practically useless against tanks' without firing platforms.[576] The development of the 18-pounder's successor, the 25-pounder, which began life mounted on Mark IV and V 18-pounder carriages, coincided with the introduction of a 360

[569] The Glen of Imaal Camp Diary contains many examples that relate to the information contained here. For examples see entries for 25 May 1936, 16 June 1936, 9 July 1936 (Artillery School, Camp diary, Coolmoney Camp, 1936-41).
[570] Cody was training at Larkhill in 1930. O'Leary, 'The foundation of the Artillery School', p. 37.
[571] The guns regularly fired from east of Leitrim Barracks to the Camaragh, between 700 and 1500 yards. Entry for 9 July 1936, (Artillery School, Camp diary, Coolmoney Camp, 1936-41). 6-inch Cassini map, Ordnance Survey Ireland online at https://webapps.geohive.ie/mapviewer/index.html (20 Sept. 2021).
[572] Entry for anti-tank practice, 30 May 1936
[573] Entry for 23 May 1936 (Artillery School, Camp diary, Coolmoney Camp, 1936-41).
[574] The British left a huge amount of equipment behind at Dunkirk including 509 2-pounders. The Irish subsequently found it very difficult to procure more of these weapons from the War Office until British supplies had been replenished. Mark Nicholls, Linda Washington (eds), *Against all odds, The British Army of 1939-40* (London, 1989), p. 31.
O'Leary, 'The foundation of the Artillery School', p. 37. Mark McLoughlin, *Kildare Barracks, from the Royal Field Artillery to the Irish Artillery Corps* (Sallins, 2014), p. 239.
[575] Michael Kennedy and Victor Laing (eds), *The Irish Defence Forces 1940-1949, the Chief of Staff's reports* (Dublin, 2011), p. xxxviii.
[576] Col. Maher, Director of Artillery to QMG, 10 July 1942 (MA, DOD 2-77487 Guns artillery stores firing platforms 18 Pdr Carriages).

degree firing platform.[577] Strapped beneath the carriage, the wheel-like platform was lowered to the ground and the gun pulled onto it to 'allow rapid all-round traverse for anti-tank shooting'.[578] The Irish ordered twelve of these platforms from the War Office and were careful to state in the requisition that they should be suitable for the Mark II 18-pounder.[579] It was planned to manufacture similar mounts for the rest of the guns, though the army's failure to order connecting linkages and trail spades meant that the platforms could not be used when they arrived in December 1942.[580] It is worth noting however that the Irish were equipping their artillery brigades for anti-tank action as best as they could some years before 'the Emergency' as four Number 22 sighting telescopes – a scope that was fitted to the Mark IV and V guns and was approved for anti-tank shooting – were included in the list of equipment to be made available for a field artillery brigade in 1936.[581]

Since 1926 the army had been trialling different versions of a reserve, it was one of the matters that the Defence Plans Division wanted to address, but the first Volunteer Reserve battery was not formed until 1931 in Cork.[582] The battery drew on the resources of the regular artillery at a time when the strength of the army had been allowed to drop below 6,000.[583] Regular batteries were already short-staffed.[584] Guns - and the personnel required to move them - were brought by rail to Collins Barracks in the city.[585] Recruitment was slow and initially only 22 per cent of the established strength of the battery was filled, but they were quickly brought into the fold of the Artillery Corps and took part in a brigade artillery exercise in the

[577] Chris Henry, *The 25-pounder field gun*, 1939-72 (Oxford, 2002), p. 8. The idea of a platform was first considered in the early 1920s and was known as the Hogg and Paul platform. Terry Gander, 'The development of the 25-pounder in *Journal of the Ordnance Society*, xxvi (2019), pp 49-57, p. 52.
[578] War Office, *Handbook for the Ordnance 25-pr., Marks II and III on carriage, 25-pr. Mark I* (London, 1944), p. 180. Riccio, *The Irish Artillery*, p. 98.
[579] The 25-pounder was mounted on the No. 9 platform. The Irish were looking at purchasing 25/18-pounder variants.
[580] Sixteen of these platforms were sold off by the Defence Forces in 1959. Sales document for arms and ammunition sold by Department of Defence to International Armament Corporation, 22 July 1958 (Courtesy of Mr. Ken Smith-Christmas), p. 4. Capt Lambert to Director of Artillery, 3 Dec. 1942 (MA, DOD 2-77487 Guns artillery, stores firing platforms 18 Pdr Carriages). Secretary, Department of Defence to High Commissioner, London, Indent No.42/1942/43, 18 Dec. 1942 (MA, DOD 2-77487 Guns artillery stores firing platforms 18 Pdr Carriages).
[581] *Provisional war equipment table for a field artillery brigade*, Oct. 1936 (MA, DOD-2-50506 Equipment Regulations), p. 26. War Office, Handbook for the Q. F. 3.7-in. Mark I Howitzer on Mark I carriage (London, 1926), p. 95.
[582] Young, 'The way we were', p. 34.
[583] The regular batteries were responsible for training the reserves. 1 Field Battery was responsible for training in the south, 2 Field Battery in the east and 3 Field Battery the west. Mark McLoughlin, *Kildare Barracks, from the Royal Field Artillery to the Irish Artillery Corps* (Sallins, 2014), p. 197. Duggan, *A history of the Irish army*, p. 159.
[584] Commandant Maher, Half yearly training report, 8 Dec. 1932 (MA, DOD-2-32432 Reports Half-yearly Training January 1932).
[585] Maj. Mulcahy to District Commander, Collins Barracks (MA, DOD-2-25163 Organisation - Artillery Battery of Volunteer Reservists – Cork).

Glen of Imaal in 1932.[586] The volunteers were trained to crew the 18-pounder and the other artillery pieces that the army had acquired, though their experience was restricted by the diktat of the Department of Finance and ammunition shortages meant that they only received half the allotment that was issued to a permanent battery.[587] A reshaped reserve, known as the Volunteer Force was established by the Fianna Fáil government in 1934 creating new part-time batteries that would become part of the regular 'Emergency' army on mobilisation in September 1939.[588] The Glen of Imaal Diary shows that reservist officers in the late 1930s were exercised in-command of batteries of 18-pounders during the same shoot as their permanent counter-parts and there seems to have been no distinction in relation to the ammunition allotment.[589]

The establishment of the first artillery brigade commenced in 1930 and brought together 18-pounders and 4.5 inch howitzers.[590] Although the number of field guns was increasing, they were not all serviceable and one source confirms that some were being used solely for training.[591] Even so, by 1934 the artillery brigade comprised three batteries of 18-pounders and one of howitzers, the size and combination of howitzer and field gun mirroring the British peacetime brigade establishment.[592] Frank Aiken as minister for defence announced in 1936 that he was going to create a second artillery brigade with a dozen more 18-pounders.[593] The Artillery Corps that year published the *Provisional war equipment table for a field artillery brigade* listing the entire equipment schedule that was required in peacetime and wartime.[594] It is not clear if all the equipment was in stores waiting for the mobilisation order but the list is

[586] Maj. J. P. M. Cotter, 28 May 1931 report for adjutant general on recruitment of Reserve Battery Cork (MA, DOD-2-25163 Organisation - Artillery Battery of Volunteer Reservists – Cork). Comdt. Maher, 8 Dec. 1932, half-yearly training report (MA, DOD-2-32432 Reports Half-yearly Training).
[587] Director of Artillery, Mulcahy thought it acceptable to cut the number of rounds by half. This information was passed onto the Department of Finance. Maj. Mulcahy to Chief of Staff, 30 Sept. 1932, and Unsigned, Department of Defence to W. Doolin, Department of Finance, 5 Dec. 1932 (MA, DOD 2-22712 Ammunition for range practices).
[588] The Volunteer Force was established by DFR 14 Peter Durvin, 'The 8 Field Battery' in *An Cosantóir*, xlv, no.8 (Aug. 1985), pp 269-71, pp 268, 270. For histories of artillery batteries and regiments see commemorative editions of *An Cosantóir* mentioned in these footnotes.
[589] Entry for 3 Aug. 1937 (Artillery School, Camp diary, Coolmoney Camp, 1936-41).
[590] The howitzers were purchased in 1925. Duggan, *A history of the Irish army*, p. 163.
[591] The Mark II 18-pounders were being kept for training purposes only. Captain J. J. Keenan, to Captain Flanagan, 10 June 1932 (MA, DOD 2-29995 Guns 18pdr MkII examination).
[592] Report on ammunition required, 9 Sept. 1930 (MA, DOD 2-23202 Purchase of Artillery Ammunition QF 18-pdr Howtizer and antiaircraft estimates 1930-1). Tom Clonan, 'History of the 2 Fd. Arty. Regt.' in Tom Clonan, (ed.), *Artillery Corps 1923-1998* (Dublin, 1998), pp 54-5. B. P. Hughes, *History of the Royal Regiment of Artillery, Between the wars, 1919-39* (London, 1992), p. 5.
[593] *Irish Press*, 25 Mar 1936. Minister of Defence Frank Aiken, Dáil Debates, 24 Mar 1936 (Houses of the Oireachtas, lxi, no.1).
[594] *Provisional war equipment table for a field artillery brigade*, Oct. 1936 (MA, DOD-2-50506 Equipment Regulations).

impressive and extremely detailed. The army was constantly looking for equipment from the War Office to expand or replenish its stock however, and there were lengthy delays getting even small items like an 18-pounder sight.[595] Still by September 1939 there were twenty-nine 18-pounders in service.[596] (table 10)

QF 18-pounder Mark	Quantity
I	5
II	4
IV	8
V	12

Table 10. 18-pounder variants in service with Irish army in 1939. (Military Archives)

The army submitted its case for the defence of the country in 1938 which was – as might be expected - rejected by the Department of Finance, though £2 million was subsequently made available for the purchase of equipment. It was too late. With war on the horizon Britain was not inclined to supply the Irish with the weaponry.[597] Batteries remained understrength and many only fielded two guns.[598] Unsurprisingly the Mark I variants were issued to volunteer units, though it is of note that some volunteer batteries were equipped with the more up to date Mark IV and V 18-pounders.[599] (fig. 23, appendix 7 list of field guns, all variants and location 1941) To properly arm the batteries, extra field guns were required, but by June 1940 France had fallen to the Germans, the British were reeling after Dunkirk, and Winston Churchill was prime minister. In an attempt to persuade the Irish to give up neutrality or at least hand over the ports, Malcolm MacDonald representing the British cabinet, called on Taoiseach Eamon de Valera in Dublin where he heard de Valera's concerns about the vulnerability of the Irish capital to a tank attack and was asked for anti-tank guns to ring the city.[600] Whilst these were not provided, a battery of 18-pounders and another of howitzers, with a substantial supply of

[595] Secretary, High Commissioner to Secretary Department of Defence, 5 July 1938 (MA, DOD-2-51508 Estimates 1935-6 Subhead P Purchase of Gun stores).
[596] One of the best sources to confirm the number of guns in service at this stage is in the Military Archives files on the mechanisation of artillery. It confirms the number and variant of gun and was compiled by Defence Forces staff who were trying to confirm how each gun was converted. See Mechanisation of guns, "A" (MA, DOD 2-52022 Mechanisation Motorisation Artillery Corps. Part II), in which a marginal note lists the complete stock of 18-pounders including 8 that were recently acquired.
[597] Young, 'The way we were', p. 36.
[598] A report from 1928 shows how a section of guns acted as a battery during training. P. A. Mulcahy, Report on artillery firing practice and training in Glen of Imaal 1928, 14 Sept. 1928 (MA, DOD-2 10582).
[599] For the guns in Volunteer Batteries in 1936-7 see (MA, DOD-2-49243, Guns Artillery Inspection of 3 & 13 Field Battery 18pdr Mk IV January 1937) and (MA, DOD 2-49242 Guns Arty Inspection 10 & 11 Field Battery). For battery numbers and status, volunteer or regular see Mark McLoughlin, *Kildare Barracks, from the Royal Field Artillery to the Irish Artillery Corps* (Sallins, 2014), pp 204-5.
[600] For a synopsis of the conversation see Robert Fisk, *In time of war, Ireland, Ulster and the price of neutrality* (London, 1985), p. 190-5.

18-pounder ammunition was received from the War Office that July.[601] They were the last for a while as a directive from the Churchill ordered that 'no equipment, except for the few items already promised, should be supplied to Éire'. Seventeen months passed before the next supply of guns arrived. It included the last four 18-pounders.[602]

An insufficient number of guns meant that older variants of the 18-pounder were still in service with the Defence Forces in 1939 when they were considered obsolete elsewhere but Mark II 18-pounders had been deployed with the Royal Horse Artillery as part of the British Expeditionary Force in France.[603] They were involved in one particularly valiant action around the village of Hondeghem. The relative lightness of the Mark II allowed the gunners to move their weapons around the village to reinforce weak points during the German attack and although the battery ultimately had to retreat, the 18-pounders engaged and defeated some of the enemy's tanks.[604] In England the GHQ of Home Forces recommended that the field gun be issued to the Home Guard in September 1941 realising that there were plenty of ex-gunners around who were trained on it and 18-pounders were deployed singly in villages in the south of the country as tank-stoppers.[605] The Canadians too continued to use the 18-pounder during the early years of the war, at first for training whilst waiting for the first 25-pounders to be manufactured. They had 218 serviceable field guns of all variants at the start of the war and used Mark Is for coast defence and a limited number of Mark IIs to protect the ports.[606]

The Irish artillery remained hopelessly under-gunned during the early years of the war, though the Home Guard example mentioned above shows that it was not unusual to deploy 18-pounder artillery singly or in pairs. The Defence Forces at first was only able to organise small mobile columns to defend the country and artillery pieces were attached as sections to support

[601] This battery of 18-pounders was identified as Mark IV variants in one report, but they were in fact Mark IIs. Michael Kennedy and Victor Laing (eds), *The Irish Defence Forces 1940-1949, the Chief of Staff's reports* (Dublin, 2011), p. xl. Mechanisation of guns, "A" (MA, DOD 2-52022 Mechanisation Motorisation Artillery Corps. Part II) confirms they were in fact Mark IIs.

[602] Other equipment was handed over with the 18-pounders including 4.5in howitzers, 75mm field guns and anti-aircraft guns. They were taken from British supplies in Northern Ireland. Michael Kennedy and Victor Laing (eds), *The Irish Defence Forces 1940-1949, the Chief of Staff's reports* (Dublin, 2011), pp xxxix-xli.

[603] Knight, *The 18-pounder field gun in Canadian service*, p. 34.

[604] Mark Nicholls, Linda Washington (eds), *Against all odds, The British Army of 1939-40* (London, 1989), p. 31. More than 700 18/25-pounder guns were sent to France at the beginning of the war. They were left behind at the evacuation of Dunkirk. Terry Gander, 'The development of the 25-pounder in *Journal of the Ordnance Society*, xxvi (2019), pp 49-57, pp 51-2.

[605] Around the same time three hundred ninety-five 75mm M1917 (British) field guns were shipped to the UK from the USA in 1940. D. M. Clarke, 'Arming the British Home Guard, 1940-1944' (P.H.D. thesis, Cranfield University, Bedford, 2011), pp 247-8.

[606] Knight, *The 18-pounder field gun in Canadian service*, pp 34-5.

infantry-companies.[607] It was not unlike the 1934 plan. More than half of the field guns were deployed in this way.[608] (table 11) The isolated nature of these deployments played havoc with training however and the 2 Battalion used the winter period, in-barracks for battalion level training.[609] In 1941 four field artillery battalions were formed with three batteries in each – they included batteries of 18-pounders and howitzers - and by the end of the year four new field artillery batteries were created when the last batch of Mark II field guns arrived from the UK.[610]

Command	Force	Number of guns
Western Command	3 mobile columns (Sligo/Castlebar, Galway & Athlone) with detachments at Fort Dunree, Malin Head & Longford. 1000 infantry with mortars and armoured cars	12 artillery pieces
Southern Command	3 mobile columns (Tralee, Limerick & Templemore) with reserve between Fermoy and Cork. 500 infantry with mortars and armoured cars.	6 artillery pieces
Eastern Command	2 columns at company strength with small reserve. 100 infantry mortars and armoured cars.	
Curragh Camp	General Reserve. Infantry battalion, mortars, armour.	4 gun battery

Table 11. Artillery pieces deployed with mobile columns early during 'the Emergency'. (Mangan, 'Plans and operations')

[607] With armour support also these units were the perfect combined arms element. One account claims a single 18-pounder was emplaced at Hazelwood House in Sligo. M. J. O'Donnell, 'Artillery in the midlands' in *An Cosantóir*, xliii, no.7 (Nov. 1973), pp 232-1, p. 232.
Padraic O'Farrell, 'Remembering 'The War'' in *An Cosantóir*, xxxix, no.11 (Nov. 1979), pp 346-7, p. 347.
[608] Organised under General Defence Plan No. 1 the columns were at first intended to act as a striking force to primarily protect against a German-assisted IRA takeover, though the threat was expected from either belligerent. Colm Mangan, 'Plans and operations' in *The Irish Sword*, xix, Nos. 75-6 (1993-4), pp 47-56, p. 49.
[609] General report on the Defence Forces for the year 1 Apr. 1941 to 31 Mar. 1942 in Michael Kennedy and Victor Laing (eds), *The Irish Defence Forces 1940-1949, the Chief of Staff's reports* (Dublin, 2011), p. 140.
[610] Organisation Defence Forces, May 1940, Artillery (MA, Emergency Defence Plans, EDP 19/1/2), p. 1. The two guns were the mainstay of the artillery during the Emergency. M. J. O'Donnell, 'The guns' in *An Cosantóir*, xxxiii, no.11 (Nov. 1973), pp 382-4, p. 382. For the expansion of the force during these years see Duggan, *A history of the Irish army*, pp 200, 211. See also General report on the Defence Forces for the year 1 Apr. 1941 to 31 Mar. 1942, and General report on the Defence Forces for the year 1 Apr. 1942 to 31 Mar. 1943 in Michael Kennedy and Victor Laing (eds), *The Irish Defence Forces 1940-1949, the Chief of Staff's reports* (Dublin, 2011), pp 110, 140, 182-3. P. O'Farrell, 'Plaiting the lanyard, An artillery *rechauffe*', pp 26-8, p. 28. M. J. O'Donnell, 'Artillery in the midlands' in *An Cosantóir*, xliii, no.7 (Nov. 1973), pp 232-1, p. 232.

The immense expansion required extra staff and potential officers courses were conducted to qualify NCOs and gunners as battery commanders, though according to the chief of staff the shortage of ammunition lowered the standard of gunnery.[611] There were long periods of training and one artilleryman remembered battery exercises to be highly intensive.[612] For the massive manoeuvres in the south of the country in 1942 complete batteries were attached to infantry battalions and they were emplaced to cover the famous Blackwater River crossing.[613] For anti-tank work the artillery section seems to have been the preferred unit and one Military College course recommended that two guns should cover tank approaches.[614] The role of the artillery was tested during exercises in defence and attack and the siting of gun positions, observation, target selection and 'support fires' all came under scrutiny, as did the gun-position's ability to switch and lift fire.[615] From 1942 with the resumption of firing practices in the Glen of Imaal an intense programme of technical training and shooting was overseen by Artillery School instructors, improving standards generally.[616]

The arrival of twenty 4.5-inch guns from Britain in March 1943 meant the 18-pounder was no longer the army's primary field piece.[617] Seven artillery regiments were created and for the first time Irish gunners could produce the firepower of a divisional artillery in support of the army's two divisions.[618] That firepower was on display for a massive seventy-two gun shoot in the Glen in 1944 that must have included most of the 18-pounders.[619] The chief of staff summed up the result,

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[611] P. A. Mulcahy to Personnel Section, 27 Sept. 1943 (MA, DOD-2 80710 Boards interview, potential officers Artillery Corps). General report on the Defence Forces for the year 1 Apr. 1941 to 31 Mar. 1942 in Michael Kennedy and Victor Laing (eds), *The Irish Defence Forces 1940-1949, the Chief of Staff's reports* (Dublin, 2011), p. 140. The history sheet for 10756 records low numbers of rounds fired during the war years. History sheet, Memorandum of inspection, gun number 10756, 1918 (MA, Personal collections, Ivor Noone, PC 625).
[612] E. D. Doyle, 'War and its aftermath' in *An Cosantóir*, il, no.9 (Sept. 1989), pp 27-32, p. 30.
[613] D Burke, 'A *pot pourri* of memories' in *An Cosantóir*, li, no.9 (Sept. 1991), pp 16-8, p. 17.
[614] Umpire's course 1942, notes for instructors (MA, EDP 59/6 Army exercise 1942), p. 1.
[615] Umpire's course 1942, Umpire's duties in attack and Umpire's duties in defence (MA, EDP 59/6 Army exercise 1942).
[616] General report on the Defence Forces for the year 1 Apr. 1942 to 31 Mar. 1943 in Michael Kennedy and Victor Laing (eds), *The Irish Defence Forces 1940-1949, the Chief of Staff's reports* (Dublin, 2011), p. 228.
[617] R. P. O'Leary, 'The foundation of the Artillery School and a brief history of its development between 1931 and 1998' in *Artillery Corps 1923-1998* (Dublin, 1998), pp 36-40, p. 37. There were 37 18-pounders and 38 4.5-inch howitzers. General report on the Defence Forces for the year 1 Apr. 1944 to 31 Mar. 1945 in Michael Kennedy and Victor Laing (eds), *The Irish Defence Forces 1940-1949, the Chief of Staff's reports* (Dublin, 2011), p. 421. The two guns were the mainstay of the Irish artillery during the Emergency. O'Donnell, 'The guns', p. 382.
[618] Duggan, *A history of the Irish army*, p. 215.
[619] Tom Clonan, 'History of the 2 Fd. Arty. Regt.' in Tom Clonan, (ed.), *Artillery Corps 1923-1998* (Dublin, 1998), p. 54. Gun number 10756 fired 49 rounds over 5 days in may that year. History sheet, Memorandum of inspection, gun number 10756, 1918 (MA, Personal collections, Ivor Noone, PC 625).

> For the first time, the field artillery regiments were long enough formed to be able to carry out technical and tactical training as complete units…both training and range practices were devoted to more advanced subjects than had ever been attempted before and a considerable measure of progress was achieved. Particular attention was paid to the employment of all batteries in a regiment as a complete fire unit.[620]

The 18-pounder field gun was fundamental to the establishment and the development of the Artillery Corps. As the main weapon in the Corps' arsenal during the 1920s the field gun was the blank canvas upon which the Free State army crafted an artillery doctrine of sorts, and its use familiarised the force with artillery tactics and techniques. The Irish general staff was influenced by the training received in the United States, but it was the British system that was followed in relation to artillery, and the shape, structure and size of Irish batteries mirrored those in the RFA. The imitation was of course made easier because the Irish used the same field gun as the British. However, whilst other artilleries came to terms with cutbacks after the Great War, the Free State artillery, from its establishment, suffered from a serious lack of investment. It is true that the force was able to grow from one single battery to two regiments by 1939 largely through the purchase of more 18-pounders, but the potential of the reserve was never fully exploited and the achievement was testament to the officers and men who had to work with the limits that were imposed by a financial department that clearly cared little about results. It meant that Irish 18-pounder gun crews would never receive the same level of training as their British counterparts. Irish artillery officers fired 60 per cent less rounds to qualify each year. They simply could not have been as well trained. And the restricted number of rounds allotted to NCOs must also have lessened capability within the force. The artillery's strict discipline and attention to detail was manifested in the appearance of the 18-pounder detachment with its team of horses, limber, and gun, during state occasions. It would be unfair to suggest that the Irish standard of drill and care for the field guns was inferior to that in the RFA, but despite the best intentions, when it came to firing the gun, the Irish gunner was less experienced. Thankfully they were never truly tested. Things improved shortly after the last batch of 18-pounders were delivered, and the massive, though mixed arsenal in 'the Emergency' army, along with an intense training programme allowed for the expansion of the Irish Artillery Corps and it was brought to a standard that meant it could fight conventionally when required. It is a suitable cut-off point for this study though a future project might examine in detail the role of artillery generally during 'the Emergency'. When the Irish took the 18-

[620] General report on the Defence Forces for the year 1 Apr. 1944 to 31 Mar. 1945 in Michael Kennedy and Victor Laing (eds), *The Irish Defence Forces 1940-1949, the Chief of Staff's reports* (Dublin, 2011), p. 397.

pounder from the British they followed by adopting the artillery doctrine that went with it and although that doctrine may not have been ideally suited for a small nation with a miniscule artillery it exercised the Irish gunner in such a way as to be able to crew the field gun come what may.

Chapter IV
Maintenance and Mechanisation

An important aspect of the 18-pounder field gun during its service in the Irish Defence Forces was its upkeep. The force was completely unfamiliar with this type of maintenance work in 1922 when the artillery pieces were handed over and it was necessary to learn fast and develop a system that allowed the weapon to be maintained and cared for properly. Perhaps unsurprisingly the British and Canadian model was adopted, and a small team of trained specialists were located at battery level within the Artillery Corps. These soldiers had the capability to maintain and repair the weapon to a specific standard. For more demanding repairs the guns were brought to Islandbridge Barracks where technicians from the Ordnance Service worked. The work of the Artillery Corps personnel and that of the Ordnance workshops' staff was overseen by a technical officer from the Ordnance Service and the files that survive from Ordnance records have been invaluable when researching this chapter. Inspection reports recorded the condition of the Irish guns and allow the researcher to examine aspects like barrel wear. Damages, faults, and mechanical failures were detailed at the time, so too were the repairs that were made and the spare parts that were used. Contemporary lists of spare parts that were purchased from the War Office show what type of components were requiring replacement. By combining this research with British textbooks and treatises it is possible to understand the methods used by the Irish maintenance technicians. This chapter also examines the mechanisation of the 18-pounder, a project that was to see the replacement of the horse-team with a motor vehicle which in turn required alterations to be made to the gun. It was a massive undertaking that extended the service of the gun by making it more suitable for contemporary warfare.

The technical nature of a piece of artillery like the 18-pounder meant that it required regular maintenance to keep it functioning properly. A preventative maintenance programme was structured around the inspection of the weapon and included the examination of the ordnance and its carriage and equipment by technically qualified personnel. At a lower level the gun required regular care and attention to ensure moving parts were kept free of dirt and rust and War Office manuals warned that 'cleaning and oiling are…necessary to preserve the equipments'.[621] Royal Artillery officer and historian Maj. Gen. Sir John Headlam, remembered

[621] War Office, *Handbook for the QF 18-pr mark IV gun*, p. 210.

that object lessons were learned with the introduction of the quick firing gun as 'improper shooting and frequent breakdowns' were experienced when it was not looked after.[622] The introduction of the 18-pounder to the Royal Artillery coincided with the attachment of extra armament artificers to the artillery brigade and the replacement of 'wheelers' with fitters to work on the gun carriages.[623]

There were distinct echelons of maintenance, (table 12) though it was 'desirable', when possible, that repairs should 'be carried out on the spot' at battery level.[624] The Irish

Echelon/Level of maintenance	**Location**
1	User/operator maintenance, carried-out by the gunner
2	Artillery Corps artificers and fitters. Battery level carried out in an Artillery Corps' workshop.
3	Ordnance Service/Ordnance Corps, work carried out in an Ordnance workshop, probably in Islandbridge Barracks.

Table 12. The echelons of maintenance.

Artillery Corps copied the British system and had tradesmen amongst the gunners in the 18-pounder battery who were qualified to look after the ordnance, the gun carriage and wheels, and the leatherwork and harness equipment.[625] The work could be carried out on the ground or in the Corps' workshops. The Great War 18-pounder battery strength incorporated seven of these tradesmen including a pair of fitters, who were probably the most qualified personnel at this level. British and Canadian artillery brigades also had a senior NCO, an armament artificer, attached from the Ordnance Corps to oversee the work.[626] This man was a very capable technician whose work was limited only by the tools at his disposal. The Irish adopted a similar

[622] Headlam, *The history of the Royal Artillery*, p 89.
[623] The 'wheeler' was a tradesman who worked on wooden gun carriages. The term seems to have continued into the twentieth century even though the only timber on an artillery piece like the 18-pounder was found in the spokes and felloes of the wheels. The rest of the wheel, the tyre, the pipe-box and hub were steel and bronze. Headlam, *The history of the Royal Artillery*, p. 90.
[624] War Office, *Treatise on service ordnance*, p. 633.
[625] The tradesmen in the battery also included personnel who kept the horses shod. *History of the Royal Regiment of Artillery*, p. 20.
[626] Ronald Clifton, *Unit organisation 1914-1918, Royal Horse Artillery, Royal Field Artillery, Royal Garrison Artillery, Military fact sheet No.7* (London, 1996), p. 3, online at https://www.westernfrontassociation.com/world-war-i-articles (25 May 2021). The Canadian artillery brigade also included a farrier sergeant, two shoe smiths and two saddlers. Knight, *The 18-pounder field gun in Canadian service*, p. 24.

structure on the establishment of the Artillery Corps in 1924 and a government White Paper decreed that each battery was to have an artificer and a 'wheeler', both with the rank of corporal, and a company sergeant who was a fitter was to be located with the Corps' headquarter element.[627] (table 13)

Rank	**Number**	**Trade**	**Sub-unit**
Company Sergeant	1	Fitter	Corps' Headquarters Staff
Sergeant	1	Farrier	Battery
Corporal	1	Maintenance	Corps' Headquarters Staff
Corporal	1	Artificer	Battery
Corporal	1	Wheel builder	Battery
Corporal	1	Saddler	Battery
Gunner	4	Maintenance	Battery
Gunner	1	Saddler	Battery
Gunner	2	Shoeing smiths	Battery

Table 13. The positions and trades of maintenance personnel in the Artillery Corps on it establishment in 1923. (Military Archives)

Even the most basic trade qualifications were welcomed by the army during the chaos of the Civil War. John Pinkman, an infantryman in the Dublin Guards, remembered being asked to transfer to the 'corps of mechanical engineers' to look after small arms when it was learned that he had worked as an apprentice fitter on the docks in Liverpool.[628] However from the start there were problems filling the artificer vacancies. It is strange that there were none qualified amongst the Royal Artillery men that joined up in 1922, nor amongst the senior NCOs listed as 'artillery' on the army census. This may have had something to do with low rates of pay. The first artificer for the Artillery Corps was Company Sergeant A. G. Laverick, who filled the vacancy in the corps' headquarters and was in the process of training a junior man in 1924. However, the offer of a promotion and better pay with the RAF in Iraq caused Maj. Mulcahy, the commander of the artillery to panic, fearing he was going to lose Laverick. Mulcahy sought

[627] The use of the term 'wheeler' suggests that those who were advising on and creating the establishment of the Artillery Corps came from an earlier era. Maj. Patrick Mulcahy to chief of staff's branch, 19 Aug. 1924 (MA, Organisation of Artillery Corps, MS-009-08).
[628] Pinkman, *In the Legion of the vanguard*, p. 98.

to have Laverick's 'pay or rank…increased so as to get him to re-attest in April 1926' when his contract ended.[629] The result of Mulcahy's representation is not recorded.

There were large areas of bare metal on the 18-pounder that needed to be kept clean and bright and protected from the climate.[630] It was up to the gun detachment to ensure that this was done. The materials for care and cleaning were officially listed in a military directive published as late as 1937.[631] The document listed the quantities of materials that were available for each battery and the intention seems to have been to limit wastage. For example the amount of lubricating grease that was allowed for each 'wheel in constant use' was reduced by half for 'each wheel not in constant use'.[632] Unsurprisingly the allocation of paraffin was increased 'as necessary' for cleaning the bores of guns after firing.[633] The field gun had more than fifty oiling points that required attention on a weekly basis or more frequently if the piece had been exposed to wet or dusty conditions, and areas like the lubricator on the breech block carrier required the artificer's 'special attention'.[634] (fig. 25)

The work of the Artillery Corps' fitters and artificers was overseen by an officer from the Supply and Ordnance Sub Department.[635] In this role Johnny Doyle, the Ordnance captain who commanded one of the field guns during the Civil War, was well known to the artillery and his name became synonymous with the 18-pounder during the 1920s.[636] (fig. 26) As a lieutenant he was listed as an armourer in the Ordnance Corps prior to the outbreak of the Civil War and he was appointed chief armourer by March 1923.[637] Ordnance was established as a Corps in May 1922, one month before the arrival of the 18-pounders, and had links going back

[629] Before entering the Irish military Laverick was one of 159 specially trained personnel gun artificers in the British Army. He was tempted by the RAF with the offer of the rank of Sgt. Maj. and a pay rate of 17 shillings and 6 pence per day. Maj. Patrick Mulcahy to assistant chief of staff's branch, 18 Dec. 1925 (MA, Organisation of Artillery Corps, MS-009-08).
[630] War Office, *Handbook for the 18-pr Marks I to II guns*, pp 164-6.
[631] Stationary Office, *Defence Force Regulation 7, Care and preservation of artillery equipment* (Dublin, 1936). Maj. Mulcahy to Q Branch, Care and preservation of artillery equipment, 20 Mar. 1935 (MA *DOD* 2-41294 Care and preservation of Arty equipment).
[632] Stationary Office, *Defence Force Regulation 7, Care and preservation of artillery equipment*, pp 2-4.
[633] Ibid.
[634] War Office, *Handbook for the 18-pr Marks I to II guns*, pp 164-6. War Office, *Treatise on service ordnance*, p. 630.
[635] The supervision by a qualified officer for this type of work was recommended by the War Office. War Office, *Treatise on service ordnance*, p. 633.
[636] Doyle accompanied gun number 10756 to Drogheda and to Cork and by the end of the war he was in Limerick looking after 18-pounders. Letter from Commandant General Hogan to Doyle, 25 July 1923 (Curragh Museum, Doyle family Papers). His 'long experience' was acknowledged by the Artillery Corps. Maj. Mahon to QMG, 30 May 1928 (MA, DOD-2 15082).
[637] *An tÓglach*, 27 May 1922, p. 7. *Irish Times*, 23 Mar. 1923. Before joining the Royal Navy Doyle worked as a plumber's mate and a brass finisher in Dublin. Letter from Anna Palmer, daughter of John Doyle to author, 25 May 2020.

to the pre-Truce fighting.[638] The army re-organisation made the unit part of the QMG's Branch and amalgamated it with the Supply Corps to form the Supply and Ordnance Sub Department in 1924.[639] The new units' headquarters was located at Islandbridge Barracks in Dublin where the depot, workshops, school and stores were situated, and an officer and a sergeant armourer were stationed in each of the command districts.[640] The Ordnance Service was responsible for the purchase, storage, distribution, inspection, repair and overhaul of a huge variety of military stores including artillery equipment. It looked after the supply of spare parts, ammunition and optical instruments; essential components for the deployment of an 18-pounder battery.[641] The special edition of the *Freeman's Journal* in August 1923 described how 'repairs to arms of all descriptions, from an 18-pounder artillery piece to a revolver are carried out by the skilled workers of the Army Ordnance Department'.[642] Even at this early stage, the workshops was properly equipped, and the overhaul and repair of field guns was 'expeditiously and efficiently carried out.'[643] It will be remembered that the Artillery Corps was located in the same barracks at the time, and an accompanying image in the newspaper depicted ordnance technicians working on a pair of field guns, one of which was being reassembled after an overhaul. (fig. 27)

This was third echelon work and was as specialised as it got. In wartime France the Canadians fielded a mobile workshop behind the frontline where a team of Ordnance technicians carried out repairs of this type that could not be done at battery level. The toll that the war took on the field gun was very clear to the Ordnance who, during one six-week period in 1917, repaired more than half of the Canadian 18-pounders.[644] The British also had workshops behind the lines in France where 18-pounders were overhauled and spare parts were manufactured.[645] As the intense rates of fire took their toll on artillery pieces during the autumn of 1916 there was increased pressure to expand repair facilities. The number of worn guns in the field rose every week and a repair programme was put in place. The life of a gun firing at such intense rates was estimated at one year before the barrel would require relining.[646] This

[638] *An t-Óglach*, 27 May 1922, p. 7.
[639] J. G. McDonald, 'The Army Ordnance Corps' in *An Cosantóir*, xxxvii, no.3 (Mar. 1977), pp 75-89, p. 75.
[640] The armourer was trained to work on small arms. J. G. Mc Donald, 'The Army Ordnance Corps', p. 76.
[641] Islandbridge had been the home of the British Ordnance Depot. *Belfast Newsletter*, 15 Dec. 1922.
[642] *Freeman's Journal*, 13 Aug. 1923.
[643] Ibid.
[644] Doug, *The 18-pounder field gun in Canadian service*, p. 24.
[645] Report by A. McD. Duckham, Advisory Committee, and observations from F. R. Bingham on same, 17 and 20 Nov. 1916 (The Churchill Archive, University of Cambridge, CHAR 15/7), pp 37-42.
[646] For a full and detailed account of third echelon and factory level repairs see Ministry of Munitions, *The official history of the Ministry of Munitions, The supply of munitions, Part I, Guns*, x, pp 75-9.

could not be done in France but had to be undertaken by the Royal Gun Factory or the other armament factories in Britain.[647] An inspection department was established in Southampton to receive, sentence, and despatch returned guns to the appropriate facility and by 1917 18-pounder repair work had moved from the Woolwich, Vickers, Armstrong and Elswick factories to the Leeds National Ordnance Factory.[648] It was hoped that 500 18-pounder barrels would be relined without affecting the production of new guns, though it was telling that there were problems getting the guns off the front line.[649]

Of course, the 18-pounder was never subjected to this type of wear in Irish service, but regular inspections were nevertheless carried out. It was crucial that the field gun's barrel should be examined periodically as part of the maintenance programme in accordance with the *Land Service, Regulations for Army Ordnance Services, Part II*.[650] The 'life' of a gun barrel was measured in quarters and was determined by the number of rounds it fired. A visual inspection of the bore was also carried out to ensure there was no damage, scoring or pitting inside.[651] (fig. 28) An 18-pounder could fire up to 12,000 rounds during its life and reached its first quarter at 3,000 rounds. The 1908 *Treatise on Service Ordnance* directed that an 18-pounder barrel should be examined after every 150 rounds, but the authors of the treatise could not have foreseen the rates of fire that gun barrels would be subjected to during the Great War and the numbers of rounds between inspections increased so that by 1923 it had reached 500.[652]

Barrels were designed to withstand the high pressures that occurred during firing, but high rates of fire generated massive heat and the hot powder gases that were produced had a greater and more detrimental effect on the barrel due to the heat from excessive firing.[653] One wartime general summed up the problem by saying 'up to this the guns have eaten up the shells; we shall now see the shells eat the guns'.[654] Fighting outside Lens in 1917 the Canadian field artillery fired their guns at such a high rate that they wore their barrels out.[655] The Canadians believed that it was better to use the artillery in such a way as to save the lives of their

[647] Even before the war there were certain tasks that could only be carried out at the factories. War Office, *Treatise on service ordnance*, p. 633.
[648] See Chapter I for the manufacture of at least one of the Irish 18-pounders at the Leeds factory.
[649] Only half of the 18-pounders that were promised were sent back from France for repair in the factories. Ministry of Munitions, *The official history of the Ministry of Munitions, The supply of munitions, Part I, Guns*, x, pp 77-9.
[650] HM Stationary Office, *Textbook of service ordnance*, pp 132, 137.
[651] For the inspection of and faults found in a piece of ordnance see HM Stationary Office, *Textbook of service ordnance*, pp 137-44.
[652] Ibid., p. 718. HM Stationary Office, *Textbook of service ordnance*, p. 153. Ministry of Munitions, *The official history of the Ministry of Munitions, The supply of munitions, Part I, Guns*, x, p. 75.
[653] Crowell, *America's munitions 1917-1918*, p. 40.
[654] Headlam, 'Developments in artillery during the war', p. 311.
[655] Strong and Marble, *Artillery in the Great War*, p. 139.

infantry.[656] Officially it was recommended that the 18-pounder should not fire more than two rounds a minute when firing for an hour, an effective rate of fire of 120 rounds per hour, and although four rounds per minute was attained regularly for shorter periods, barrage fire plans were generally timed to allow a period for the barrels to cool.[657] The 18-pounder's history sheet only recorded the numbers of rounds fired, not the rate of fire, so this made it difficult to assess the damage that might be done to the bore during these massive barrages and it made the physical examination of the bore extremely important.[658] It was a task that was overseen by the Ordnance officer who was equipped with various gauges, and measuring and inspection equipment for the purpose. The purchase of this equipment by the Irish in the mid-1920s demonstrates a commitment by the Ordnance Service to correctly maintain the field gun by properly monitoring the wear on the 18-pounder barrels. (table 14)

Inspecting Equipment	**Limits**	**Remarks**
Gauge striker protrusion No.1	0.09-0.11in	To check the firing pin
Gauge checking clearance firing hole bush to cartridge No.7		To check the distance between the face of the breech and the base of a shell case
Gauge testing clinometer plane and axis of bore No.9		Comes with measuring rods
Instruments taking impression No.2		To take an impression from the inside of the bore
Gauges plug bore		A go-gauge for the bore
Gauges acceptance after lapping		

Table 14. List of tools and gauges used to inspect an 18-pounder. (War Office, *Treatise on service ordnance*)

[656] A. G. L. McNaughton, 'The development of artillery in the Great War' in *The field artillery journal*, xx, no.3 (May-June 1930), pp 256-71, p. 261.
[657] War Office, *Handbook for the 18-pr Marks I to II guns*, p. 167. US Army War College, *Artillery operations of the Ninth British Corps at Messines*, p. 66.
[658] A guide in the History Sheet for gun number 10756 recommended that the bore should be inspected every 250 rounds. The 375 rounds that were fired during the Four Courts bombardment meant that this gun barrel was overdue an examination before the gun was brought to Drogheda on 4 July. History sheet, Memorandum of inspection, gun number 10756, 1918 (MA, Personal collections, Ivor Noone, PC 625).

The rates of fire and numbers of rounds fired during the Civil War are unlikely to have caused any major problems with the barrels of the Irish 18-pounders, though the wear on number 10756, the weapon that fired 375 rounds at the Four Courts, is worth examining. Its history sheet records that between proof firing in 1918 and 1926 the wear on the barrel was twice as much as that recorded during the rest of the gun's service.[659] The wear on the other Mark II guns used at the Four Courts may have been as extensive but without history sheets it is impossible to evaluate. Whilst the Mark I guns may have been used during the Great War, in Ireland in 1922 they were more likely to suffer damage through neglect or a lack of cleaning after firing than from the firing itself. With that in mind it is surprising that so few mechanical problems occurred during the war when the weapons were being handled by inexperienced crews. It is certainly of note that the two major mechanical failures that did occur were due to issues that were related to the weapon's service before they were handed over to the Provisional Government.

Joe Sweeney's field gun jammed during the shelling of the fort on Inch Island and according to the Royal Artillery officer who inspected it at Fort Dunree afterwards, 'was never in a firing condition as it was not properly assembled'.[660] The repairs were described in the RGA Battery Digest,

> The two battery fitters took the recuperator and buffers down and worked incessantly the whole day till 10pm; the control ram [rod] had jammed in the piston and necessitated enormous labour to get it out again, the control ram had burred and had to be filed for 3hrs., dirt was removed from the piston and rust and all the glands overhauled and repacked.[661]

The Royal Artillery officer reported to Macready that gun was in 'very bad condition', it was rusty and had no oil in the buffer.[662] This would cause major problems during recoil and run-out and the recoil would be extremely violent which makes it understandable that Sweeney would not been inclined to use his artillery piece again. (table 15)

[659] The measurements show that 0.009 inches of wear was measured after proof firing in 1918, 0.021 inches of wear in 1926 and only 0.0275 inches of wear over the next twenty years. History sheet, Memorandum of inspection, gun number 10756, 1918 (MA, Personal collections, Ivor Noone, PC 625).
[660] Report from No.2 Brigade, 1 Northern Division, 16 July 1922, (UCDA, Mulcahy papers, P7/B/109), p. 271.
[661] Battery Digest for 15 Heavy Battery, RGA, 15 July 1922 (RA, Museum archive).
[662] Secretary of state for war, Report on the situation in Ireland week ending 22 July 1922, 28 July 1922 (Cabinet Papers, CAB 24/138/34) p. 2.

Fault	Cause	Remedies
Recoil violent	Air in buffer cylinder. Insufficient oil in buffer system Reduced air pressure in recuperator.	Operate relief valve. Fill buffer and recuperator. Test and recharge recuperator.
Recoil excessive	Wear of piston and valve. Faulty packing. Buffer nearly empty.	Re-adjust correcting gear. Tighten gland. Fill buffer and reservoir.
Recoil short	Damaged slides. Excessive air pressure. Correcting gear wrongly set. Excess liquid in recuperator. Packings too tight.	Examine and repair. Test and expel surplus. Test and adjust gear. Repack.
Run-out slow	Plug adjusting run-out incorrect. Burrs or grit on slides. Reduced air pressure. Packings too tight.	Open plug. Remove obstruction. Test and adjust pressure. Repack.
Run-out violent	Plug adjusting run-out incorrect. Excessive air pressure. Retarding valve stuck in open position.	Close plug further. Test and expel surplus. Strip recuperator and replace valve.
Failure to run-out	Too much oil in buffer. Air in buffer. Plug adjusting run-out closed. Burrs or grit on slides. Reduced air pressure in recuperator. Packings too tight.	Loosen plug 'N'. Operate relief valve. Open plug. Remove obstruction. Test and adjust pressure. Repack.

Table 15. A list of faults, causes and remedies for problems with the recoil system. (War Office, *Handbook for the 18-pr Marks I to II guns.*)

A similar problem occurred with serial number 5732, another Mark I 18-pounder. Doyle inspected this weapon and found a defective plug in the recoil system that 'blew out after the gun fired…thereby allowing the liquid to escape'. He found that the recoil system was rusted and ineffective and he determined that a lack of proper care and attention 'during the period previous to its take-over' by Free State forces worsened the outcome.[663] So convinced was Gen. Mulcahy that the fault lay with the British that he wrote to the assistant under-secretary Sir Alfred Cope to advise on the best way forward with the matter if the Provisional

[663] Mulcahy to Cope, 29 Aug. 1922 (UCDA, Mulcahy papers, P7/B/43), p. 1.

Government should have to pay for the weapon.[664] In the meantime under Doyle's supervision the armourers in the Ordnance workshops in Islandbridge repaired the piece and sent it back into action.

Departing British field artillery units in 1922 had been handing their 18-pounders over to the Royal Army Ordnance Corps since the beginning of the year and some of the guns – the Mark I variants - may have been lying uncared-for for some time before they were given to the Irish.[665] The huge numbers of 18-pounders that were left over after the war probably meant that Mark Is in particular were neglected as the Mark IV and V variants were entering service. It was not the first account of Royal Artillery guns suffering from this type of malfunction. According to Captain E. Gerrard of the RFA, the 18-pounders that were used to shell Dublin during Easter Week needed to be 'oiled and pumped by artificers' before they could fire. He admitted that all eight guns stored in Athlone suffered from neglect.[666]

The Free State army too, failed in this respect. There is evidence to show that the Mark II 18-pounders did not receive 'proper care and attention in 1922 and 1923' and as a result were only suitable for training purposes a decade later.[667] It is likely the damage occurred during the long guerrilla phase of the Civil War when the field guns were rarely used.[668] Doyle found 'pitting' on the surfaces of recuperator pistons and cylinders and recommended that new recuperators be purchased.[669] It was subsequently deemed acceptable to continue to use the weapons for training and replace the new components only when the guns were to be fired. The history sheet for one of the guns verified that between 1929-35 it never fired a shot. It will be remembered that this was a period that was marked by ammunition shortages though the use of the Mark II gun again from 1935 suggests the recuperators had been replaced by that time.[670]

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[664] Report by Captain John Doyle, 6 Aug. 1922 (UCDA, Mulcahy papers, P7/B/43), p. 3. See also Niall Harrington's research notes (NLI, Harrington papers MS 40662).
[665] Movement instructions for RHA stations 1921-3 (RA Archive, AMOT039_WW1_RHA), online through The Ogilby Muster at https://www.theogilbymuster.com/ (20 Oct. 2021). Battery digest, 16 Battery RFA (RA Archive, Larkhill, AMOT039_WW1_field.battery.16-0163), online through The Ogilby Muster at https://www.theogilbymuster.com/ (10 Oct. 2021). Sandys, The last months of 5 Divisional Artillery, Sandys papers, 1920 (RA Archive, AMOT039_WW_MD.211.5), p. 3, online through The Ogilby Muster at https://www.theogilbymuster.com/ (27 Oct. 2021).
[666] Captain E. Gerrard, Bureau of Military History witness statement (MA, BMHWS 348), pp 2-3.
[667] Captain J. J. Keenan, memo, 18 June 1932 (MA, Guns 18Pdr MkII Examination, DOD-2 29995).
[668] Patrick Mulcahy, 'At the beginning', p. 377.
[669] Lieutenant P. P. O'Farrell to QMG Branch, 20 Apr. 1932 (MA, Guns 18Pdr MkII Examination, DOD-2 29995).
[670] History sheet, Memorandum of inspection, gun number 10756, 1918 (MA, Personal collections, Ivor Noone, PC 625).

The hydro-pneumatic recoil apparatus had many advantages over the old oil and spring system, but as stated in one manual, it required 'more care on the part of the personnel to keep it efficient'.[671] It was important that the system be properly filled with air and oil prior to going on the march, quick checks should have been made during halts and, before going into action glands and packings should have been examined for leaks.[672] A loss of oil or air could cause serious problems.[673] (table 15) A gun that was not fired regularly needed to be 'exercised' by pulling the barrel back to simulate recoil. Like the barrel, the recoil system should have been stripped and examined on a regular basis. In this way a light 'pitting' would be discovered and could be monitored, and a glycerine mixture added to the oil to prevent it getting worse.[674] The failure to prevent the worsening of the damage to the Mark II recuperators suggests they were not being checked properly during the early years. Inspection reports show that the buffers on the Mark I field guns suffered a similar fate, while the Mark IVs appear to have been better maintained and in 1938 their recoil systems were still in a serviceable condition after more than a decade of use.[675] A stock of parts purchased in 1930 which included seals and packings for the Mark IV recoil system implies there was by then, a clear realisation of what was required.[676]

The Supply and Ordnance Sub Department officially became the Army Ordnance Service in 1931 and was renamed the Army Ordnance Corps in 1942.[677] In 1939 the artificers serving with the Artillery Corps were transferred into the Ordnance Service and the technical repair of artillery was left to Ordnance personnel.[678] The first official armament artificer's course was conducted in the Ordnance School in 1946 for personnel who were already qualified

[671] War Office, *Textbook of gun carriages and gun mountings*, p. 122.
[672] War Office, *Handbook for the 18-pr Marks I to II guns*, p. 171.
[673] It will be remembered from Chapter I that the Mark I carriage was mounted with a recoil system using oil and springs. This helped to cushion the recoil during firing and the springs helped to return the gun to the battery (fully run-out/forward) position. If there was a loss of oil in the system the recoil and run-out would become very rough or violent. The Mark II carriage with the hydro-pneumatic recoil system used air in place of the springs. With that there was the potential to lose air and/or oil. In this case the result would also be a violent movement of the barrel when firing and if enough air was lost the barrel would remain in the rear position, unable to run-out. This could be rectified by pushing the barrel into the battery position by hand, a difficult job to be done by the gun crew.
[674] War Office, *Handbook for the 18-pr Marks I to II guns*, p. 173.
[675] Inspection reports for 10 and 11 Field Batteries, 18pdr MkI carriage, (MA, DOD-2 49242). Inspection reports for 6 and 7 Field Batteries, 18pdr MkIV carriage, 18 May 1938, (MA, DOD-2 49240).
[676] Issue vouchers for Ordnance QF 18pdr MkIV parts, 6 Aug. 1930 (MA, DOD-2 23619). In an interview with the author retired Ordnance Corps artificer Joe Eaton remembered that the remaining 18-pounders required a lot of work on the recoil systems in the 1960s, though the guns were well looked after. Joe Eaton interview, 12 June 2020.
[677] McDonald, 'The Army Ordnance Corps', p. 76.
[678] The artillery's growing arsenal no doubt had something to do with this move. The new weapons included 4.5-inch and 3.7-inch howitzers, coastal guns since the handover of the forts in 1938, and anti-aircraft guns. It would not have been possible to retain enough artificers and fitters in every battery.

as fitters or turners before they joined the army.[679] The list of tests that they were required to pass indicates that they were highly qualified technicians.[680] (see appendix 8) It is difficult to find any mention of official training for artificers in the Artillery Corps or in Ordnance prior to this and it may have been done on the job in same way that Laverick instructed his trainee in 1924. The technical officers in the Ordnance Service entered the army with a degree in either engineering or science and they were subsequently trained in the Ordnance School to a standard that allowed them to oversee the work of armourers and artificers. During the 1920-30s they attended training courses at the Military College of Science in Woolwich which for the mechanical engineers included training on artillery systems.[681]

Overall, there appears to have been a good relationship and a close association between the artificers in the artillery and the Ordnance Service. There were times when the Artillery Corps was 'without the services of a qualified artificer' and Doyle was ordered to Kildare Barracks to supervise the 'reconditioning' of the field guns in May 1928.[682] His 'long experience' was readily acknowledged by the Artillery Corps who were test firing the new Mark IV 18-pounders that year and they specifically requested that he be allowed to attend the firing practice in the Glen of Imaal.[683] When the Artillery Corps moved into the Curragh Camp for a time in 1937 the Ordnance directorate arranged for proper facilities to be made available in the artillery workshops. Prior to the intervention of the Director of Ordnance the workshop was situated beside a carpenters' shop which caused the work on recuperators to cease due to the high levels of dust. The carpenters were moved, a proper hoist was installed, and an electrically powered lathe was ordered.[684] Ordnance officers reporting on the matter seem to have been most eager to 'restart the recuperator work'.[685]

Ordnance officers signed-off on the work that was done by the artillery and their reports reveal the type of maintenance that was taking place at battery level. Along with the work on the recuperators they were overhauling breech blocks and were carrying out the repairs that

[679] For a photograph of the first artificers' course see Ordnance Corps, *A chronicle of the Ordnance Corps 1930-46* (Dublin, 1996), pp 16-7.
[680] Director of Training, *Test for the award of stars, Ordnance Corps* (Dublin, 1952), p. 3.
[681] McDonald, 'The Army Ordnance Corps', p. 76.
[682] Maj. Mahon to QMG branch, 30 May 1928 (MA, DOD-2 15082).
[683] Ibid.
[684] Prior to the this there was an old and rather primitive treadle lathe in the workshop. Lieutenant J. G. McDonald, Report on artificers' workshop, 22 May 1937, and Commandant Buggle Report to Director of Ordnance, 5 July 1938 (MA, Report on Artillery Corps Workshops, (DOD-2 51223).
[685] Lieutenant Healy, 9 Aug. 1937 Memo to Director of Ordnance (MA, Report on Artillery Corps Workshops, (DOD-2 51223).

were identified as necessary by the officer during his inspection.[686] The removal, by the Artillery Corps, of the upper section of the shield in 1939 forced the Ordnance Service to seek a ruling on the matter.[687] The artillery at the time were trialling mechanical haulage and it is likely the top shields were vibrating heavily, potentially causing damage to sight brackets and other assemblies. The Director of Artillery agreed to let Ordnance technicians replace the shields, but only if they could be secured properly when the guns were being towed.[688] The issues that surrounded the mechanised draught of the 18-pounder are discussed below, but the damage that occurred during the Artillery Corps' experimentation clearly tested the relationship between technician and gunner.

The procedure that was used to inspect and repair the field guns can be determined by examining the files and reports that have survived. It appears that the artillery artificers contacted the Ordnance Service when they had a problem that they could not solve. Otherwise, faults were identified during the weapons' annual inspection.[689] The 18-pounders had to be serviceable for the summer training period which began around May, so it was essential that inspections and repairs be completed prior to that. The inspection was ordered by the Director of Ordnance who contacted his counterpart in the Artillery Corps to ensure the guns were made available to his officers. The period allotted for the work was not always sufficient and one Ordnance officer complained about not having enough time.[690] A lieutenant or a captain from the Ordnance Depot carried out the inspection at the battery location which may have been in two different places as far apart as Tralee and Kilkenny. In 1938 Commandant Buggle, the officer in charge of the Ordnance Depot, asked the Director of Ordnance for 'the particulars of the location of the various batteries and the number of each gun forming that battery' for his inspecting officers who were having difficulties finding where some of the guns were.[691] Once the inspection was completed the Ordnance officer submitted a report to his commanding officer at Islandbridge describing the problems that were found, the repairs that were required and the parts that were needed. In the case of the 10/11 Field Batteries, Lt. McKenna reported on the availability of spare parts. He looked at what was present in Irish stocks and decided

[686] Inspection reports, 16 May 1938, (MA, DOD2 49240, Guns Artillery Inspection of 6/7 Field Batteries). Inspection reports, 6 Apr. 1938 (MA, DOD-2 49242, Guns Artillery Inspection of 10/11 Field Batteries). Lieutenant McKenna, Inspection report, 7 Apr. 1938 (MA, DOD2 49240) Lieutenant McKenna, Inspection report, 27 May 1938 (DOD-2 49242).
[687] Commandant Buggle to Director of Ordnance, 5 June 1939 (MA, DOD-2 49242, Guns artillery inspection, 10/11 Field Batteries).
[688] Director of Ordnance to Commandant Buggle, 18 Aug. 1939 (MA, DOD-2 49242).
[689] Lt. Farrell to QMG branch, 20 Apr. 1932 (MA, DOD-2 29995, Guns 18pdr MKII examination).
[690] Lt. McKenna to Commandant Buggle, 27 May 1939 (MA DOD-2 49242).
[691] Commandant Buggle to Director of Ordnance, 5 June 1939 (MA DOD-2 49242).

what should be manufactured at Islandbridge and what should purchased from the British War Office.[692] The Ordnance officer supervised the repairs at battery level depending on the work that was required though for complex work the 18-pounder was transported to the workshops at Islandbridge. In his final report the officer costed the job for labour and parts. Labour was rated at two shillings an hour and the work on a battery of guns might cost as much as £3.[693]

Following his examination of the equipment the Ordnance officer had to 'pass a decisive sentence on the gun' based on the condition of the barrel and carriage.[694] Inspection records reveal something of the general condition of the Irish weapons. (appendix 9) As mentioned above recoil systems required constant attention, so too did breech mechanisms.[695] Barrel inspections showed that none had fired anything near the recommended maximum number of rounds, in fact most had fired only a fraction of the 12,000 rounds permitted. Examinations found coppering, pitting, and sometimes scoring in the barrels and one officer found the 'usual ring of corrosion' near the breech end.[696] Once monitored and treated none of these problems were particularly serious. Coppering was caused by the copper from the shell's driving-band and was deposited during firing, but it could be removed with chemicals by 'skilled artificers'. If left unchecked however it might restrict the internal diameter of the bore.[697] Bore measurements on the Irish guns indicated that barrels were not worn, and breeches passed the cartridge head clearance test which checked the crucial relationship between the breech face and the base of the cartridge case when loaded. The force of blow test – a test that checked the strength of the striker (firing pin) spring - failed in a significant number of guns, but this does not appear to have been identified as a serious problem.[698] This test was affected by a number of variables and the failures may have been overlooked for that reason.[699] The was no damage to strikers, the low number of rounds fired no doubt a factor, but the

[692] Lt. McKenna inspection reports, undated May and 21 July 1938 (MA DOD-2 49242).
[693] Capt. Keenan to Director of Ordnance, 18 Dec. 1939 (MA, DOD-2 49249). Commandant Buggle to Director of Ordnance, 7 Apr. 1938 (MA DOD-2 49242).
[694] War Office, *Treatise on service ordnance*, p. 578.
[695] Inspection report for guns number 5732, 7470, 6460 and 10756, undated 1940 (MA, DOD-2 49249).
[696] History sheet, Memorandum of inspection, gun number 10756, 1918 (MA, Personal collections, Ivor Noone, PC 625). It was not unusual that a barrel that had fired a number of rounds should exhibit signs of wear like this. War Office, *Textbook of service ordnance*, p. 139. Joe Eaton remembered that breech screws were very worn by the 1960s. Joe Eaton interview, 12 June 2020.
[697] War Office, *Textbook of service ordnance*, p. 143.
[698] The inspection report for gun number 6460 recorded a force of blow at 29 in/lbs, 1 in/lbs below the acceptable limit. Inspection report for gun number 6460, 6 Apr. 1938, (MA DOD-2 49242).
[699] For the variables see War Office, *Treatise on service ordnance*, pp 610-1.

replacement of a tripping piece – a small component in the firing mechanism reveals how meticulous the inspections were.[700] (table 16)

The existence of play between the barrel and cradle might signify wear along the gun rails which would have been discovered when the gun was being exercised. There is only one record of this occurring, and it was remedied at depot level by Doyle's technicians. The repair was only briefly described in the subsequent report, 'all lateral play between the wings of the piece and liners taken up', but solder discovered along the gun rails of gun number 9168 might reveal how exactly the play was eliminated.[701] The manual does not mention this as a remedy, and it may have been a solution resorted to by Doyle.

Component	**Manufacturer**	**Date**
Breech Block	Royal Gun Factory	1921
Rod Connecting Elevating Screw	Vickers Sons Maxim	1919
Cradle Clamp Spindle Sleeve	Vickers Sons Maxim	1919

Table 16. Parts found during restoration of gun number 9168 that were manufactured after the gun and therefore fitted as part of the maintenance programme. (author's research during preservation of gun 9168)

The type of problems encountered and the kind of maintenance work that was carried out on the 18-pounders can also be discerned from the lists of parts that were purchased during the period.[702] It is not surprising that a large quantity of components for the recoil system appear on the lists which reveals how much work this part of the gun required. But there were also parts for the ranging gear, the breech and firing mechanisms, the cradle clamping system and the road gear.[703] The introduction of the Mark IV and V guns was followed by the purchase of a massive stock of spare parts in 1927.[704] Interestingly a supply of pads for the beaten faces of the Mark V carriages were purchased in 1930.[705] This small, but essential component prevented metal to metal contact between the barrel and the cradle during the final stage of run-out. They only rarely required replacement.

[700] Inspection report for gun number 7470, 6 Apr. 1938, (MA DOD-2 49242). War Office, *Treatise on service ordnance*, p. 604.
[701] Captain Doyle, Report on gun number 2819, 21 Jan. 1929 (MA, Personal Collections, PC 625).
[702] For examples of these files see Purchase of warlike stores through War Office London, March 1926 (MA, AFO 16-War Equipment-342 [374]). Purchase of Warlike stores through the WO London, Jan. 1925 (MA, AFO-16 War Equipment 244). Purchase of artillery spares, 1930, (MA, DOD 2-23619).
[703] The road gear included complete spare wheels. Issue vouchers for Ordnance QF 18pdr MkIV parts, 5-6 Aug. 1930 (MA, DOD-2 23619). Issue voucher, 30 Mar. 1926 (MA AFO 16 War equipment-342 (374)).
[704] Secretary, High Commissioner to Army finance officer, 2 Sept. 1927 (MA, AFO 16-War equipment 513 List of accessories for 18-pounder batteries Peace Scale 15 Sept. 1927).
[705] Issue vouchers for Ordnance QF 18pdr MkV parts, 5 Aug. 1930 (MA, DOD-2 23619).

Four cases of spare parts were held by the artillery and a limited amount were carried on the gun carriage and limber to be replaced in the field, but there were always items that were not in stock and some of these were manufactured by tradesmen in the Ordnance Service.[706] The workshops in Islandbridge were well equipped with lathes, shaping and milling machines, welding equipment and a forge. A large and varied number of components could be produced there. The workshop in the Curragh was also fitted with a lathe and in 1939 a mobile workshop was attached to each of the Ordnance companies that were formed and located in the four army commands. These self-contained sub-units were completely independent and had a machinery truck with a lathe, a pedestal drill, milling and shaping machines, an electric welder and a generator onboard.[707] Even with these capabilities one Ordnance officer was driven to complain in 1938 about having to get parts manufactured and he admitted that a stock of spares would mean the repair could be 'quickly effected by the artificer without the undue delay of first having to procure the necessary material and then spend a considerable amount of time in making and fitting such parts'.[708]

A system was implemented between the British and Irish governments as early as February 1924 whereby technical stores and ammunition could be purchased from the War Office based on the procedures that were followed by dominion and colonial governments.[709] Whilst ammunition was to be inspected by an Irish Ordnance officer before it was accepted, it was agreed that the services of Dr J. F. Crowley, an agent and consulting engineer, would be used by the Free State government for the purchase of everything else.[710] Requisitions from the Ordnance Service were passed to the QMG's department before being channelled through the army finance branch for authorisation from the Department of Finance. The requisition was then sent to Crowley who would compare 'War Office pieces with outside conditions and buy when favourable'.[711] The controlling arm of the Department of Finance was once again visible, and the idea of waiting for favourable conditions to purchase parts that were manufactured by

[706] Stocktaking report, undated (MA, DOD-2 22458). War Office, *Handbook for the 18-pr Marks I to II guns*, pp 152-3.
[707] From 1936 18-pounder sighting equipment was repaired in the optical workshop which opened originally in Islandbridge Barracks. It subsequently moved to the Curragh where the open spaces made it easier to test sights and scopes. McDonald, 'The Army Ordnance Corps', pp 76-7. .
[708] Lt. McKenna inspection reports, undated May 1938 (MA DOD-2 49242).
[709] Procedure for the requisition of ordnance stores from the War Office by dominion and colonial governments, Crown agents and the Egyptian and Sudanese governments, 10 Feb. 1923 (MA, DOD-A-08967 Supplies Ordnance Procedure for supply of Artillery Arms and Ammunition).
[710] Governor General T. M. Healy to Duke of Devonshire, 13 Feb. 1923 and J. H. Thomas, Secretary of State for the Colonies to Healy, undated Feb. 1924 (MA, DOD-A-08967 Supplies Ordnance Procedure for supply of Artillery Arms and Ammunition).
[711] Memo, M. Ó C., 22 Nov. 1923 (MA, DOD-A-08967 Supplies Ordnance Procedure for supply of Artillery Arms and Ammunition).

the Royal Ordnance Factories and, after the war, were probably in War Office stocks, was somewhat ridiculous. The following year Crowley's services seem to have been dispensed with and an Irish army General by the name of Cronin was in his place. All transactions were made through the office of the High Commissioner in London and the mass of files that were generated by purchases sanctioned during the next two decades show that High Commissioner always sought the best deal for the Free State.[712]

The greatest expenditure that was spent on field artillery took place during the programme that resulted in the mechanisation of the field gun. For an army of its size the Defence Forces was relatively advanced in the way it converted its artillery from horse draught to mechanical haulage. The transformation was labelled the 'mechanisation' of the Artillery Corps in army files, although some theorists would argue that it was in fact only 'motorisation'. In 1929 the US Army Chief of Staff, Gen. Summerall, summed up the difference by describing mechanisation as 'the application of mechanics to the combat soldier on the battlefield with a view to increasing his mobility, his protection and his striking power', whereas motorisation was 'the replacement of animal-drawn by motor-propelled vehicles and the employment of motor trucks for rapid transportation of large bodies of troops'.[713] Mechanisation was tactical by nature, motorisation was strategic.[714] A Defence Forces meeting on 3 September 1937 looked at the 'technical aspects of motorization' but weeks later Commandant Comerford, the Acting-Director of Military Engineering, cleared things up by suggesting that the British School of Military Engineering definition be adopted. It described mechanisation as the use of the combustion engine for the transportation of troops and material and for the generation of 'power which works or moves machinery which can be applied to military needs in actual combat or to assist any arm in the attainment of its military objectives'.[715] It was agreed by all including the Director of Ordnance, that 'mechanisation' was the correct term to use in the Irish situation.[716] However, the limited resources available to the Irish army in the late 1930s ensured

[712] The office of High Commissioner was held by James McNeill, 1923-28, T. A. Smiddy, Feb. 1929-Dec. 1930, John Whelan Dulanty, Dec. 1930-1949. Dulanty became the first Irish ambassador to Great Britain.
[713] The term mechanisation is used here to describe the Irish situation because that was the term used by the Defence Forces.
B. C. Hacker, 'The military and the machine: An analysis of the controversy over mechanisation in the British Army, 1919-1939' (P.H.D. thesis, The University of Chicago, Chicago, 1968), p. 17.
[714] Raymond Marsh, 'Mechanization of combat units' in *The military engineer*, xxv, no.144 (Nov-Dec. 1933), pp 451-6. p.451.
[715] Memo by Commandant Comerford, Acting Director of Military Engineering, 21 Sept. 1937 (MA, DOD-2 52022, Part I).
[716] Ibid.

that mechanisation was only ever going to be achieved in its simplest form, and for the Artillery Corps it simply meant mechanically hauled guns.

Steam traction engines had been used to haul heavy guns in South Africa during the Boer War and British trials after the conflict found that 'steam haulage offered the best solution for the army'.[717] In 1902 the RFA's Maj. Bethell, designed a steam wagon to haul the 15-pounder at a time when the weight of the future 18-pounder was being dictated by that which could be hauled by a team of horses.[718] Traction engines were used again during the Great War but their use near the front line was limited due to the smoke and steam which made them a target for the enemy's guns. The potential of the internal combustion engine in a military context was clear from the beginning of the twentieth century and experiments with caterpillar-tracked gun-towers before 1914 proved satisfactory.[719] Petrol-fuelled traction engines, and tracked and four wheel drive vehicles all demonstrated that they were up to the terrible conditions along the Western Front and mechanical traction – driven by the internal combustion engine - was to replace the horse for the final major offensive of the war that was planned for 1919.[720] An American analyst considered the 'far-reaching and highly important' result of the US Army's involvement in the war to have been the fleet of trucks, tractors and trailers that were designed to move its artillery. This included a trailer engineered specifically to carry the field gun and limber together.[721] Whilst the mobility of the American army's light artillery during the war was augmented by motor traction, the British made no attempt to tow their field artillery with anything other than horses.[722]

After the war, military planning in Britain was shaped by the political belief that the next war was a long way off and although military tacticians embraced the notion of mechanical mobility their plans were constrained by government cutbacks and a scaled down army at home.[723] It was assumed that horse drawn artillery would be adequate for the British army of the future as it policed the Empire. Nevertheless, a series of trials were conducted to test the

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[717] Fletcher and Ventham, *Moving the guns, The mechanisation of the Royal Artillery*, pp 7-9.
[718] Bethell's design was based on the Thornycroft engine that had featured in trials. As an artillery officer he must have received some sideways glances for this move away from horse draught. Ibid., p. 9. War Office, *Textbook of gun carriages and gun mountings*, p. 45.
[719] The military realised the potential of the internal combustion engine as early as 1902 and a trial proved the internal combustion engine tractor was the best a year later. Azar Gat, *A history of military thought, From the Enlightenment to the Cold War* (Oxford, 2001), p. 572.
Fletcher and Ventham, *Moving the guns, The mechanisation of the Royal Artillery*, p. 9.
[720] French, 'Doctrine and organization in the British Army, 1919-1932', p. 499.
[721] Benedict Crowell, *America's munitions*, pp 148, 150, 153.
[722] C. Beard, 'Fire and effect of modern artillery', p. 448. Fletcher and Ventham, *Moving the guns, The mechanisation of the Royal Artillery*, p. 15.
[723] B.P. Hughes, *History of the Royal Regiment of Artillery, Between the wars, 1919-39* (London, 1992), p. 99. French, 'Doctrine and organization in the British Army', pp 508, 510.

various methods by which artillery could be moved mechanically. Three field artillery brigades - equipped with 18-pounders – experimented with tracked and half-tracked gun towers and portée arrangements on tracked and wheeled carriers.[724] A contemporary War Office manual showed a preference for the tracked solution, known as the Dragon, admitting that

> the present type of track laying vehicle has a very considerable power of movement across the country and is being rapidly deployed for fast work on roads. It is reasonable therefore to regard it as the alternative to horse traction.[725]

In 1925 an 18-pounder was mounted on a tracked chassis to become the self-propelled Birch Gun. With a 360-degree traverse and 90-degree elevation it was extremely adaptable and was an ideal mount for an anti-aircraft weapon, but the vehicle was dogged by mechanical failure and the exercises in 1927-8 failed to make the most of the weapon tactically.[726] It was employed mainly in support of the tank and engaged targets with direct fire over open sights; the skill of the artilleryman was being overlooked. Concerns were raised also about the ease with which an 18-pounder that was mounted in this way could be lost in combat through the failure of the vehicle, whereas an injured horse or a broken-down tractor could be replaced with another without affecting the viability of the gun.[727]

The arguments for and against mechanisation were played out in the military journals, and articles were reviewed and re-published across the sector ensuring that the Irish artilleryman reading *An tÓglách* was kept informed. Irish and foreign written articles tried to make sense of developments. In 1927 the revamped Irish journal examined what it called the mechanisation 'problem'.[728] In fact the problem had been considered in the Journal of the Royal Artillery three years earlier in an article that took an objective look at mechanisation based on

[724] They were the Mark I and II Dragon vehicles and Burford-Kégresse, Citroën-Kégresse and Morris-Roadless half-tracks. Fletcher and Ventham, *Moving the guns, The mechanisation of the Royal Artillery*, pp 26-7.
[725] War Office, *Textbook of gun carriages and gun mountings*, p. 5.
[726] The 18-pounder was mounted as the Birch Gun and at first had the recoil system over the barrel with a complex sighting system above it. Later the recoil system was slung below the barrel and a large shield was fitted to protect the crew. A series of exercises were conducted between 1927-8 using the Experimental Mechanised Force and the Experimental Armoured Force. The exercises were very focused on the role of the tank.
[727] British experimentation with self-propelled artillery was therefore short lived and was not looked at seriously again until World War II. Fletcher and Ventham, *Moving the guns, The mechanisation of the Royal Artillery*, pp 32-4.
[728] The Irish journal became more professional in its outlook after it was taken over by a new management committee in 1927. For a history of *An tÓglách* see S. Hayes, 'The story of *An tÓglách*' in *An tÓglách*, v (Apr. 1931), pp 1-7. J. A. Power, 'Editorial' in *An tÓglách*, i (Oct. 1927), pp 4-5.

the findings of the Royal Artillery's trials.[729] It was clear to all that things were moving at a rapid pace and interestingly Irish officers disagreed with each other in print over the best approach.[730] As early as 1923 *An tÓglách* carried a piece that considered the advantages of the internal combustion engine, noting that it required only three quarters of a pint of fuel per horse-power per hour to run.[731] Those arguing in favour of mechanisation made much of the savings that could be made on manpower, forage, and stores, and research showed that a horse pulling a load required 24.6lbs of hay per day and more if the animal was to haul at a trot.[732] The horse was at its best hauling at a speed of around 2.5mph, though it was able to go somewhat faster.[733] This was considerably slower than the 6.25mph that were achieved by a Dragon towing an 18-pounder during trials in the UK.[734]

The Glen of Imaal was the site for one of the first Irish experiments with this new technology in 1926. To resolve 'whether horses or tractors are more suitable for artillery work in this country' a Fordson tractor was pitted against a gun crew and its team of horses.[735] Both pulled a field gun and a limber wagon. The Artillery Corps' preference for horse haulage was unashamedly obvious in the course that was laid out across the Glen. Described as a 'difficult' route it included rocky paths, steep slopes, and river crossings. Maj. Mulcahy, the OC of the Artillery Corps, noted afterwards that the representatives of Fordson refused to drive their vehicle across a bog and were unable to ford deep rivers or climb steep hills with the tractor. Mulcahy's article in *An tÓglách* was accompanied by a series of photographs of the horse-drawn gun negotiating the obstacles and he warned that 'it would be most unwise to discard our present system until the tractor has proved that its merits are at least equal to that of the horse for gun-haulage'.[736] Circumstances during the Civil War necessitated for the mechanical haulage of the 18-pounder all over the country and it is true that gun towers struggled on mountain roads and guns were sometimes manhandled into firing positions, but at no point did a gun have to cross the obstacles that were laid down for the trial in the Glen.[737] It was three

[729] These trials were conducted with the 9 Brigade Royal Artillery. C. C. Armitage, 'The mechanisation of field artillery' in *The Journal of the Royal Artillery*, li, no.1 (Apr. 1924), pp 1-8.
[730] Mulcahy was happy to stick with horse draught, whilst Maj. McDonnell was in favour of mechanisation. P. A. Mulcahy, 'The problem of haulage for field artillery' in An t*Óglách,* i (Oct. 1927), pp36-40. D. McDonnell, 'Mechanisation' in *An tÓglách*, i, no.2 (Jan. 1928), pp 14-7.
[731] *An tÓglách*, 23 Jan. 1923, p. 1.
[732] C. Beard, 'Fire and effect of modern artillery', p. 448. C.F. Morse, 'Notes on feeding artillery horses' in *The field artillery journal*, xii, no.5 (Sept.-Oct. 1922), p. 447.
[733] Morse, 'Notes on feeding artillery horses', p. 447.
[734] Armitage, 'The mechanisation of field artillery', p. 5.
[735] *An tÓglách*, 7 Aug. 1926, p. 14.
[736] Mulcahy, 'The problem of haulage for field artillery' in An t*Óglách*, p. 38.
[737] There was clearly a dependence on vehicular transport during the war. One reason for this was the primary role that was given to the armoured car; it was a very modern way of fighting. One Free State soldier

years since the introduction of the horse into the Artillery Corps and yet there was a clear preference for horsepower, as there was in the Royal Artillery.[738] An officer who was serving with the Royal Artillery at the time admitted later that soldiers were reluctant to abandon the horse.[739]

The selection of the Fordson for the test in the Glen of Imaal is interesting. Henry Ford had set up his Cork factory – one of the few industries in the Free State - to build '50,000 low-priced' tractors a year and the simplicity of the design and the compactness of the Fordson compared to his famous Model T, though it lacked power and was not the best choice as a gun tower.[740] The Fordson dominated the market due to its affordability, but there were scores of other machines available so it is likely the tractor's manufacture in Ireland and the availability of company representatives made it the tractor of choice for the test.[741] The British had experimented with the Fordson – one was fitted with tracks – in 1923 when they were looking at the possibility of using farm tractors and although it was not the most successful contender in their official trial, it was found to be as mobile as a team of horses when Territorial artillery units tested it with their guns.[742]

Two months after the tractor was trialled in the Glen of Imaal the army's Director of Operations, Col O'Higgins, sought to test the mobility of a force that was deployed on military manoeuvres near Dublin.[743] It would have made more sense to trial the Fordson during this operation.[744] In November that year senior Irish officers attended a large demonstration of British equipment at a mechanised display near London.[745] Gun towers and carriers in their many configurations were exhibited, and five new Mark II Birch guns were revealed in a mock battle.[746] An Irish newspaper correspondent was inspired to admit, 'no longer will the horse bring up the guns'.[747] But there were two major difficulties for the small Irish army when it

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remembered having 'an 18-pounder as a travelling companion over the south of Ireland' towed by a Lancia armoured car and he admitted that it struggled on the mountain roads. From an article first published in *An tÓglách*, 16 June 1923 republished as Our special correspondent, 'The artillery' in *An Cosantóir*, xxxiv, no.1 (Jan. 1974), pp 21-2, p. 21.

[738] There were fears in the Royal Artillery that *esprit de corps* would suffer if horsepower was done away with. Armitage, 'The mechanisation of field artillery', p. 1.

[739] Maj. Gen. B. P. Hughes joined the Royal Artillery in 1923. Hughes, *History of the Royal Regiment of Artillery*, p. 99.

[740] D. S. Jacobson, 'The political economy of industrial location: The Ford Motor Company at Cork 1912-26' in *Irish economic and social history*, iv (1977), p. 47. M. W. Reynold, 'Henry Ford's tractors and American agriculture' in *Agricultural history*, xxxviii, no.2 (Apr. 1964), p. 84.

[741] Michael Williams, *Classic farm tractors* (London, 2007), pp 38, 64, 105.

[742] Fletcher and Ventham, *Moving the guns, The mechanisation of the Royal Artillery*, pp 51, 105.

[743] *An tÓglách*, 2 Oct. 1926, p. 9.

[744] It certainly shows poor judgement and a preference for the horse.

[745] *Irish Times*, 15 Nov. 1926.

[746] Fletcher and Ventham, *Moving the guns, The mechanisation of the Royal Artillery*, pp 32-3.

[747] *Irish Times*, 15 Nov. 1926.

came to mechanisation. The first was financial; cost and a lack of funding were, as always, primary issues, as manpower reductions and cuts continued through the 1920s.[748] Secondly the absence of a defence policy made strategic and tactical planning along these lines extremely difficult.[749] With no plan it was hard to know how best to approach mechanisation. The options available were considered by Maj. McDonnell, as early as 1928, and although he acknowledged there were problems with the costs involved he maintained that tracked or half-tracked vehicles were the best solution for gun towing.[750] One of the officers who had been on the American military mission also examined mechanisation, this time in relation to the armoured car, but he too had to admit that ingenious solutions were required to overcome the difficulties for the skeleton force that was the armoured car corps in the Free State Army.[751] In 1934 army manoeuvres tested the effectiveness of a mechanised and a non-mechanised force by pitting them against each other.[752] As the decline continued into the 1930s the Minister of Defence, Frank Aiken was forced to admit - as he announced the formation of a second artillery brigade in 1936 - that there were deficiencies in 'up-to-date equipment, mechanisation, transport and reserves of every kind of war material'.[753] His announcement at least indicated that mechanisation was on the government's agenda.

The Royal Artillery was given the order to mechanise completely in 1936 and British field artillery units began using Morris 8-cwt and 15-cwt gun towing tractors to pull their field guns.[754] By 1938 the horse had all but gone from the British army.[755] In Ireland the slow decline in the number of horses in civilian life and the animal's replacement by motorised vehicles generally, made its removal from the military easier. By 1938 there was an insufficient number of horses in the Artillery Corps to haul the guns; the number of guns had of course increased during the preceding decade.[756] The mobilisation of the army's Transport Corps in 1935 during

[748] For the extent of cuts to the numbers of personnel in the Defence Forces see A. J. English, *Irish Army orders of battle*, 1923-2004 (2005).
[749] See Chapter III.
[750] McDonnell, 'Mechanisation', p. 15-6.
[751] Sean Collins Powell, 'Armoured car units and their general characteristics' in *An tÓglách*, v (Apr. 1932), pp 37-42.
[752] Frank Aiken, Minister of Defence, Dáil Éireann debate, Committee on Finance, Vote number 65, Army, 11 Apr. 1934 (Houses of the Oireachtas, i, no.12).
[753] *Irish Press*, 25 Mar. 1936. Remember from above that Aiken and de Valera attended one of the shoots in the Glen of Imaal that summer. Entries for Mon. 22 June, 13 July 1936, Artillery Corps, Glen of Imaal diary, 1936-41, Artillery School, DFTC Curragh Camp.
[754] The development of the low-pressure pneumatic tyre with cross-country capability made tracked vehicles like the Dragon less necessary for field artillery work. *History of the Royal Regiment of Artillery*, p. 107.
[755] This meant a loss for the Irish horse trade, though armies on the continent were still using the horse. The French and German armies continued to use the horse and German army buyers were at the Dublin horse show less than one month before the invasion of Poland in 1939. *Evening Herald*, 7 Sept. 1938, 12 Aug. 1939.
[756] Assistant Chief of Staff to Chief of Staff, 25 May 1938 (MA, DOD-2 52363, Part I).

a transport strike was impressive and it demonstrated that progress was being made towards mechanising the force generally.[757] 'The great advance in the mechanisation of the army' was lauded by the press during a series of military exercises that took place across the country in 1938, and it was reported that senior officers were working through 'the newest idea of mechanisation - the process of shifting troops by transport.'[758] The first and foremost duty of the artillery was to accompany and support the infantry, according to Mulcahy in 1927; whilst the infantry was on foot, horse drawn field guns were appropriate, but when the infantry began moving by mechanical means it was time for the artillery to do the same.[759] The Artillery School's Glen of Imaal diary reveals that stores, equipment and indeed troops were being transported to and from the Wicklow camp by lorry from the mid-1930s.[760] One advantage of mechanisation was of course speed. Mulcahy was to admit later when the Artillery Corps was eventually mechanised that the march to the Glen went from an exercise that at one time required an early start from the Curragh, a day travelling, and a rest day for troops and horses on arrival at Coolmoney Camp, to a departure from the Curragh 'at 9 o'clock Monday morning and we shoot at 11!'[761]

The details of the artillery's actual transition to mechanical draught are somewhat difficult to follow due to the massive number of files related to the matter, but it appears to have begun in 1936. It is worth mentioning that Mulcahy was promoted to a position in the Air Corps the year before.[762] Artillery pieces – 18-pounders and 4.5 inch howitzers – were brought to the Glen of Imaal by horse draught for the 1936 training period and horses were used to haul some equipment, but lorries were employed to move troops and stores during the camp that year.[763] On the 8 June a pair of tractors – probably Fordsons - from the anti-aircraft battery arrived at Coolmoney Camp and the vehicles' drivers were taken onto the unit strength.[764] The anti-aircraft battery had been cobbled together after the arrival of four 3 inch 20cwt AA guns

[757] One newspaper report was impressed with the army's 'vehicles that were never built to carry [civilian] passengers' and with the performance of the soldiers. During the two-month long strike there were no injuries to the public who were transported by army vehicles. *Irish Press*, 25 Mar. 1936.
[758] *Irish Press*, 26 May 1938. *Irish Examiner*, 22 Sept. 1938.
[759] Mulcahy, 'The problem of haulage for field artillery' in *An tÓglách*, p. 36.
[760] Entries for 23 June 1936, 21 July 1937, Artillery Corps, Glen of Imaal diary, 1936-41, Artillery School, DFTC Curragh Camp.
[761] Mulcahy, 'At the beginning', p. 11.
[762] Ibid. Mulcahy left the Artillery corps in 1935 and to serve with the Air Corps. He returned in 1942 when Maher retired to run Shannon airport. He admitted that he never appreciated what a difference mechanisation could make until he returned to the Corps in 1942.
[763] Horses were hauling G. S. (general service) wagons and limbers between Kildare and the Glen of Imaal. Entry for 12 June 1936, Glen of Imaal diary, 1936-41, Artillery School, DFTC Curragh Camp.
[764] Entries for 8 June, 14-16 July 1936, Artillery Corps, Glen of Imaal diary, 1936-41, Artillery School, DFTC Curragh Camp.

in 1928 and for the unit's first shoot five years later the guns were towed by tractor.[765] By 1936 they were being hauled by a later version of the Fordson.[766] There is nothing to show that the field guns were towed by tractor whilst in the Glen of Imaal that year and battery drivers continued to receive 'instruction in driving drill and equitation', but the tractors remained with the artillery in the camp and were used to haul 18-pounders back to Kildare when the training finished.[767] It might not be a coincidence that the mechanical haulage of artillery happened the day after de Valera and his Minister of Defence, Frank Aiken, visited the Artillery Corps in the Wicklow camp.[768]

The tractors were brought to the Glen of Imaal again in July 1937 and personnel from the composite batteries and the mortar batteries were moved by motor transport that year.[769] The speed of tractor haulage was made very clear in the Glen of Imaal diary with 'guns from 3 Field Battery were tractor drawn from K-lines Curragh to Camp arriving 1100 hours'.[770] They could easily have fired that afternoon. The 18-pounders from 1 Battery were hauled back to the Curragh by tractor, though it took several trips to move guns, limbers, and wagons.[771] Mechanical haulage was however taking its toll on the gun carriages even though they were towed at just 8mph. The steel-tyred wooden wheel on the field gun was designed to withstand substantial hardship and examples were known to have travelled thousands of miles on various surfaces including cobblestones at that speed, but there is evidence to show that the artificer was accompanying the guns when they were being towed and an overhaul of the carriages was required when the training period ended.[772]

The British had been testing a six wheeled Fordson tractor and found it to be quite suitable as a gun tower, and although the Irish were looking at a six-wheeled Fordson lorry for

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[765] The AA guns lay in Islandbridge Barracks for more than three years before they were taken on charge and formed into a battery. Riccio, *The Irish Artillery Corps*, pp 66-7.
[766] Lt. Healy to Director of Ordnance, report on lorry towing 18-pounder, 28 Sept. 1937, (MA, DOD-2 51496).
[767] Entries for 14, 15 June 1936, Artillery Corps, Glen of Imaal diary, 1936-41, Artillery School, DFTC Curragh Camp. Two 18-pounders were towed to Kildare on 14 June. Mark IVs were towed there on 15 June.
[768] De Valera visit on 13 June. See Chapter III.
[769] The composite batteries were the volunteer reserve batteries. Entry for 13-16 July 1937, Artillery Corps, Glen of Imaal diary, 1936-41, Artillery School, DFTC Curragh Camp.
[770] Entry for 24 July 1937, Artillery Corps, Glen of Imaal diary, 1936-41, Artillery School, DFTC Curragh Camp.
[771] This may well have been the first time that these guns were hauled mechanically since the Civil War.
[772] For the theory behind the design of the 18-pounder wheel see War Office, *Textbook of gun carriages and gun mountings*, pp 65-89, 299-317. The design of the artillery wheel was considered in Arthur Cassels, (ed.), 'Ordnance Notes, Current field artillery notes' in *The field artillery journal*, x, no.6 (Sept.-Oct. 1920), pp 633-40. p. 635. Sergeant Scanlon, artificer accompanied the guns of 3 Battery as they were tractor hauled to the Glen of Imaal. 24 July 1937. Entry for 24 July 1937, Artillery Corps, Glen of Imaal diary, 1936-41, Artillery School, DFTC Curragh Camp. Technical aspects of motorisation, Conference minutes, 3 Sept. 1937, (MA, DOD-2 52022).

the job they were very much at the early stages of experimentation.[773] This was made clear by a series of questions that were asked at an army conference on 3 September 1937.

1. What kind of alteration was required to make the guns, carriages and limbers suitable for motor haulage?
2. Was the limber required or should it be dispensed with?
3. Can alterations be carried out in the Ordnance Workshops if necessary?
4. Will alterations affect the characteristics of the gun?
5. What effect would towing the guns without alteration have on the weapons?
6. Would a towing ambulance or bogie be practical?
7. Could the gun be towed by horses once the alteration was carried out?
8. What vehicle was the most suitable for towing the field gun?[774]

The fact that they were asking about the using horses to draw converted artillery showed just how far behind their thinking was. It was clear from the damage that occurred during the 1936-37 training period that something had to be done to the gun carriages to prevent a reoccurrence. During the early 1930s the Canadians realised that their wooden wheeled 18-pounders could only be hauled mechanically at reduced speeds and they added a solid rubber tyre to the steel rim on the wheel in an attempt to solve the problem, but it was not enough to prevent the shock from transferring through to the carriage, and towing speeds had to be kept to that of a moving horse.[775] The Irish officers agreed to look at the British system that replaced the timber wheels with pneumatic-tyred steel wheels. Two thousand British artillery pieces had been adapted for mechanisation by February 1937. It was known that new axels, wheels, and pneumatic tyres could be purchased for £175 per gun, to be fitted in Ireland by Ordnance personnel.[776]

Later that month an experimental trial was held when one of the Fordson tractors was set against a six-wheeled Sussex Ford V8 lorry, each towing an 18-pounder. The lorry was faster, but the tractor was more manoeuvrable. The subsequent analysis focused on the lorry's performance and whilst it found the vehicle to be a 'feasible' option for haulage, there were problems with the towing connections. A top speed of 20mph was reached, but for most of the test only 6-10mph was achieved and the gun and limber had to be unhitched and manhandled

[773] Fletcher and Ventham, *Moving the guns, The mechanisation of the Royal Artillery*, p. 80. Peader MacMathgamhna, Department of Defence to Secretary, Department of Finance, 16 July 1937 (MA, DOD-2 51496).
[774] Conference Minutes, 3 Sept. 1937, (MA, DOD-2 52022).
[775] Knight, *The 18-pounder field gun in Canadian service*, p. 32.
[776] Conference Minutes, 3 Sept. 1937, (MA, DOD-2 52022).

when reversing or making difficult turns.[777] The problems with the arrangement that connected the lorry to the field gun and its limber had been flagged as early as July that year and it was arranged that parts should be manufactured to improve the tow-hitch.[778] As the discussion continued about the best type of vehicle to use for haulage a line of enquiry was established with the War Office and plans were made to visit Woolwich to view 'sample equipments' to make the guns more suitable for towing in March 1938.[779]

At the same time, the attention of the Minster for Defence was drawn to a new device, produced in the United States to 'modernize' artillery.[780] The Buquor adaptor was a conversion kit produced by the Martin Parry Corporation, Pennsylvania to replace the timber wheeled, road gear on a piece of artillery with pneumatic-tyred, steel wheels. The company had already converted the US Army's 75mm field guns and were in the process of converting the 18-pounders in New Zealand's and Canada's artillery brigades.[781] The Irish Army were looking around at other forces to see how they were tackling the problem and having made a favourable assessment of the American system they contacted the Martin Parry Corporation early in 1938. A trial was eventually conducted on 23 August by the American company using two Irish guns – a Mark II 18-pounder and 4.5-inch howitzer – fitted with the new adaptor.[782] A pair of Ford lorries towed the guns to the Glen of Imaal from Dublin where cross-country and firing stability tests were carried out. The trucks once again proved unsuitable as towers although a top speed of 25mph was reached on the return journey. The anti-aircraft battery's tractors were used for the cross-country test which established that the mobility of the gun and its ability to cross obstacles depended only on the capability of the towing vehicle to negotiate the route. Both weapons performed very well during the firing stability test and the board overseeing the trial seemed surprised that 'throughout the firing the wheels did not sink into the ground' in the way that 'ordinary wheels' did.[783]

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[777] Officers' board, 1 Artillery Brigade report on lorry drawn field artillery, 8 Oct. 1937 and Report by Lt. Healy for Director of Ordnance, 28 Sept. 1937 (MA, DOD-2 51496).
[778] Peader MacMathgamhna, Department of Defence to Secretary, Department of Finance, 16 July 1937 (MA, DOD-2 51496).
[779] Director of Ordnance to QMG, 13 Jan. 1938 (MA, DOD-2 52022, Part I). Secretary Department of Defence to High Commissioner, London, 24 Feb. 1938 (MA, DOD-2 52022, Part I).
[780] Brochure on Martin Parry adaptor, Letter from Secretary Department of Defence to Secretary Department of Foreign Affairs, 23 Dec. 1937, (MA, DOD-2 52363).
[781] Knight, *The 18-pounder field gun in Canadian service*, p. 33. G. H. Clifton, 'Mechanization in New Zealand' in *Journal of the Royal United Service Institution*, lxxxiii (Feb. 1938), p. 349-50.
[782] A. Buquor to Secretary Department of Defence, 12 Feb. 1938 (MA, DOD-2 52363).
[783] Report for Director of Artillery about suitability tests on Martin Parry adaptors, 26 Aug. 1938 (MA DOD-2 52363, Part I).

A sense of urgency is clearly discernible in the files that relate to these investigations and the delay between the Woolwich visit and the Martin Parry demonstration six months later, must have been frustrating for those eager to see the conversion happen.[784] The Director of Artillery, Maj. Maher, realised it would not be possible to procure the necessary equipment before the annual training period and though he was willing to wait for the views of the Ordnance Directorate, his weariness was apparent as he waited for a decision about towing attachments and he ruled out the mechanisation of the Second and Fourth Field Artillery Brigades that year.[785] Yet despite Maher's reservations about towing field artillery in its current state and apparently without any consultation with the Director of Ordnance, mechanical haulage continued. The Second Brigade's artillery pieces took part in the massive military exercise in Gormanstown at the end of May after the annual camp in the Glen of Imaal and it is likely the guns were towed from the Wicklow camp to the Meath camp.[786] The Director of Ordnance Maj. McGrath made it known earlier on 14 April that he was not in favour of having the Mark I and II 18-pounders towed without 'prior financial direction to cover any damage' that could not be attributed to normal fair wear and tear.[787] Furthermore the work to adapt the hitches was not completed until later that summer.[788] The damage that occurred as a result of towing, added to the cost of mechanisation and it caused another headache for Ordnance officers who questioned the need for repairing wheels that were to be replaced altogether in the future. The matter was serious enough for the Ordnance officer, Lt. McKenna, to withdraw the weapons from service during the exercise in Gormanstown and he demanded that they be transported to the Ordnance Depot on the back of a truck for repair.[789]

McKenna also inspected the Mark IV 18-pounders from the Sixth and Seventh Field Batteries after they had been used in the Glen of Imaal and Gormanstown and he found damage that was a 'direct result of them being towed at speeds above that laid down in the handbook for the equipment'.[790] Maher recognised that it was 'practically impossible to confine drivers to this speed (6-7mph) over long distances' and he expressed his opposition to mechanical haulage until the equipment was modified properly.[791] The 18-pounder's axel and shield

[784] Director of Ordnance to QMG, 13 Jan. 1938 (MA, 52022 Part I). Assistant Chief of Staff to Chief of Staff, 25 May 1938 (DOD-2 52363).
[785] Maj. P. Maher to Chief Staff Officer, G1 Branch, 8 Apr. 1938 (MA, DOD-2 51496).
[786] *Irish Press*, 26 May 1938. Entry for 30 May 1938, Artillery Corps, Glen of Imaal diary, 1936-41, Artillery School, DFTC Curragh Camp.
[787] Director of Ordnance to QMG, 14 Apr. 1938 (DOD-2 49242).
[788] Maj. Devlin, Memo, 14 July 1938 (DOD-2 51496).
[789] Lt. McKenna to Officer Commanding 2 FA Bde, 31 May 1938 (DOD-2 49242).
[790] McKenna, report on inspection of 6/7 Field Batteries, July 1938 (DOD-2 49240).
[791] Maj. P. Maher to Chief Staff Officer, G1 Branch, 8 Apr. 1938 (MA DOD-2 51496).

support brackets suffered the worst damage during haulage and McKenna recommended that the cracked and broken parts be welded in the armourers' workshop in the Ordnance Depot.[792] These repairs may explain the welds that were uncovered during the conservation work that was carried out on gun number 9168.[793] (fig. 29)

The decision to accept the Martin Parry conversion kit was made very soon after the company's demonstration in Ireland and a contract for eight 18-pounder Mark II, and 8 ammunition trailer adaptors was signed on 23 September 1938.[794] The total cost was £1,945 to come from a sum of £5,500 that had been included in the supplementary estimates set aside specifically to cover the cost of field artillery mechanisation.[795] The speed with which the decision was made to purchase the Martin Parry kit is significant; its effectiveness and simplicity convinced the Irish as it did the armies of New Zealand and Canada of the value of this piece of equipment.

However, the purchase of the adaptor disrupted the plan for mechanisation that was formed in 1937. It was originally intended that the Mark IV and V guns would be converted first due to the age of the earlier Mark I and II variants which, though still serviceable, were effectively obsolete.[796] As the contract was being signed with the Martin Parry Corporation for the Mark I and II adaptors, a proposal suggested continuing the programme of mechanisation by accepting the British system of conversion for the remainder of the field guns and a line of communication was opened with the War Office through the High Commissioner's office in London.[797] It was claimed the British conversion was cheaper and had been adopted by the Royal Artillery; it would standardise the system through the 'uniformity of equipment' for spare parts, and would be supported by the easy access to spare parts afterwards.[798] With a budget that had increased to £12,500 for the project by February 1939 it was decided to order the necessary equipment from the War Office to convert eight Mark IVs, twelve Mark Vs, fourteen 4.5-inch howitzers, and eight ammunition trailers.[799] The turn-around time for the

[792] McKenna, report on inspection of 6/7 Field Batteries, July 1938 (DOD-2 49240).
[793] Several small sections of weld were found on the axel and carriage body that could easily be explained by repairs made by McKenna and his team of Ordnance technicians. Robert Delaney, 'Field gun 9168, More than just a number' in *Archaeology Ireland* xxxiii, no.129 (Autumn 2019).
[794] Agreement between Department of Defence and Martin Parry, 23 Sept. 1938 (MA, DOD-2 52363 Part I).
[795] Secretary Department of Defence to Secretary Department of Finance, 27 Feb. 1939 and QMG to Secretary Department of Defence, 20 Sept. 1938 (MA, DOD-2 52363 Part I).
[796] High Commissioner to Secretary Department of Defence, 14 Dec. 1937, (MA, DOD-2 52022, Part I).
[797] Agreement between the Irish Minister of Defence and the Martin Parry Corporation, for artillery adaptors, 23 Sept. 1938 (MA, DOD-2 52363, Part I) M. J. Beary, secretary, Department of Defence to secretary High Commissioner's office, London, 19 Sept. 1938 (MA, DOD-2 52363, Part I).
[798] Report by Lt. Healy for Director of Ordnance, 9 Sept. 1938 (MA, DOD-2 52363 Part I). Maj. Maher to QMG, 6 Jan. 1939 (MA, DOD-2 52022, Part I).
[799] Secretary High Commissioner to Department of Defence, 21 Sept. 1938, (MA, DOD-2 52022, Part I).

manufacture of these components was lengthy with an estimated eighteen month wait for the Mark V parts. Of all the variants the Mark V was 'not an easy conversion' and at one stage it was thought the guns would have to go to the Royal Ordnance Factory for the work.[800]

In July 1939 Buquor contacted the Department of Defence to say the Martin Parry Corporation had begun manufacturing adaptors for the British, but by then the Irish contract with the War Office was already in place, and the Irish replied that they were 'unable at the moment to consider his offer owing to our commitments elsewhere'.[801] When Buquor previously visited Ireland he was keen to look at the possibility of designing an adaptor kit for the Marks IV and V field guns and by September 1939 the British had stopped using their own system and 'turned to Martin Parry adaptors in order to speed up their mechanisation'.[802] Events in Europe were shaping decision making in Britain and they were about to have an effect in Ireland. The War Office was unable to meet the Irish order 'owing to the increased demands in the British Service', and Martin Parry equipment was offered in lieu of the British designed kits.[803] It was finally agreed to complete Irish mechanisation using the Martin Parry system and a supply of American adaptors were obtained from the War Office.[804] Adaptor kits for the remaining 18-pounders were ordered from Buqour and road and firing tests were conducted on a Mark V gun in September 1940 proving the kit to be 'satisfactory from every point of view'.[805] Still, it took another eight months to convert all of the 18-pounders and it was 1943 before there were enough limbers and trailers for every gun.[806]

The war affected the Irish mechanisation project in several ways. Once the Martin Parry system was accepted a supply of spare parts was sought.[807] Some of the components were standard Ford parts and the Ford factory in Cork was consulted to examine the possibility of manufacturing other parts, but with no facility for casting steel in Cork this line of enquiry

[800] Secretary for High Commissioner to secretary Department of Defence, (MA, DOD-2 52022, Part I). Maj. Maher to QMG, 6 Jan. 1939 (MA, DOD-2 52022, Part I).
[801] ACOS to QMG, 20 July 1939 and reply from QMG to ACOS, 4 Aug. 1939 (MA, DOD-2 52363, Part II).
[802] The British system required machining of the axel. Recent work fitting the original type of wheel to gun number 9168 has demonstrated that the Martin Parry system caused no damage to components like the axel and can be reverse engineered without difficulty. The wheels that were fitted are manufactured using a modern pipe-box in the centre that has been cast from an original Royal Carriage Factory version of the component. Maj. Maher and Lt. McDonald report on visit to Woolwich, 18 Oct. 1939 (MA, DOD-2 52022, Part I). QMG to Contracts officer, 28 Sept. 1939, (MA, DOD-2 52022, Part I).
[803] QMG to Contracts officer, 28 Sept. 1939, (MA, DOD-2 52022, Part I).
[804] QMG to Contracts officer, 28 Sept. 1939, (MA, DOD-2 52022, Part I).
[805] Secretary DOD to A. P. Buquor, Martin Parry Corporation, 31 Oct. 1939, and Maj. Maher to QMG, 3 Sept. 1940 (MA, DOD-2 52022, Part I).
[806] Commandant Flanagan to Deputy QMG, 13 May 1941, and Report for Department of Defence by W. J. O. R. S4a Branch, 15 Feb. 1943 (MA, DOD-2 52022, Part II).
[807] Secretary DOD to A. P. Buquor, Martin Parry Corporation, 31 Oct. 1939 (MA, 52363 Part II).

ended almost as soon as it began.[808] The Great Southern Railway works at Inchicore was in a better position to help and along with experimental work on 18-pounder platforms the railway workshops assisted in the mechanisation program by adapting Martin Parry kits to suit trailers.[809]

A large order of spares from the Martin Parry Corporation generated a hefty file in Military Archives when its shipment was continually delayed by war related problems. There were difficulties securing the correct documentation to cross the Atlantic, sailings were cancelled and one vessel was requisitioned by the US government before it set sail.[810] The number of German U-boats operating in the Atlantic was increasing steadily at the time and 160 ships were sunk during the time it took to get the goods from a store on the docks in New York to Ireland.[811] The half-ton of equipment in two crates eventually made it to Dublin via Lisbon. It is telling that army files contain marine insurance forms for purchases that were shipped at this time when the risk of loss was so high.[812]

The search for a suitable gun tower continued after the field guns were converted. The Canadian army trialled a variety of vehicles for this role after the guns had been fitted with Martin Parry adaptors.[813] The Irish experiment in 1937 proved how unsuitable the Ford lorry was and the Director of Supply and Transport came up with a list of more suitable contenders.[814] It was a slow process and a pair of four-wheeled two-ton Ford lorries were used in February 1939 on the Curragh in a trial to ascertain 'whether or not trailers [limbers] are essential with field artillery units'.[815] Each of the lorries hauled a Mark II 18-pounder that was converted with the Martin Parry adaptor and they carried six members of the gun detachment and a supply of ammunition. One of the Fords also had the field gun's limber attached. The lorries negotiated the route easily but were deemed 'too cumbersome' for artillery work and were difficult to manoeuvre in confined spaces according to the board of officers overseeing

[808] B O'Byrne report for Directors of Artillery and Transport, 10 Dec. 1940 (DOD-2 67192). Mr. W. O'Connell, Henry Ford Ltd. Cork to Maj. Maher, 22 May 1940 (MA, DOD-2 52363, Part II).
[809] Memo by B. B. Byrne, Department of Defence (MA, DOD-2 52022, Part I).
[810] Correspondence between Department of External Affairs and Department of Defence, 14 July 1941; 14 Aug. 1941; 13 Sept. 1941; 15 Sept. 1941; Saorstát and Continental Steamship Co. to Department of Defence, 23 Oct. 1941 (MA, DOD-2 67192).
[811] Charles Messenger, *World War II in the Atlantic*, (London, 1990), p. 34.
[812] In one file 'enemy action' was blamed for the loss of the indemnity record for the cargo of Mark IV and V adaptors that made it safely to Dublin in 1942. It was therefore necessary for the British and Irish Steam Packet Company to send the Department of Defence a letter 'to satisfy your guarantors that their security is ended'. William Masson, British and Irish Steam Packet Co. Ltd. to Department of Defence, 18 June 1942 (MA, DOD-2 52022, Part II).
[813] Knight, *The 18-pounder field gun in Canadian service*, p. 32.
[814] Director Supply and Transport to ACOS, 16 Nov. 1937 (MA, DOD-2 51496).
[815] Report by board of officers Mechanisation-Artillery for Director of Artillery, 27 Feb. 1939 (MA, DOD-2 51496).

the trial.[816] A memo from the assistant chief of staff disagreed with them. He remembered how well the Ford had performed during the Martin Parry trials and he wondered why the board had not 'recommended an alternative commercial vehicle which would be better'.[817] The general staff were clearly thinking about using a 'commercial' lorry as a gun-towing vehicle. They were not alone. The British had consistently looked for commercially viable vehicles during the experimental phases of mechanisation and tracked and half-tracked gun-towers were more than likely doomed to fail without a version that could be produced for the civilian market.[818] The advent of a good low-pressure pneumatic tyre meant that wheeled vehicles could replace tracked, and British trials conducted in 1934 with an 18-pounder and limber sought an appropriate four- or six-wheeled gun-tower. The six-wheeler Morris Commercial manufactured using mostly standard Morris components, was the result.[819]

The Irish trials continued into the early years of 'the Emergency' and Leyland, Ford and Bedford lorries were all 'pressed into service' as gun towers, but there was a fear that they would 'probably fail when most urgently required' and none of them were able to negotiate difficult terrain.[820] Finally, nineteen partly built Morris Commercial gun-towers were procured from the British between 1938-39. They were fitted with Irish built bodies at the transport workshop in Islandbridge Barracks.[821] The 1939 testing board had complained about the high profile of the lorry so the open topped Morris with a low silhouette was considered ideal for field artillery.[822] The Morris was not designed to carry ammunition however, and Irish – like British – field artillery batteries continued to use the limber. It had been demonstrated at the trial on the Curragh how important the limber was. It helped to balance the 18-pounder when it was being manhandled and it was easier to conceal than a truck. The use of the limber meant that the ammunition was readily at hand and time was not wasted unloading it from the lorry. But it was almost impossible to reverse a Morris Commercial with the gun and limber attached. Plenty of armies got rid of the limber after mechanisation, and its retention by British and

[816] Report by board of officers Mechanisation-Artillery for Director of Artillery, 27 Feb. 1939, (MA, DOD-2 51496).
[817] ACOS, Memo, 28 Mar. 1939, (MA, DOD-2 51496).
[818] Fletcher and Ventham, *Moving the guns, The mechanisation of the Royal Artillery*, pp 75-6.
[819] W. S. Marble, 'Furries or dragons, Imperial considerations and mechanization' in *Journal of the Royal Artillery*, cxxiv, no.2 (Autumn 1997), pp 34-9, p. 38. The military was almost entirely responsible for the development of a pneumatic tyre with a wide section and a cross-country thread. Fletcher and Ventham, *Moving the guns, The mechanisation of the Royal Artillery*, p. 78.
[820] Director of Artillery reports 16 Sept. 1940, 31 Aug. 1942 (MA, DOD-2 65665).
[821] Karl Martin, *Irish Army vehicles, Transport and armour since 1922* (Dublin, 2002), p. 49. Riccio, *The Irish Artillery Corps*, pp 175-7.
[822] Report by board of officers Mechanisation-Artillery for Director of Artillery, 27 Feb. 1939 (MA, DOD-2 51496).

Commonwealth field artillery units until well into World War II has been attributed to the conservative nature of the artilleryman in these armies.[823] The Artillery Corps seems once again to have simply copied its British counterpart.

The Chief of Staff, Maj. Gen. McKenna, reported in March 1941 that the mechanisation of all field artillery equipment was completed, though at the time there was still a shortage of gun towing vehicles.[824] At the end of the previous year the Department of Defence tried to buy more Morris Commercial tractors which were proven as 'the most suitable for artillery traction in difficult country'.[825] The department even contacted the Morris sales representative in Ireland only to be told 'the whole output of the firm is now under British War Office control'.[826] Huge numbers of these vehicles were lost at Dunkirk and British stocks had to be replaced.[827] Subsequent enquiries from Dublin made it clear that the six-wheeled Morris Commercial was already obsolete and had been replaced by a four-wheel-drive version.[828] The Morris Quad gun-tower entered service a few months before the outbreak of the war.[829] The speed with which the Irish side placed an order for thirty-five of these new gun tractors is commendable, though it was deemed important to make sure that they were 'suitable for towing 18-pounder and 4.5 inch howitzer equipment'.[830] Once again the Irish order was affected by the war and it was explained to the Department of Defence that 'heavy demands for these vehicles in active theatres of war' meant that it would be twelve months before they could be delivered.[831] They were finally received in January 1942 and the Chief of Staff's report for that year (ending 31 March 1942) stated 'the mechanisation of all existing F. A. guns was completed and nearly all guns are provided with tractors'.[832]

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[823] Fletcher and Ventham suggested that it was 'through conservatism' that the Royal Artillery kept the limber. Fletcher and Ventham, *Moving the guns, The mechanisation of the Royal Artillery*, pp 78-9. Report by board of officers Mechanisation-Artillery for Director of Artillery, 27 Feb. 1939 (MA, DOD-2 51496).
[824] Dan McKenna, Chief of Staff, 'General report on the army for the year 1 Apr. 1940 to 31 Mar. 1941' in Michael Kennedy and Victor Lang (eds), *Irish Defence Forces 1940-49, Chief of staff's reports* (Dublin, 2011), p. 63.
[825] Secretary, Department of Defence to Secretary for High Commissioner, 30 Oct. 1940 (MA, DOD-2 65665).
[826] The Morris General Sales Manager, C. S. Ledridge explained that 'things were extremely difficult at the time for reasons which will be probably obvious to you'. Secretary DoD to High Commissioner, 30 Oct. 1940, and reply from Morris Sales Manager 4 Nov. 1940 (MA, DOD-2 65665).
[827] Mark Nicholls and Linda Washington (eds), *Against all odds, The British Army of 1939-40* (London, 1989), p. 24.
[828] The Morris Commercial was a 6 x 4.
[829] Fletcher and Ventham, *Moving the guns, The mechanisation of the Royal Artillery*, p. 83.
[830] Lt. Col. for QMG, 16 Dec. 1940 and Secretary, Department of Defence to Secretary, High Commissioner, 24 Dec. 1940 (MA, DOD-2 65665).
[831] High Commissioner to Secretary Department of Defence, 28 Mar. 1941, and Office of Director of Artillery, 21 Jan. 1942 (MA, DOD-2 65665).
[832] Dan McKenna, Chief of Staff, 'General report on the army for the year 1 Apr. 1941 to 31 Mar. 1942' in Michael Kennedy and Victor Lang (eds), *Irish Defence Forces 1940-49, Chief of Staff's reports* (Dublin, 2011), p. 140.

The life of the 18-pounder in Irish service was without doubt extended well beyond the period when the gun was considered obsolete by other armies through a programme of inspection and repair and by the modernisation of the road gear to mechanise the piece. It was a considerable achievement for an army that had no artillery capability to quickly develop a system of maintenance that began with basic care and attention and progressed through the various echelons of repair to the complete overhaul of the gun and carriage. The mechanical troubles that dogged two of the field guns during the Civil War showed just how important even basic maintenance was. Preventative maintenance and a knowledge of the workings of the gun would have eliminated the need for British intervention in Donegal and it would probably have kept the other 18-pounder in the field without it undergoing a very necessary overhaul. Technical expertise was limited however in the new army and was overseen almost entirely by ex-Royal Navy artificer Johnny Doyle.

After the Civil War, as the makeup of the Artillery Corps mirrored the Royal Artillery, personnel with the relevant skills were located in the gun detachment and in the Corps' HQ. These qualified tradesmen were sometimes hard to find. The Ordnance Service was at the top of the tiered maintenance approach, and it was the parent unit of the officers who were responsible for the inspection of the field gun. The inspection of the 18-pounder was a crucial aspect of the maintenance programme and Ordnance officers were provided with the necessary equipment to fulfil this task correctly. A period of neglect early on left the Mark II field guns unserviceable with damaged recoil systems and by 1932 they were suitable only for training. This was a particularly vulnerable part of the weapon and required constant attention to keep it functioning correctly. The purchase of spare parts shows that the Ordnance Service understood what was required and the Mark II guns were back in service by the time 'the Emergency' was declared in 1939. The Ordnance workshops at Islandbridge were equipped to carry out the most complex repair work on artillery and were, when required, able to manufacture an array of spare parts for the weapon. A system had been set up in 1922 that allowed parts to be purchased through War Office supply lines and although there were difficulties securing orders in short timeframes it seems to have functioned in a satisfactory way during peacetime. Whilst the controlling hand of the Department of Finance was, as always, visible in the background during the purchase of tools and equipment it does not seem to have been as restrictive as it was elsewhere, perhaps it was understood that a small spend on maintenance would keep the limited number of guns in service and alleviate the need to spend big on their replacement. The 18-pounder was of course not replaced until after the Second World War and was 'modernised' by adapting it for mechanical haulage. This was a massive

project that involved the Artillery Corps and the Ordnance Service and, once the decision was made to go ahead with it, was done relatively quickly and determinedly. The transition from horse drawn to tractor hauled artillery is another example of the Defence Forces endeavouring to be more conventional than it was in fact able to be. During this phase of the field gun's life the roles of the Ordnance officer and the Ordnance technician were extremely important and without them the 18-pounder would not have been able to continue in service through the Second World War and into the 1950s.

Conclusion

During the first half of 1922 the army of the Irish Free State showed no real sign of establishing an artillery unit. The receipt of two 18-pounders from the British to deal with the anti-Treaty force in the Four Courts was therefore a significant moment in the shaping of the new army as it laid a foundation for a Corps that was otherwise unplanned. The service of the 18-pounder with the Defence Forces might not have been significant in the historiography of the gun but it was important nevertheless, firstly in the way the weapon was deployed during the Civil War and secondly because all variants of the field gun were in use – at the same time – for a considerable period of the forces' history. The gun was shaped by conflict, its design based on the lessons learned in South Africa at the turn of the century, its modification a necessity because of the devastating effects of total war twelve years later and its redesign a symptom of the industrialised nature of twentieth century combat, and later it was adapted to be ready for the next big - mechanised - war in 1939.

By the time the 18-pounder entered Irish service in 1922 the Mark I variant was already obsolescent, and the Mark II was being replaced in Royal Artillery batteries by the Marks IV and V. Yet all bar one of the Irish 18-pounders were in service during 'the Emergency' twenty years later. The gun – the first nine – became the nucleus around which the Defence Force's artillery was formed. An army that had previously professionalised guerrilla warfare against the British suddenly found itself wielding one of the greatest field guns of the age. It was no wonder the bombardment of the Four Courts proved to be somewhat disastrous. The guns did not fail though. When used correctly and with the right ammunition the 18-pounder did exactly what it was supposed to. In fact, though the point-and-shoot capability of the gun has not been referred to in the historical record it was a feature of the weapon that allowed poorly qualified gunners to deploy the piece during the Civil War and must surely be testament to the gun's design.

Tactically the Civil War deployment of the field gun was unspectacular, except perhaps for the battle of Kilmallock. The gun was a siege breaker in Dublin, Drogheda and Limerick, and it neutralised enemy strongholds in Waterford and acted as a heavy support weapon for the advancing infantry generally. It is true the use of the gun improved – considerably in some areas – as ex-artillerymen joined up, though at the same time it is clear that some Free State commanders failed to exploit the full potential of the 18-pounder in their area of operation. The Irish use of the gun in 1922 stands out however because of its simplicity and its efficacy. The machine gun positions in the church towers in Collooney and Adare and in Kilcash Castle were

all silenced without the need for elaborate gunnery skills, though it looks like all three engagements were managed by experienced men. Outside Dublin the field gun was only deployed in single gun actions - the pair of 18-pounders in Cork do not appear to have been used together - but whether it was an action triggered by a deliberate or an encounter attack the result was always the same, the withdrawal of the enemy.

The closeness of the weapon to the local commander meant it was always on hand during the advance, accompanying the infantry, and was employed well in this role between Waterford and Clonmel, in west Limerick and in Cork. Noteworthy engagements include the standoff with the *Ballinalee*, the anti-ambush encounters and the deployment at Macroom where an 18-pounder faced an attacking force armed with a mortar. These were not large-scale combat operations, it was not that kind of war, but the new National Army nevertheless found a place for the 18-pounder in its campaign even after anti-Treaty Republicans turned to guerrilla warfare. It is difficult to find a comparison in other theatres of war, partly because of the small scale of the conflict in Ireland and the limited number of artillery pieces. If artillery doctrine was followed it was only because someone in the gun crew had served the guns before. Single guns were deployed in the way that batteries or sections of guns were deployed elsewhere and ammunition was often in short supply. Casualties were low. Yet the power of the 18-pounder was very much in evidence, especially during the conventional phase of the war. Republicans knew they had lost the advantage once the big gun arrived, and they targeted it accordingly or simply retired without giving the gun a chance to fire. The anti-Treaty decision to turn to guerrilla tactics was no doubt influenced by the presence of artillery in the arsenal of their enemy.

One of the most striking things about the use of the artillery piece by the Free State Army in 1922 was the way it was transported. Only in the case of an emergency was a horse used to pull the gun. This makes the post-Civil War Artillery Corps' adoption of the horse as gun tower stand out and it indicates that lorries and Lancias were good enough until the Corps had time to train and adopt the traditional – British – method of haulage. As field artillery units in other countries were experimenting with mechanised draught the Irish artillery tradition, though still in its infancy, was firmly embracing the horse. It characterised the conservative approach taken by the Corps from 1923 and was represented in Maj. Mulcahy's attitude towards the Fordson trial in the Glen of Imaal three years later.

The conservative approach also saw the implementation of British artillery doctrine and systems of training. They were tried and tested and known to the large numbers of personnel under Mulcahy who had previously served with the Royal Artillery. Trodden's placement on

the military mission to the US might have helped to marginally broaden the mindset but Irish artillery doctrine was only ever going to be conventional, and a chance to invent something different for a modestly sized army with a good record in guerrilla warfare was lost.

The nine 18-pounders were the nucleus around which everything else was built and they were presented to the Irish public frequently, helping to establish the unit as one that was meticulous and particular about attention to detail. But behind the scenes the Corps, and the army generally, was struggling with the lack of proper funding and the strict limitations set by a controlling Department of Finance. It affected everything and slowed the development of good gunnery skills by limiting the amount of ammunition that was available for practice. This in turn meant that the Irish guns were used less and suffered very little wear over time. The analysis of barrel wear from Military Archives' files – something that has not been done previously – shows that the Irish Mark I and II 18-pounders were obsolete long before they reached the last quarter of life.

The story of the 18-pounder in Irish service is marked by limitations. Tight financial controls meant that the Artillery Corps could only expand slowly and though the first two batteries of guns were each attached to infantry battalions in the 1920s the true reflection of how thinly the artillery would be stretched in wartime was exposed during army manoeuvres when a single battery was instead deployed to support three battalions. The 1934 war plan was probably one of the most realistic approaches to a potential war situation and even though it was intended to field twenty-eight artillery pieces – most of them 18-pounders – the plan admitted that the west of the country would be left without guns. The early years of 'the Emergency' proved how thinly the guns could be spread as sections of artillery were attached to mobile columns. Tactically the Artillery Corps was enthusiastic about the role of the field gun in anti-tank training, but its efforts were limited by the shortage of ammunition, and cost as always was a factor when purchasing firing platforms for the 18-pounders that were to be deployed in the anti-tank role. Only a dozen platforms were procured from the War Office, the rest had to be manufactured in Ireland. Advancements in 18-pounder design made the Mark V gun suitable for anti-tank work, but the Irish wanted platforms to suit the Mark II also as the artillery made the most of what they had. When the reserve was finally established it too faced limitations. It is true that it would go on to become the core of the new artillery units that were established at the start of 'the Emergency' but for a long-time reserve batteries only had two guns.

The importance of maintenance on the field gun was made very clear from the very beginning of its service in the National Army. Two guns were rendered unserviceable due to

mechanical issues during the Civil War. That is a high percentage of the total number in the arsenal. If an artificer had accompanied the 18-pounder to Donegal on the *Helga* the gun would have proved more useful to Sweeney and might have seen more service in the county but the expertise simply was not there. In many ways Capt. Johnny Doyle laid the foundations for the artificers who worked on the guns in the years that followed. He understood the importance of maintaining the history sheet correctly by recording the number of rounds fired and he travelled with the gun when necessary and took charge of operations in the workshop when that was required. The Ordnance Service in Islandbridge Barracks always seemed to have enough qualified personnel to work on the guns and was able to carry out an overhaul of the weapons in 1923 but there were shortages of qualified tradesmen in the Artillery Corps. Overall there was a good working relationship between the two units and Ordnance generally seems to have supported the Artillery Corps in its endeavours with the field gun.

The recoil system more than any other assembly caused the most problems, and it required the most attention during the gun's long service. Its redesign during the Great War modernised the 18-pounder but the replacement of springs with air did not lessen the prerequisite for care and attention. The lack of maintenance on this part of the gun almost rendered the first batch of weapons unserviceable by 1930. The records show however that the Irish system of maintenance was satisfactory. Inspections were generally carried out correctly with the proper equipment and supplies of parts were attained as required, though maybe not as quickly as would have been liked. At the same time the Ordnance workshops also had the capability to manufacture components. It is true that the Irish 18-pounder did not suffer with the same wear and tear that Great War guns experienced but it did require the same care and attention to keep it working and the long service that the weapon endured in the Defence Forces is testament to the efforts of the technical staff who worked on it.

It is also partly due to the upgraded road gear which was mounted on the gun to make it suitable for mechanised haulage. It is surprising how quickly the Artillery Corps embraced the need to 'mechanise' in the late 1930s and it is also quite remarkable how the cost of mechanisation was accepted by the financial controllers. The war clouds on the horizon no doubt had something to do with it. It was a complex project and was difficult to research, but it began with the simplest of questions. What was required for the gun and what was required in the gun tower? Other armies had examined this earlier, but Irish mechanisation was never going to be about masses of armoured vehicles and heavy weaponry moving under its own power. It was always going to be simpler – and on a smaller scale - and this perhaps allowed it to happen at a quicker pace than in other armies when everything was agreed.

Once again, the Defence Forces turned to the British for the answer until the Martin Parry adaptor appeared. The simplicity with which this kit allowed an 18-pounder to be converted was evident from the start and had been noticed by other forces before the Irish considered it as a solution. The readiness with which the American company was prepared to work with the Irish on the matter even though the Irish operation was small was also commendable. With the 18-pounder converted a greater difficulty was encountered in the choice of vehicle as gun tower and this brought the army's transport, ordnance, and artillery sections together to solve, though the final solution came from the British War Office. The war in Europe might have made the Department of Finance ease its grip on the purse strings but this came at a time when the procurement of parts and equipment had become extremely difficult after British losses at Dunkirk.

A future study could look at the broader subject of mechanisation in the Defence Forces by examining transport in general, the movement of the infantry and the phasing out of the horse. This was done quite quickly at the time. the use of artillery of all types for the defence of the Free State during the Second World War is another project that needs further research and the history of the Artillery Corps and the Ordnance Corps both warrant academic analysis. As mentioned already histories about subjects that cover technical issues and maintenance are rare and the role of the Ordnance technician and the work that he or she carried out over the Defence Forces' one-hundred year history has yet to be researched properly.

To conclude it is worth once again looking at the material evidence. Traces of oil and grease were found in the recoil system and gear boxes of gun number 9168 during its preservation, last applied, it is thought, by an artificer in the 1950s. It is evidence that to the end of its service in the Defence Forces the 18-pounder was well maintained. It represents the work done by scores of tradesmen who were part of the gun detachment or workshops staff. The working mechanisms of the gun – many of which were made operational during the restoration project – embody the very ethos of the 18-pounder design which was intended to last and was manufactured to serve without failure. When failure occurred the field gun was modified and 9168 built at the end of the 1914-18 war mounted the altered recoil system. Although it was obsolete by the 1950s it had been made serviceable for the second half of the twentieth century with the adoption of the Martin Parry conversion kit, the simplicity of which was made clear when it was replaced on 9168 with modern copies of the original timber wheels. To fit the Martin Parry kit, it was not necessary to alter the axel and it was replaced easily to allow the field gun to be presented as it was in 1922. It will be displayed as it looked between 1922-39 when it was the primary artillery piece in the Free State Army. During that time, it

shaped the Artillery Corps and saw the introduction of – chiefly - British drills and doctrine. It was deployed at first in combat by a force unused to artillery which made its use somewhat unusual.

Figures

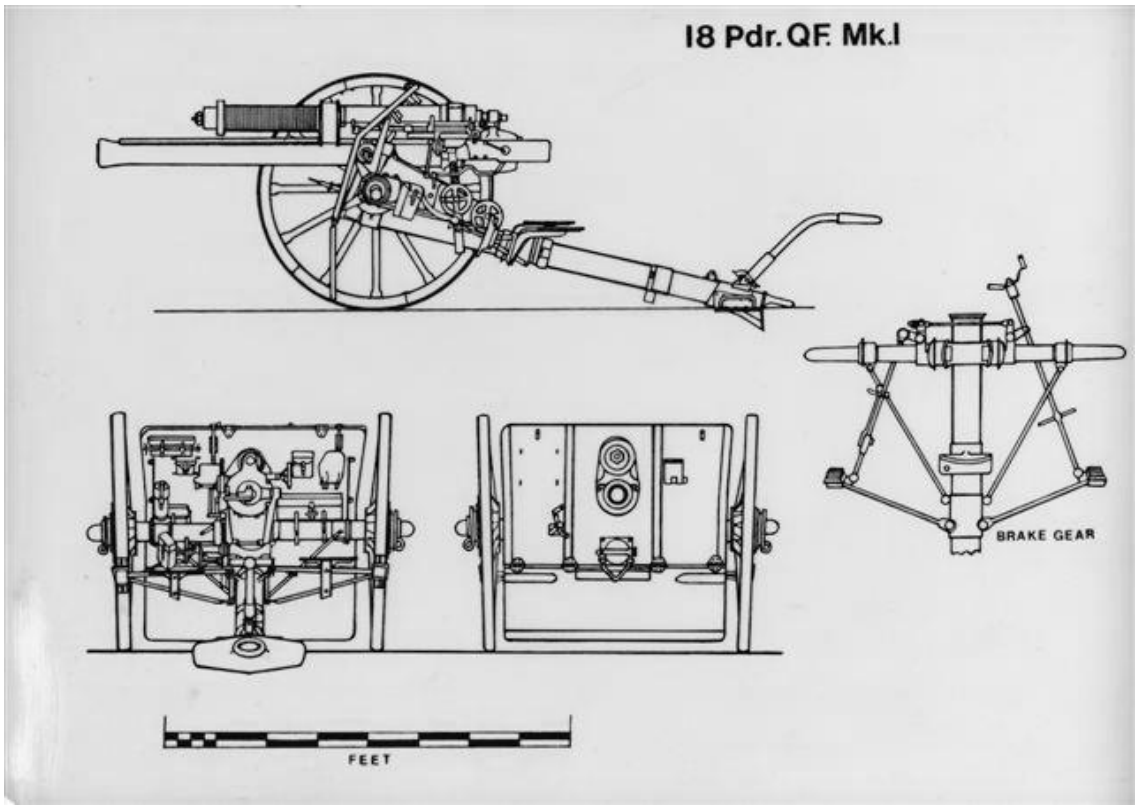


Fig.1 Drawing of Mark I 18-pounder. (Trawin, *Early British quick firing artillery*)

Fig.2 Cammell Laird Mark I barrel on gun number 9168. (author)

Fig.3 No.7 dial sight on the bracket that was used to fit it to the 18-pounder. This allowed indirect fire to become the norm. (Fort Nelson Museum)

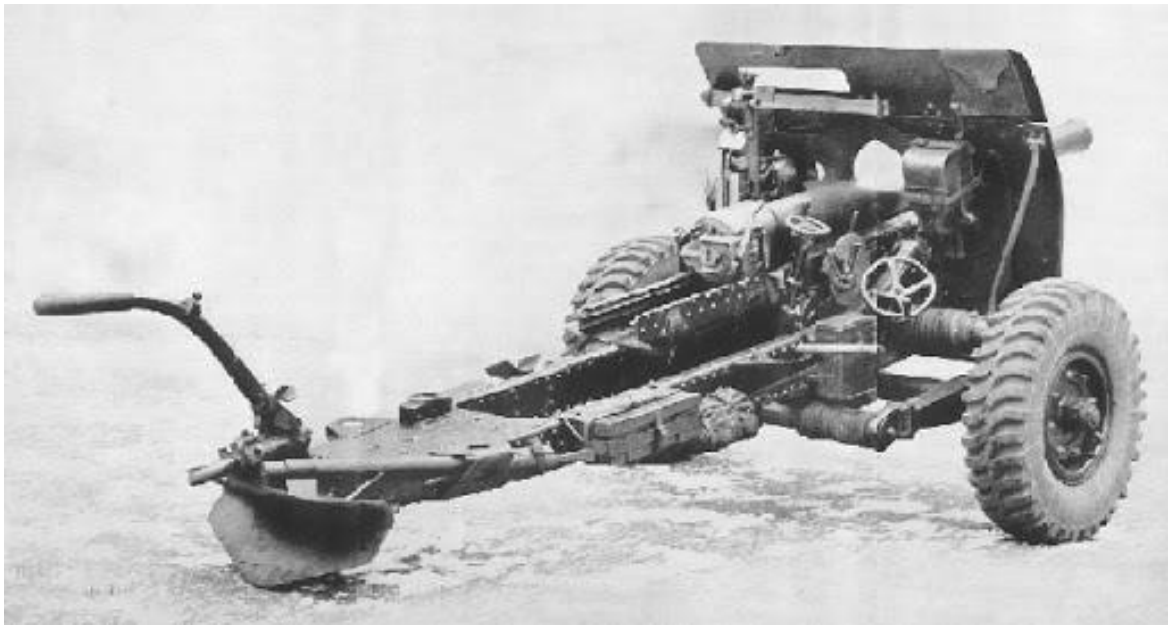


Fig.4 Mark IV 18-pounder. The box trail is clearly visible. (War Office, *Handbook for the Q.F. 18-pr gun, Mark IV on carriages, field, Marks III, IIIT, III* and IV*)

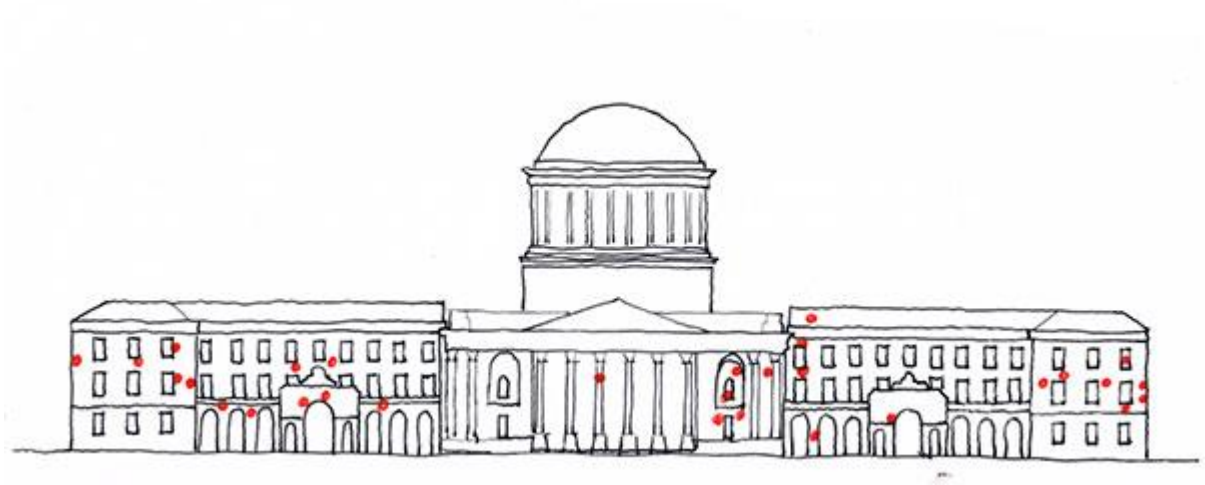


Fig. 5. Four Courts façade showing areas where artillery fire was concentrated. (Fewer, *The battle of the Four Courts*)

Fig. 6 Record House after the battle of the Four Courts confirms that most of the rounds struck the same area to make the breach. High on the wall of the building are signs of hits where the HE shells pierced the stone fabric of the building. (NLI, Independent Newspapers collection)

Fig. 7 Image from the Bridge Street firing point of the breach on Morgan place. Note the narrow arc of fire and the Four Courts Hotel to the left of the damaged section of the Courts. Note also the damage to the quay wall in front of the gun position. (Getty Images)

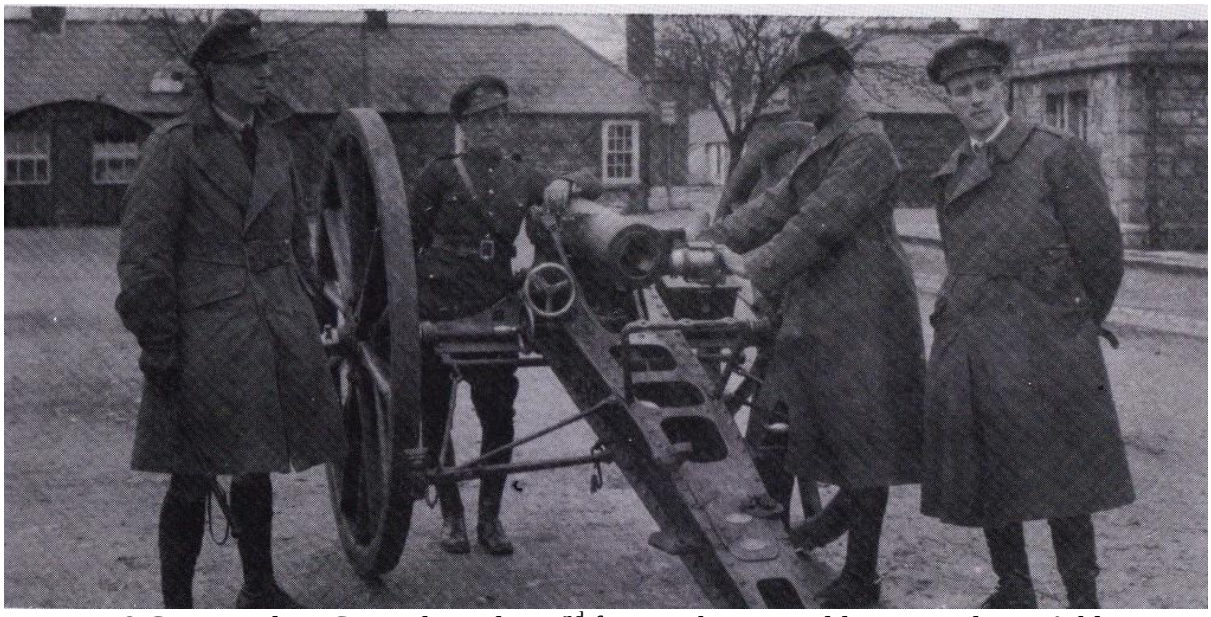
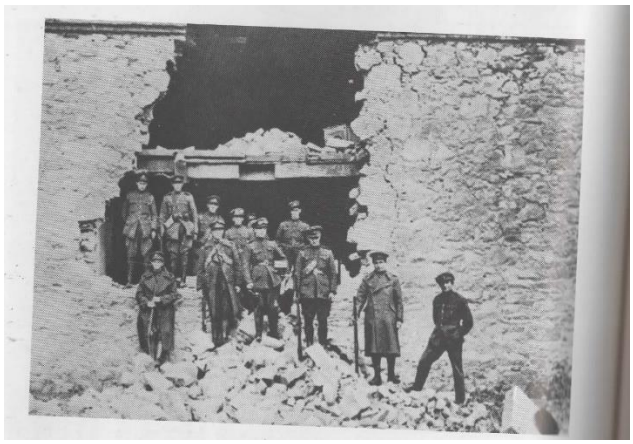


Fig. 8 Commandant-General Lawlor, 2nd from right, at an old 15-pounder in Athlone Barracks in 1923. This may have been the gun that he used to 'train' Free State soldiers before the outbreak of the Civil War. (*An Cosantóir*, April 1990).

Fig. 9 Bridge Street gun position. Note how ammunition is left lying around. (NLI, Hogan collection, also *Irish Times*, 1 Jul 1922)

Fig. 10 Shell damage on the wall of the Four Courts, likely to have been done by shrapnel. (Fewer)

Fig. 11 The tower, Millmount Fort, Drogheda after the bombardment. Note the extensive damage to just one area of the wall. (Getty Images)



Figs. 12 and 13 Breaches – front and rear - in the walls of the Strand Barracks Limerick. Note how similar the shape of the rupture was to that seen earlier at Millmount. (Cork Examiner)

Fig. 14 Q. F. 18-pounder 'Hammond Lane No.4' on Henry Street during the battle for Dublin. Note upper shield attachment. The lower attachment folds back underneath the gun for traveling. (NLI, Independent Newspapers collection)

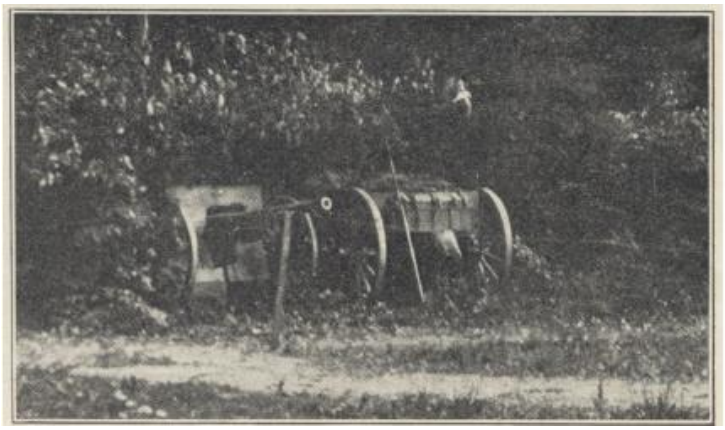
Fig. 15 18-pounder on O'Connell Street firing between Lancia armoured cars. (Getty Images)

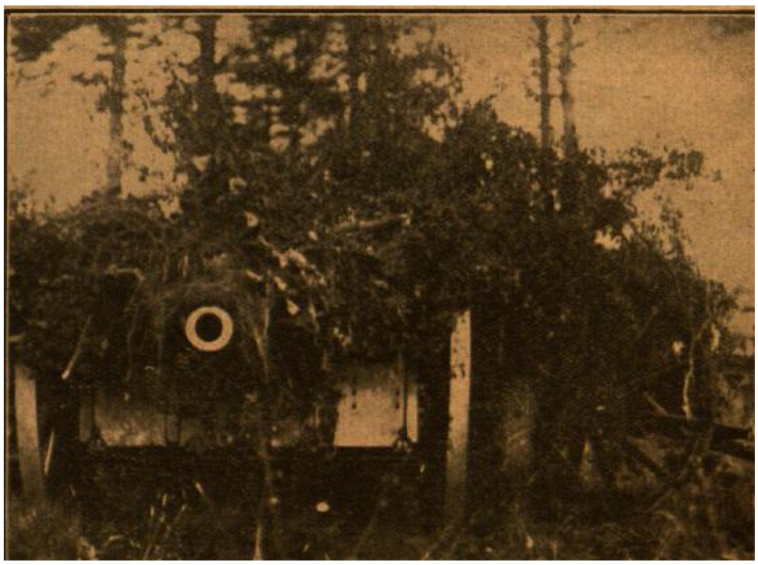
Fig. 16 and 17 Immaculately turned-out field guns during training in-barracks in the 1930s. (MA, *An Cosantóir*)

Fig. 18 Gun carriage, 18-pounder and limber, at Michael Collins funeral, 1922. (NLI, Independent Newspapers, collection)

Fig. 19 Gun salute being fired for the Papal Nuncio, Paschal Robinson, January 1930. (NLI, Independent Newspapers collection)

Fig. 20 A detachment crossing the River Slaney in Wicklow 1926. (*An tÓglach*)





Figs. 21 and 22 How to camouflage a field gun. A US Army student battery's gun above demonstrates that less foliage is required if the gun is positioned under the cover of natural woodland, whilst the Irish 18-pounder would be difficult to fire. (*The Military Engineer* and *An tÓglach*)

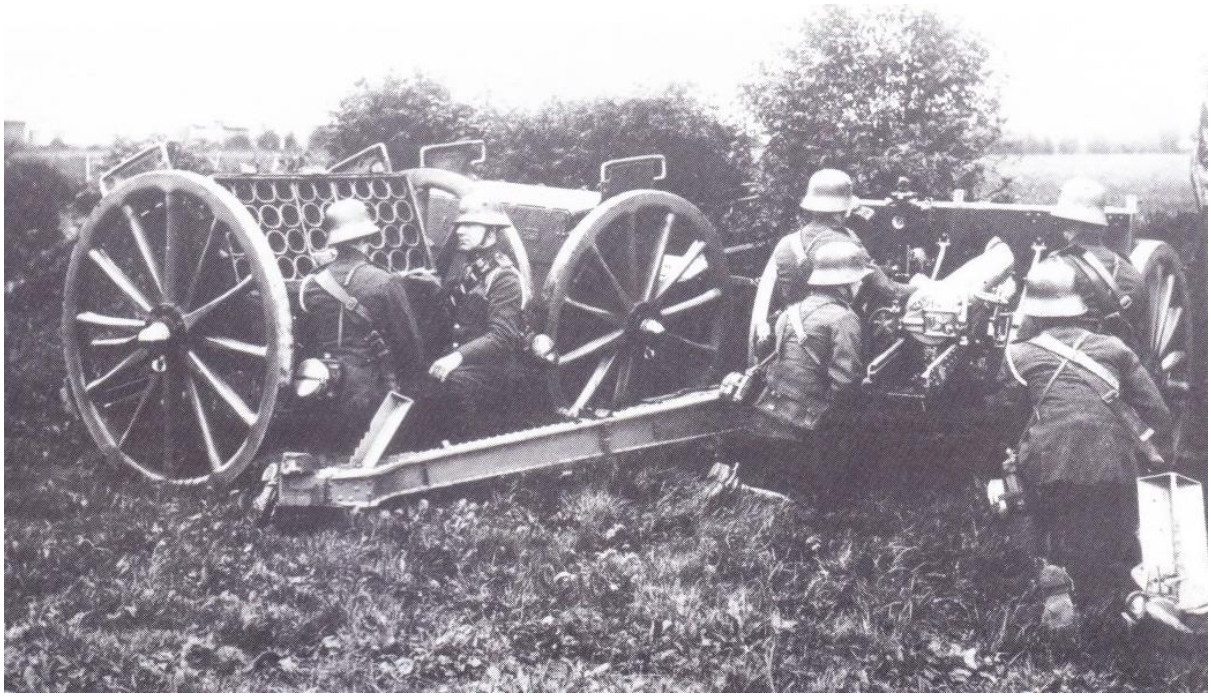


Fig. 23 A Mark V field gun deployed for action during an exercise, 1930. (*An Cosantóir*)

Fig. 24 An 18-pounder battery of Mark V guns deployed in the Glen of Imaal. Though taken in 1954 this photograph could easily have been taken earlier. (*An Cosantóir*)

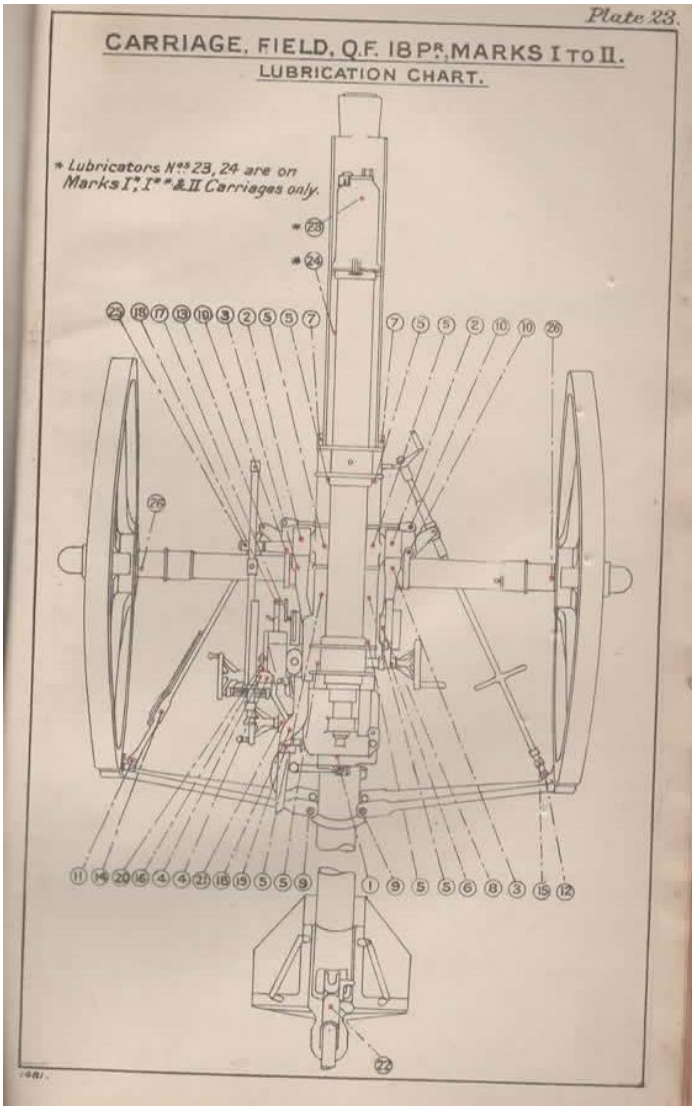


Fig. 25. The lubrication chart for an 18-pounder showing the oiling and greasing points on the gun carriage. (War Office, *Handbook for the 18-pr Marks I to II guns*)

Fig. 26. Captain John Doyle, holding a rag, working on an 18-pounder in Omeath during the Civil War. (MA)

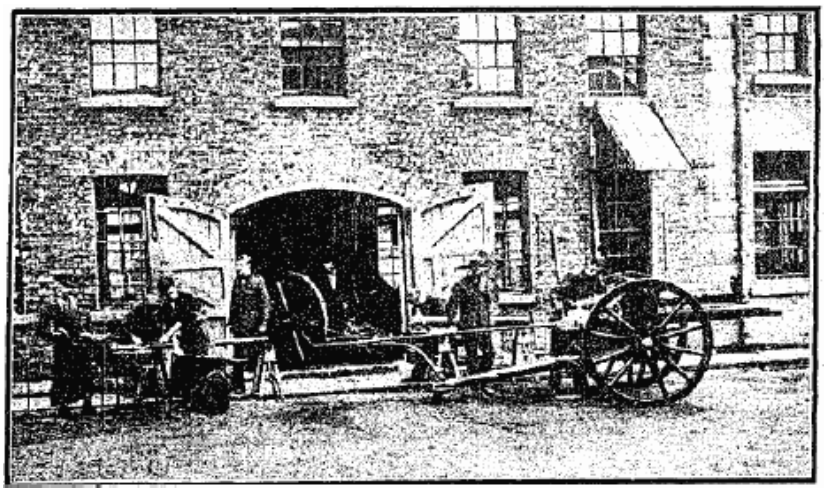
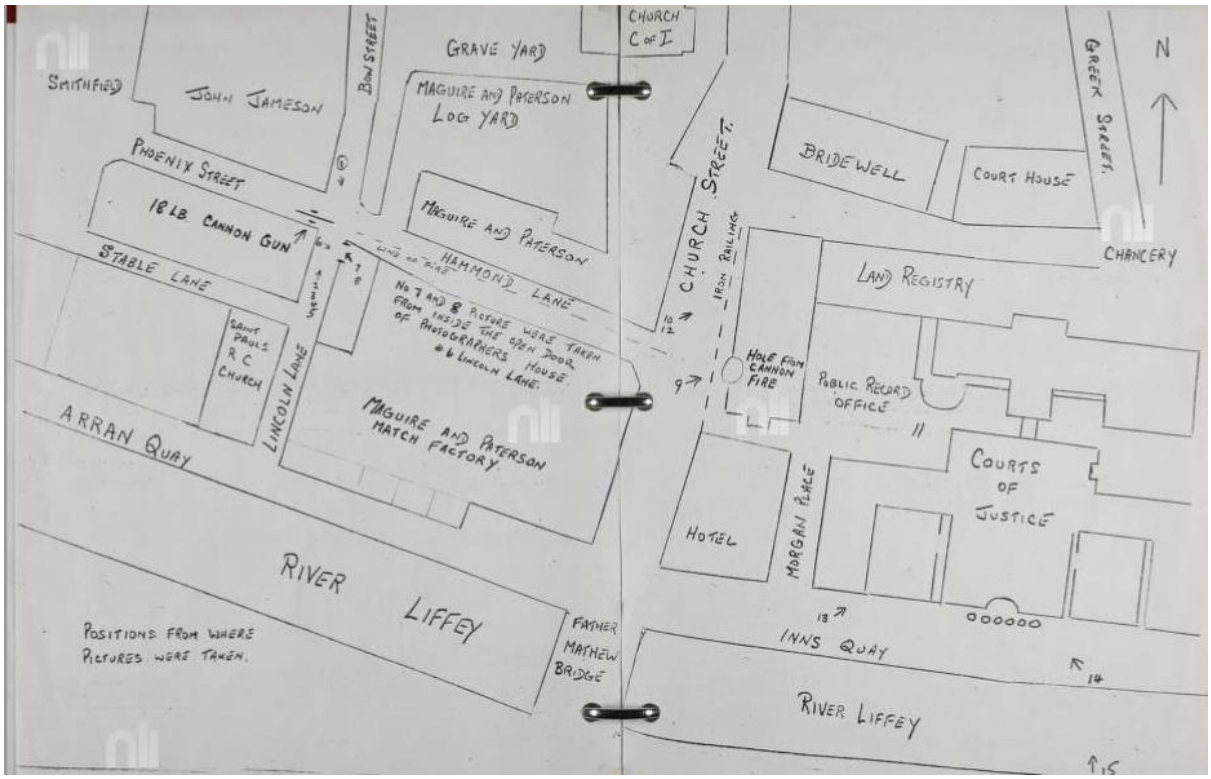


Fig. 27. Ordnance technicians reassembling an 18-pounder (inside) and cleaning an already reassembled field gun outside the workshop. (*Freeman's Journal*)

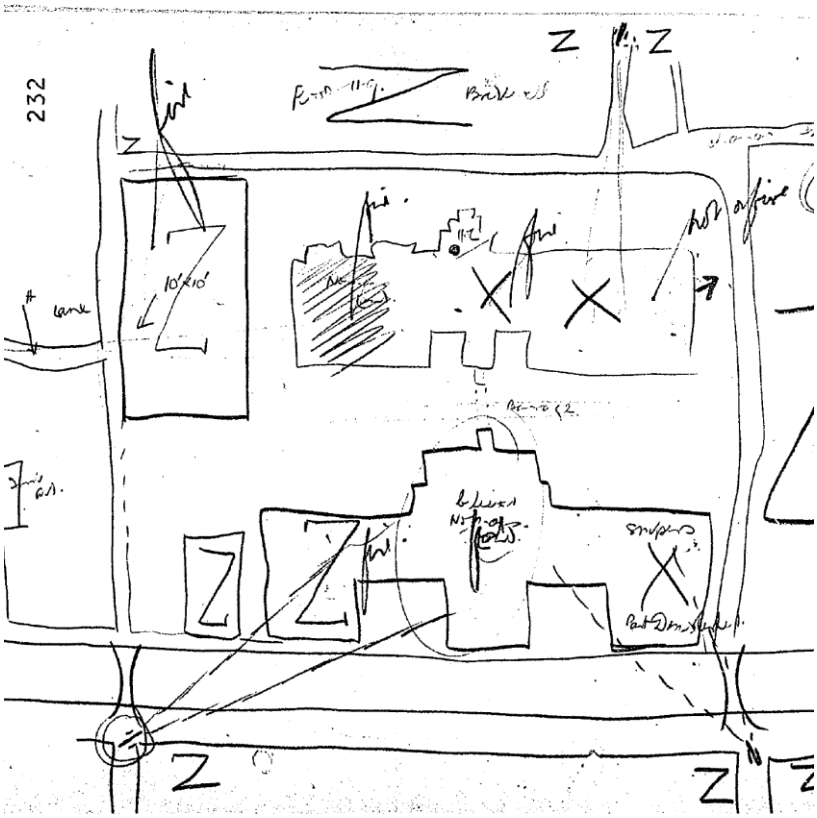
Fig. 28. Bore inspection mirror. One of the many tools used to inspect the bore of an 18-pounder. This piece would have had a pair of electric cables attached and was fitted with a bulb to reflect light into the barrel. (author)

Fig. 29. A weld found on the underside of the carriage body during the restoration of gun number 9168. The weld which is of poor quality may have been required following mechanical haulage tests at speed before the gun was converted with the Martin Parry adaptor. (author)

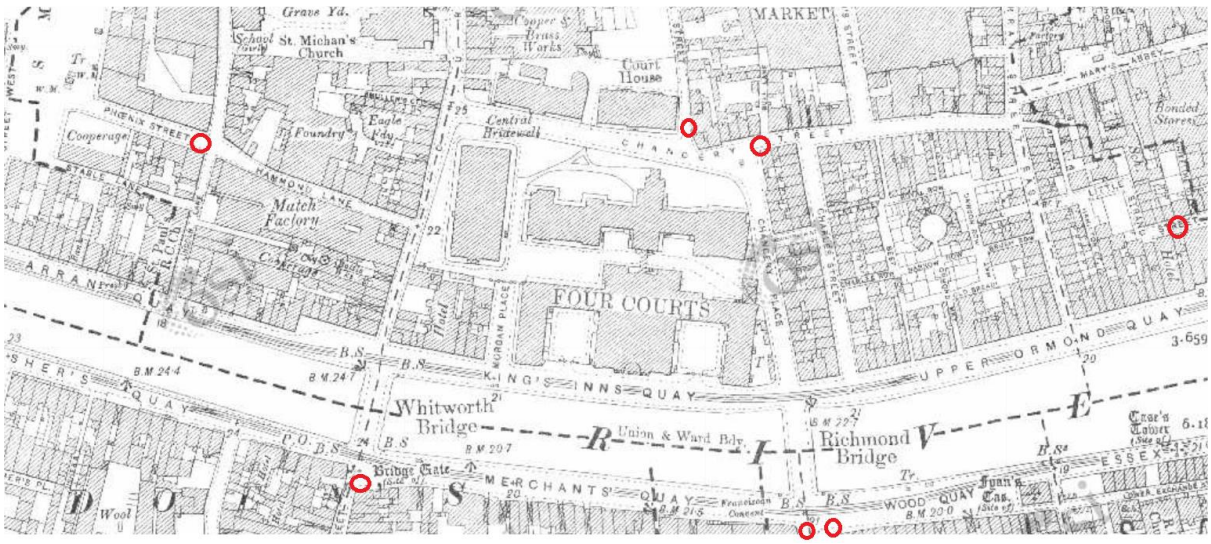
Maps



Map 1. Drawn by Michael MacConnoran showing the gun position on Phoenix Street targeting the west of the Four Courts. (NLI, MacConnoran album)



Map 2. Hastily drawn map of the Four Courts showing positions of field guns. The ‘Z’ signifies friendly forces, the ‘X’ anti-Treaty. These positions confirm the map was drawn late in the battle. (UCDA, Mulcahy papers)



Map 3. showing the positions of the attacking artillery during the Four Courts bombardment.

Appendices

Appendix 1

Serial numbers of 18-pounders shipped onboard the *Finnmerchant* in 1959.

Gun serial number	Mark
5732	I
6460	I
7209	I
7470	I
10392	I
2819	II
2908	II
3484	II
4770	II
5605	II
7554	II
7765	II
8577	II
8976	II
9168	II
10756	II

Appendix 2

List of advantages of government manufacture

i. For some of the productions required for public purposes government is in a position similar to that of a private consumer, and can rely on prices being regulated by the ordinary operation of supply and demand.
But with regard to other kinds of necessary supplies, including some of the most important and costly munitions of war, the operation of these economic principles which ordinarily determine prices is less certain.
Not only are sources of supply in these cases strictly limited, but demand also is limited. Government finds itself in the position of a consumer supplied by a limited number of producers, who enjoy something approaching to a monopoly; and effective competition can scarcely be said to exist.
It is obvious that such conditions are favourable to the existence of understandings of a more or less formal nature, between the few firms who are capable of supplying the requirements in question; and experience shows that where government is not in a position to manufacture for itself, full advantage will be taken of its necessities.

ii. In another direction, also, the possession of factories by the government conduces to economy. It is impossible, of course, to accept supplies from private manufacturers without inspection, and when these supplies consist of articles of complicated mechanism, such as

artillery, the highly specialised knowledge required for efficient inspection can scarcely be obtained without some practical experience of manufacture.

iii. Again, it is incontestable that repairs of all kinds necessitated by the wear and tear of the service, from a battleship to a rifle, are more economically effected by government than by private contract. The amount of repair required in a given case can scarcely ever be gauged with any degree of accuracy beforehand, nor is it easy to devise any effective means of checking the items of the labour bill in the case of repairs done under contract.

iv. Manufacture by government is further valuable in establishing a standard of excellence in workmanship.

v. The existence of government manufacturing establishments appears to be of some public utility also in relation to the improvement of design. The government factories are able to collate and compare the features of different designs submitted to them from the several private manufacturers and others with whom they are brought into contact, and the design eventually adopted may thus combine the advantages of a number of alternatives.

vi. Lastly, there is no doubt that government manufacture incidentally furnishes a means of checking the prices charged for supplies purchase from private trade.

From *Government factories and workshops committee. Report of the Government factories and workshops committee,* pp 6-7, H.C. 1907 (3626), x, pp 424-5.

Appendix 3

List of Irish Mark I and II 18-pounders (in green) interleaved with Knight's list of Canadian guns that were in service in 1933. (the Canadian list is much longer, only those guns that were closest in register number to the Irish 18-pounders are recorded here)

The date of manufacture of the Irish guns can be estimated using the Canadian gun numbers that were produced around the same time. (sources Doug Knight, *The 18-pounder field Gun in Canadian service* (Ontario, 2019). B. A. Ward, Invoice for armaments sold to International Armament Corporation, USA, 12 July 1958 (Supplied to the author by K. Smith-Christmas)

18-pounder field gun				Carriage		
Gun Mk.	**Register No.**	**Manufacturer & Date**		**Carriage Mk.**	**Register No.**	**Manufacturer & Date**
II	2434	VSM 1915		II	C15876	WBC 1917
II	2819			II	858	
II	2908			II	CA875	
II	2999	EOC 1915		II	C15656	EOC 1918
II	3385	EOC 1918		II	C15749	EOC 1918
II	3484			II		
II	3501	BSC 1917		I	C64665	BSC 1915
II	3981	VSM 1917		II		
II	4254			II		
II	4770	VSM 1915		II		
II	5304	BSC 1916		I	C151	OCM 1915
II	5598	BSC 1916		II	C15803	EOC 1918
II	5605			II		
II	5612	BSC 1916		I	C120	OCM 1915
II	5682	BSC 1917		I	C173	OCM 1915
I	5732			I	C32930	
II	5801	EOC 1916		II	C6836	VSM 1917
II	5911	WBC 1916		II	C16730	EOC 1918
I	6460			I	C26104	
II	6478	VSM 1917		II	C14164	VSM 1917
II	7068			II	C16873	
I	7209			I	C39532	
I	7470			I	C32497	
II	7554			II		
II	7716			II	C16017	EOC 1918
II	7765	VSM 1918		II		
II	7768	VSM 1918		II	C16016	EOC 1918
II	8558	EOC 1918		II	C16846	WBC 1917
II	8577			II		
II	8584	EOC 1918		II	C16035	EOC 1918
II	8916	VSM 1918		II	C16006	EOC 1918
II	8976			II		
II	9072	WBC 1918		II	C878	WBC 1918
II	9140	WBC 1918		II	C852	WBC 1918
II	9168	WBC 1918		II	C14010	VSM 1918
II	9611	EOC 1918		II	C16970	WBC 1918

II	10374	VSM 1918		II	C854	WBC 1918
I	10392			I	CA9	
II	10661	NOF 1918		II	C16879	WBC 1918
II	10756	ROF Leeds		II	C13990	
II	10787	NOF 1918		II	C15745	EOC 1918

Appendix 4
A section from a report undertaken by the 24 and 25 Young Officers' Course, Ordnance School, Curragh Camp following a lecture by the author on the battle of the Four Courts and the 18-pounder. The report looks at the effect of HE and shrapnel shells on buildings. (The references in the text are those cited by the course)

The Ordnance School

Analysis of the use of the 18-pounder field gun during the battle of Dublin.

Prepared by,

The 25th & 26th Ordnance Young Officers Course

05 September 2020

Purpose

The main effort of this report is to provide technical observations on several unanswered questions in relation to the involvement of the 18-pounder field gun during the battle of Dublin in 1922. This report pays particular attention to the gun's involvement in the shelling of the Four Courts. It should be noted that any suggestions made in this report are based on a technical analyse available at the time of writing. Therefore, this document is not authoritative.

1.0 Gun Emplacements and Royal Hospital Kilmainham

Reports indicate that two guns were present on the south side of the river Liffey as can be seen in image 1. One was placed at the junction of Merchants quay and Winetavern Street and the other at the junction of the N1 (formally Bridge Street). It is possible that these two guns were placed with the intention of attacking the main Four Courts building and the Four Courts hotel, however considerable damage was done to the Record Treasury, Record House, Headquarters Block and The Land Registry Office. From the confirmed gun emplacements, it would not be possible to have affected these structures. Given the maximum elevation of the 18-Pounder in service at the time (16 degrees), and its proximity being used in direct-fire, it is unlikely that shots could have landed on these buildings without the near complete destruction of the intervening Four Courts building and Hotel. The damage sustained by the Land Registry Office etc, is consistent with having had additional guns or alternate emplacements, which lends credence to reports that cite there being more than two gun emplacements.

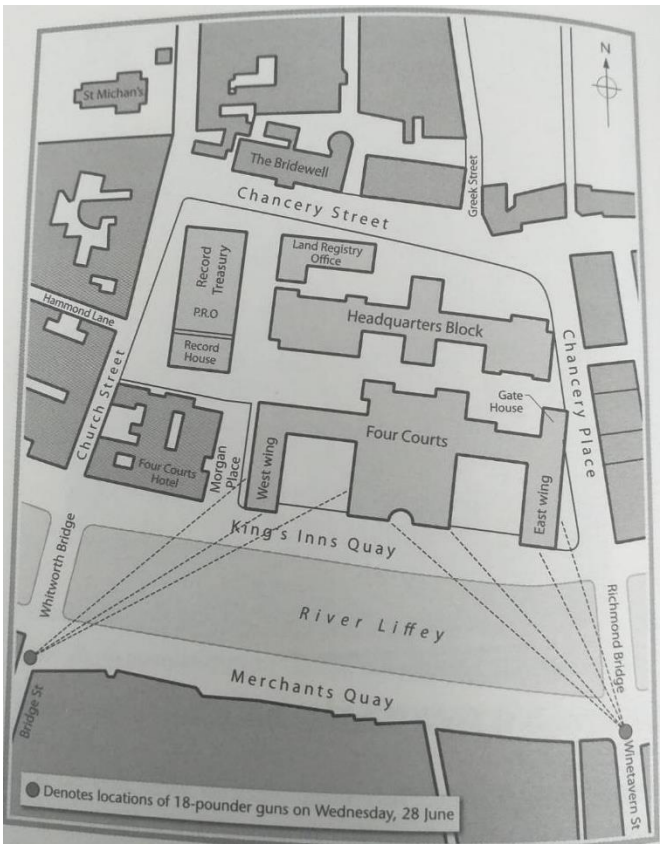


Figure 1: Confirmed gun positions

Some Reports have guns placed at the junction of Chancery Place and Chancery street and somewhere along Hammond lane. These locations would open arcs of fire suitable for attacking the rear buildings. The damage witnessed on this cluster of buildings to the rear is consistent with additional emplacements on the north side of the river. The proposed location of the guns can be seen in image 2. Although there is evidence to support the additional or alternate gun positions, this does not explicitly confirm or refute reports of additional guns.

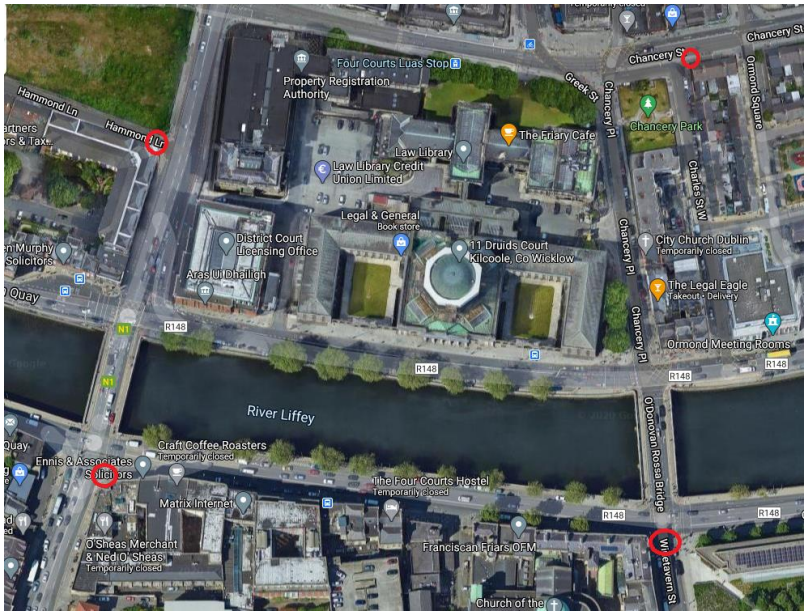


Figure 2: Proposed additional Gun positions

The artillery, stationed across the Liffey on Winetavern Street, opened fire at 4:15 a.m. on Wednesday morning, 28 June, reportedly firing at fifteen-minute intervals. The southern wing of the building sustained damage, but as the day wore on it became increasingly apparent to Gen. Dalton that the guns were not having the required effect. The garrison kept up their fire, using the armoured car's Vickers machine gun against the snipers in Jameson's and St, Michan's tower.

Two additional 18 pdrs. were handed over for Gen. Dalton's use, but because his guns were only supplied with twenty shells each, he became concerned and appealed to the British C-in-C in Ireland, Gen. Macready, for more ammunition. Gen. Macready later related, "I agreed to send him fifty rounds of shrapnel, which was all we had left, simply to make noise through the night, as he [Gen. Dalton] was afraid that if the guns stopped firing his men would get disheartened and clear off." The crisis was solved when high-explosive shells arrived by ship from Carrickfergus. In an interview Gen Dalton stated “the British had deceived me they were told to give me high velocity shells, and instead of that they had given me shrapnel” [2]

The battle for the Four Courts continued into the next day and Republicans from the 1st Dublin Brigade occupied buildings around the city. The British became alarmed. The Free State Army was offered the use of 60pdr. howitzers, while Churchill offered to provide Collins with British aircraft flown by British pilots, but painted in Free State markings, to bomb the Four Courts. Both offers were turned down, presumably because their use would risk too many civilian casualties. By Thursday, 29 June the Free State commanders had concluded that a breach needed to be affected so that the building could be taken by storm. One or more guns were moved to Bridge Street to fire across the Liffey against the western wing of the Four Courts, while other guns on Chancery Street were trained on the Records Office behind the western wing, which the Republicans had converted into a munitions factory. By nightfall both sections had been badly damaged, leaving a sufficient breach in the western wing.

"The other reference is in the more recent and long-awaited Dalton biography by Sean Boyne. The incident gets a good mention from Pg 140 on. It explains that Dalton moved the 18 pounders around, and at times had the initial two either side of the Liffey.... one at Winetav and another at Chancery St / Place....later he would move the Winetav gun to Bridge St and later still have two guns firing from Winetav.... and the other two later acquired guns one each at Chancery St (the one that got McCready) and the other at Hammond Lane. In all four guns borrowed, and no one knowing how to fire them properly [1]."

<u>The Royal Hospital Kilmainham:</u>

There are reports of rounds of artillery ammunition impacting in the gardens of the Royal Hospital Kilmainham (RHK). If this is true it would strongly suggest a gun location on Chancery street as this is the only known position that could have likely placed ammunition in the gardens of the RHK. The Chancery gun position is approximately 1.87 km away from the

nearest point of the RHK. Image 3 shows a plot of the range and the maximum left and right of arc that the gun would have needed to fire in order to impact on RHK.

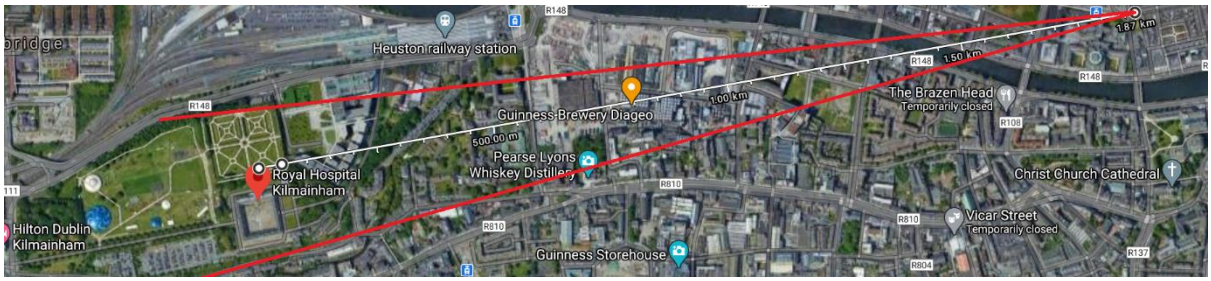


Figure 3: Firing arc to impact RHK

To reach the nearest point of the RHK, the gun would need to be fired at an elevation of 2 degrees. The furthest point of RHK would require an elevation of 4 degrees. Both angles of elevation are taken from the range tables of the 18-pounder.

With these angles of elevation, it is possible to determine the maximum permissible heights of the Four Court Buildings that would allow a shot to pass over and impact the RHK. The Names of each entry correspond to Left, Centre and Right of arc, respectively. The range of each entry is an approximation from the assumed gun position to the first potential point of impact at each point along the firing arc.

Name	Angle	Tan Angle	Range	Max Height (m)
LOA	4	0.06	123.03	7.3818
COA	4	0.06	128.71	7.7226
ROA	4	0.06	142.84	8.5704

Name	Angle	Tan Angle	Range	Max Height (m)
LOA	2	0.03	123.03	3.6909
COA	2	0.03	128.71	3.8613
ROA	2	0.03	142.84	4.2852

It should be noted that the heights of these buildings are unknown. However, from the 2 tables above it is clear that the possibility of firing at 2 degrees is not likely, as these buildings are clearly taller than a single story. Therefore, any rounds fired that may have impacted the RHK

will have to of been fired from 4 degrees. This is assuming that the buildings are shorter than 8.57 m or had experienced sufficient damage to allow a projectile to pass through.

References

[1] Dublinforum.net. 2020. The Irish Civil War [Archive] - Page 3 - Dublinforum.Net - Forum. [online] Available at: <http://www.dublinforum.net/forum/archive/index.php/t-10610-p-3.html> [Accessed 6 September 2020].

[2] YouTube. 2020. [online] Available at: <https://www.youtube.com/watch?v=2AdNwLZZ2eU&list=PLF7667FA2D605E4B1&index=5> [Accessed 6 September 2020].

[3] Walsh, P., n.d. THE IRISH CIVIL WAR, 1922-1923: A MILITARY STUDY OF THE CONVENTIONAL PHASE, 28 JUNE - 11 AUGUST, 1922.

[4] Boyne, S., 2016. Emmet Dalton. Sallins, Co. Kildare [Ireland]: Merrion Press.

Damage Analysis

This section will look at the likely damage to brick and stone structures from the impact of 18-Pounder (18 Pdr) shrapnel shells and 18 Pdr High Explosive (HE) Shells.

Kinetic Energy Attack

When a projectile strikes a stone/mortar structure, the energy is dissipated primarily in deforming the case, producing strain and heat, and displacing the target material. The stone/mortar is pulverised in the local area of impact. A saucer shaped crater is formed at the front surface, with a cylindrical bore-hole at the bottom of the crater. As the projectile begins to penetrate, the material is forced aside forming a wake that flows rearwards. At the rear of the projectile the pulverised dust wake re-establishes contact and the pressure built up is usually sufficient to cause the target to fail and crack radially which aids further penetration. *(Cranfield University – Ammunition Technology – Warheads – 2015)*

Factors affecting penetration are:

Projectile;

- Mass and calibre - the kinetic energy density.
- Nose shape – ogival noses with radii between 0.8 -0.5 calibres behave well at normal incidence ; cones or flat nosed projectiles give greatly reduced penetration.
- Fuzing-must give the required delay and be robust; premature detonation reduces penetration.
- Structural integrity of projectile - if the attack is at a yaw angle, bending and shear reduce penetration.

Striking Conditions;

- Impact Velocity - obviously a factor and all formulae include some form of relationship of penetration to strike velocity.
- Angle of Incidence - ricochet is likely at angles of incidence above ~60°.
- Yaw - yaw at impact misaligns the axis of penetration and the axis of the projectile; this increases the forces acting on the missile with the result of reduced penetration and an increased probability of ricochet.

Target Material;

- Strength of Stone/mortar - increased compressive strength decreases penetration as would be expected. Typical values of 35 MPa should be used in calculations.
- Density - the higher the density the greater the resistance to penetration.
- Ductility - at high impact loads ductile materials flow and relieve stresses. Concrete has low ductility and under impact it tends to shatter and crack.
- Aggregate Size - larger aggregate size in the mortar increases the resistance.

Kinetic Energy density.

Penetration of a target can be usefully estimated by the kinetic energy density (KED) of the penetrator. This is simply the kinetic energy of the penetrator ($\frac{1}{2}mv^2$) divided by the cross-sectional area of the penetrator and is usually given in units of J/mm^2. *(Defence Academy UK – Ammunition Handbook – 2018)*

The following is a list of particulars of the Shrapnel and HE natures of the 18 Pdr projectile *(CAT-UXO)*. The KED has been calculated at muzzle velocity 492m/s throughout – for reasons of simplification, the following assumptions have been made;

1. No loss of velocity due to close firing ranges during engagement
2. No added velocity to the shrapnel bullets upon ejection

	Diameter (mm)	Length (mm)	Mass (kg)	KED (J/mm^2)
18 Pdr Shrapnel Round Intact	84	230	8.160	178
18 Pdr Shrapnel Bullets -each	12.7	12.7	0.011	10.5
18 Pdr HE Shell	84	230	8.400	183

KED required to defeat targets *(JSP 364)*

Type of wall	Thickness (mm)	KED to defeat (J/mm^2)
Solid Concrete	50	40
Brick	120	90

Empirical equations have been formulated from experimental data, one example of which is stated below (*PETRY- 1910)*

$$P = \frac{2.16\times10^{-3}}{\sqrt{S}} \frac{W}{D^2} \left[\frac{D}{C}\right]^{0.1} \left[\frac{V_s}{533}\right]^n$$

where	P	is the penetration to nose of projectile in *metres*
	S	is the compressive strength of concrete in *MPa*
	W	is the weight of projectile in *kg*
	D	is the calibre of projectile in *metres*
	C	is the maximum size of course concrete aggregate in *metres*
	V_s	is the striking velocity in *metre/sec*
	n	$= 3.0833/S^{0.25}$

Calculating using data for the 18 Pdr HE shell, would yield a penetration of 0.42m.

However, all of these calculations assume that the munitions being used, are solid shot armour piercing (AP) rounds, which are the most suitable for penetration of targets. Neither the 18 Pdr HE nor shrapnel are solid shot, AP or semi AP rounds. They lack the hardness, and resistance to bending and shearing required to effectively penetrate a structure.

In fact the shrapnel round is designed only for use against troops in the open, and is entirely unsuitable against fortifications. This is reflected above by the 10.5 J/mm^2 KED. The pock marks in the pictures of the walls of the building are consistent with the damage profile expected from such a KED. Modern body armour would stop those shrapnel “bullets” at that energy level, and the marks in the stone are similar to that of small arms fire, which ties in with this thesis.

Additionally, the penetration of a munition into a thick-walled structure alone is insufficient to cause serious structural damage. The munition, once penetrated, should possess the ability to detonate in order to effect meaningful damage to the target.

The 18 Pdr HE rounds, strike with more KED, and can penetrate somewhat, but it is the detonation of the HE fill which causes the serious damage the stone/mortar structure, by effecting it from the inside out.

In the modern battle space, hard targets often require a compound munition for their defeat –a combination of kinetic energy or shaped charge to penetrate, and a blast warhead to detonate within the target

US Army Field Manual 90-10-1 states that weapons of at least 155-mm are necessary against thick reinforced concrete, stone, or brick walls. Even with heavy artillery, large expenditures of ammunition are required to knock down buildings of any size. This is implying that light artillery just is NOT designed to destroy buildings, whereas it goes on to elaborate on how large air dropped blast bombs are the most effective at achieving this aim.

For purposes of comparison, the manual describes what is recommended, based on prior experience and empirical data, in order to attack fortified brick/stone structures

> *155-mm Howitzers. It is effective due to its rate of fire and penetration. High-explosive rounds can penetrate up to 38 inches of brick and unreinforced concrete. Projectiles can penetrate up to 28 inches of reinforced concrete with considerable damage beyond the wall. HE rounds fuzed with concrete-piercing fuzes provide an excellent means of penetrating strong reinforced concrete structures. One round can penetrate up to 46 Inches. Five rounds are needed to reliably create a 1.5-meter breach in a I-meter thick wall. About 10 rounds are needed to create such a large breach in a wall 1.5 meters thick. Superquick fuzing causes the rubble to be blown into the building, whereas delay fuzing tends to blow the rubble outward into the street (FM 90-10-1, Chap 8- 13)*

Given this information, it can be reasonably assumed that the attack in question began using 18 Pdr shrapnel shells. Whether fuzed correctly or not is irrelevant as the capacity of the munition to effect damage to a stone/mortar structure is very limited. The fuzes could have been set to expel the shrapnel within the range of the emplaced guns (minimum distance for ejection of shrapnel is 50m from muzzle), which would result in peppering the structure with shrapnel, to limited effect. It could also have been set to SQ which would have seen the burster charge function on impact, the 60g burster charge also having little damaging effect, and the

casing having only very modest penetrating power. This is consistent with the low levels of damage witnessed on the target, and the prolonged duration of the siege initially.

It can reasonably be inferred from the increasing rate of structural damage recorded at the latter stages of the siege, that HE shells had been acquired, as the evolution of damage sustained documented between successive photographs shows the relatively rapid breaching of the structure, a trait consistent with a round that had the ability to penetrate, albeit by a small amount, before detonating and causing meaningful damage and breaching effects. Once cratering has been formed, the subsequent rounds have a greater effect due to the effect of functioning at greater and greater penetrative depths within the walls of the structure.

4.0 Likely Damage from HE Shells

HE shells utilise blast as the primary damage mechanism, and fragmentation as the secondary mechanism. The blast effect is short in duration and is very localised to the point of impact.

HE shells, when employed correctly, are considered effective against hardened targets such as structures, bunkers and buildings. (*FM 6-30 Chapter 4 Call For Fire*, no date)

Table E-3. GUIDE FOR ARTILLERY OR MORTAR ATTACK OF TYPICAL TARGETS

SHELL AND WEAPON	FUZE	SUITABLE FOR
DPICM 155-mm, 203-mm	Time Base ejecting	Personnel in open Light armored vehicles in open
APICM 105-mm, 155-mm	Time Base ejecting	Personnel in open
HE 81-mm, 107-mm, 105-mm, 155-mm, 203-mm	Quick	Adjusting Personnel in open Light armored vehicles
HE	Delay 0.05 second	Targets in trees Unarmored vehicles
HE	Concrete piercing 0.25-second delay	Bunkers Earth and log emplacements Hard targets
HE	VT radio-activated M514 20-meter HOB M728/732 7-meter HOB No HOB adjustment required	Personnel in open, in trenches, or in fighting positions Light armored vehicles
HE	Time HOB adjustment required	Same as VT

However, it is generally agreed that attacks on these targets are best made by weapons of considerably larger calibre than the 18-Pdr (84 mm) (Beard, 1919).

"*The most effective shells in attacking concrete works are those of large calibre with very solid ogive, fused at the base, non-delay*".

The shell body is of sufficient strength…

"*so that it does not break upon impact with the concrete, and it penetrates the outer layer. The shock of its impact produces fissures and a disturbance favourable to the effects of the bursting charge, which explodes immediately after, at the moment when the shell is fairly near the end of its course. The effects produced are considerable".*

Target Damage Criteria

Target damage is the effect of fires on a given military target. It results in total, partial, or temporary loss of the target's combat effectiveness. The categories of target damage are annihilation, demolition, neutralization, and harassment. (RA, no date)

Annihilation fires make unobserved targets combat-ineffective, needing major construction to be usable. For a point target such as an ATGM launcher, the OPFOR must expend enough rounds to ensure a 70 to 90 percent probability of kill. For area targets such as platoon strongpoints or nuclear artillery assets, they must fire enough rounds to destroy from 50 to 60 percent of the targets within the group. These fires result in the group ceasing to exist as a fighting force.

Demolition refers to the destruction of buildings and engineer works (bridges, fortifications, roads). Demolition requires enough rounds to make such material objects unfit for further use. It is a subset of annihilation.

Neutralization fire inflicts enough losses on a target to - Cause it to temporarily lose its combat effectiveness; Restrict or prohibit its manoeuvre; Disrupt its C2 capability. To achieve neutralization, artillery must deliver enough rounds to destroy 30 percent of a group of unobserved targets.

Harassment uses a limited number of artillery pieces and ammunition within a prescribed time to deliver harassment fires. The goal of these fires is to put psychological pressure on enemy personnel in concentrated defensive areas, command posts, and rear installations. Successful harassment fire inhibits manoeuvre, lowers morale, interrupts rest, and weakens enemy combat readiness.

In the context of the Four Courts bombardment, it would certainly appear that, at least initially, harassment was the desired target effect.

The images below illustrate a variety of structures targeted by HE projectiles. An important caveat here is the significant development in munitions technology in the interim between the examples given below and the shelling of the Fore Courts in 1922. An 18-Pdr HE shell contained 1.1 lb of TNT/Amatol, whereas modern HE projectiles incorporate explosives with higher detonation velocities and pressures. The target damage will therefore be less destructive, but the general effect much the same and the comparison is therefore worthwhile.

Recent images from the Yemeni Civil War (top) and the Battle of Grozny (bottom), illustrating the target effect of medium calibre artillery fire consisting of HE shells appropriately fuzed for attacking structures. The relatively small penetration accompanied by concentric 'splashing' from fragmentation indicates HE projectiles fired at a relatively flat trajectory (similar to the direct fire engagement at the Four Courts).

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FM 6-30 Chapter 4 Call For Fire (no date). Available at: https://www.globalsecurity.org/military/library/policy/army/fm/6-30/f630_5.htm#REF41h4 (Accessed: 6 September 2020).

RA (no date) 'Artillery Training - Field Artillery', *Pamphlet 29*, 3.

5.0 Visual Ammunition Confirmation

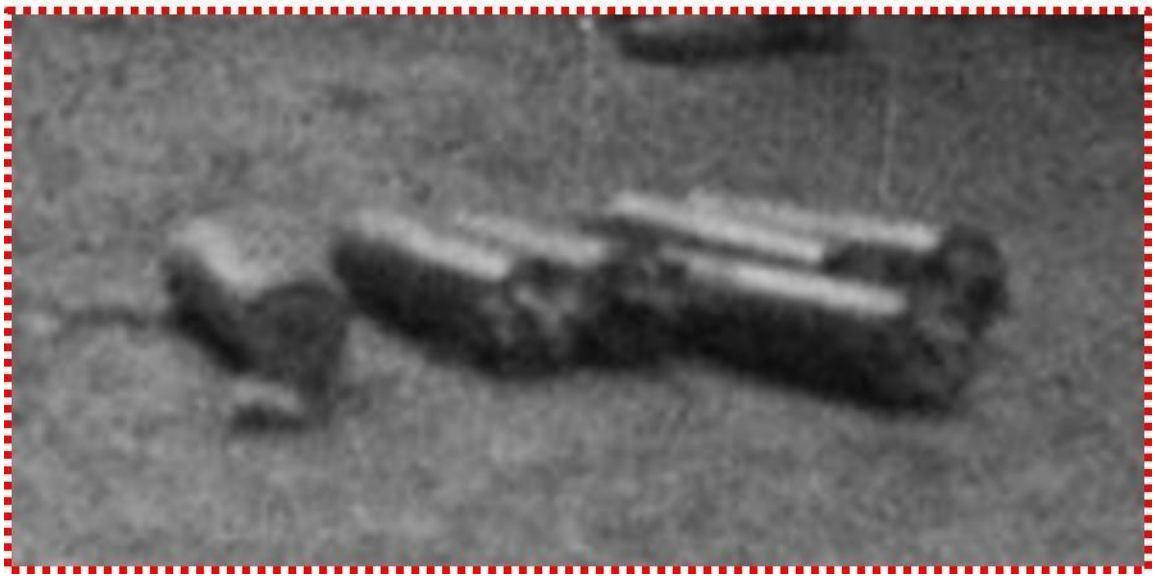
18 Pdr ammunition was a fixed round which meant the shell and brass cartridge case were loaded as a single unit. Based upon existing literature, the two types of 18 Pdr ammunition utilised during the Battle of Dublin were the shrapnel and HE rounds. These are outlined in further detail below.

The shrapnel shell (above) was the first ammunition developed and utilised with the Ordnance QF 18 Pdr Gun. The projectile did not burst, but projected 374 lead antimony bullets forwards in a cone. These bullets were effective up to 300 yards from the burst and the fuze was designed to function as close as 50 yards from the muzzle if required, in order to eliminate the need for case shot.

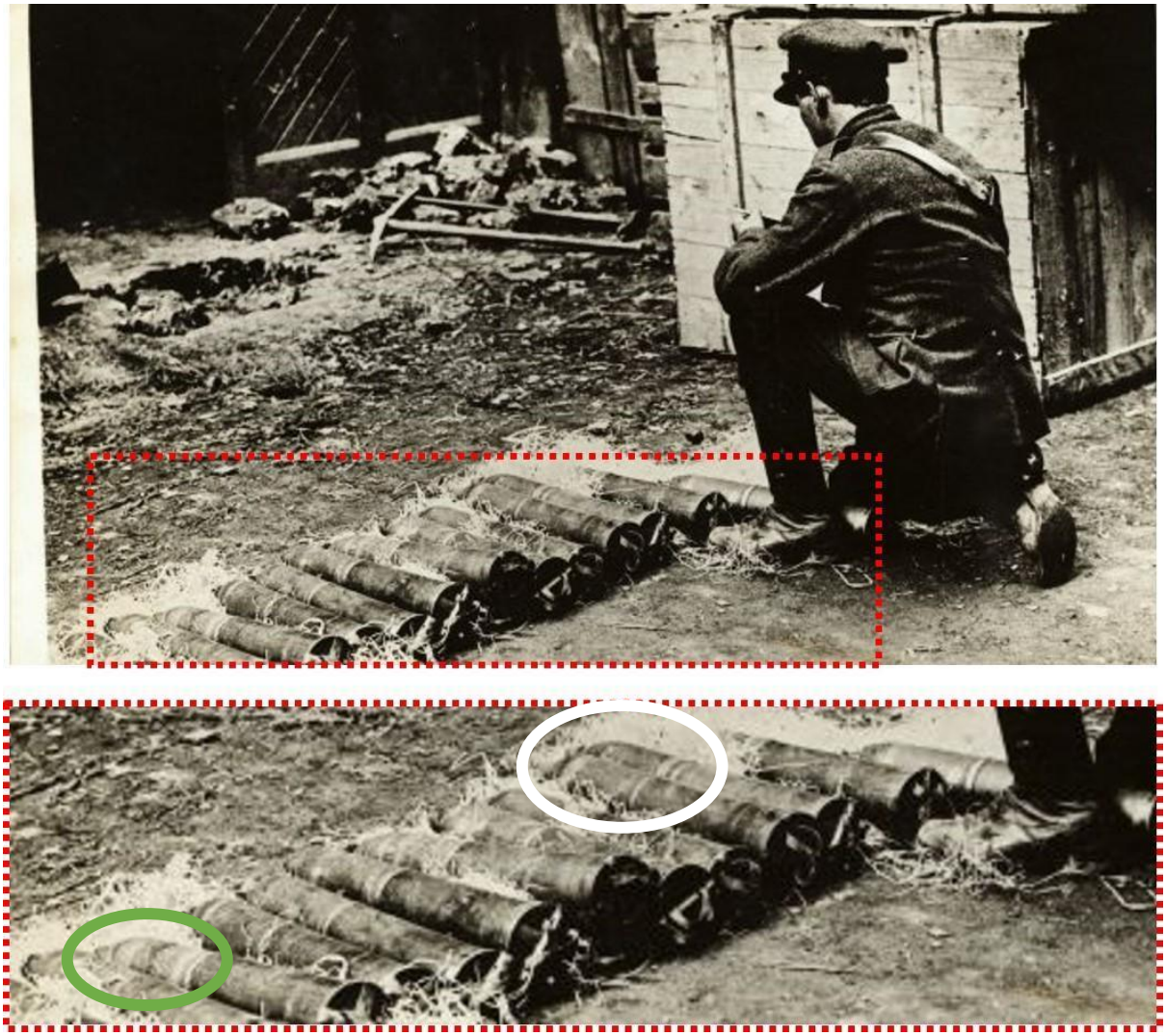
These rounds, if armed correctly, would be ineffective in breaking down a brick or masoned structure. Ironically, if the shrapnel rounds were not armed to project their contents at a target and fired dumb/inert, the impact of the projectile would have a greater effect. Though this would still be of very limited capability in comparison to an armed HE round for example.

The HE shell (above) was introduced in 1914 and went through an evolution throughout WW1. The eventual composition of the HE round comprised of a TNT/Amatol mixture and the round itself had key identifiers in the bands on its body. The red band on the munition denotes the shell has been filled, while the green band denotes it is filled with amatol or TNT. These rounds, if armed correctly, could cause a significant amount of destruction on brick or masonry targets. The following images were captured from 18 Pdr positions during the Battle of Dublin and from these it was attempted to confirm the types of ammunition utilised in the action by the Free State Army.

The type of rounds used in this image are not possible to discern from the quality of the imagery available.



The type of rounds used in this image are not possible to discern from the quality of the imagery available.



The nature of the munitions in this image are difficult to make out, but based on the bands located on the mid portion of the shell bodies and the contrast in colour to the cartridge casing is consistent with HE rounds. The most obvious example is the 3rd round from the left where a dark band can be clearly seen on the body which denotes a TNT/Amatol fill. This is circled in green). There may also be shrapnel rounds in this allotment based on the dark contrast between the round and the cartridge casing of some of the rounds. This is circled in white.

Based on the darker contrast of the rounds body in comparison to the cartridge casing, the visual evidence of this image would suggest shrapnel shells are being utilised.

Damage from only HE shells

As stated previously, the damage from shrapnel shells on the buildings structure would be minimal if armed properly. It could be the case that the shrapnel shells were purposely armed incorrectly to act as a dumb projectile. While this would have increased the damage dealt to buildings structures, the shrapnel shells would still be less effective than HE shells. The image below shows the effect shrapnel rounds have on a building when armed correctly.

Based off the photos shown, it is likely that the shrapnel shells were being used as dumb projectiles to increase damage to the buildings targeted. However, if 100% of the ammunition used was HE, a higher amount of damage is to be expected at the target area. As stated previously, HE rounds are much more effective against hardened structures compared to shrapnel rounds, whether they are armed correctly or incorrectly. Comparing the shrapnel damage image above to the HE damage pictures shown earlier, even a slight increase in the amount of HE shells used in favour of shrapnel shells could have a clearly noticeable difference on the damage dealt to the buildings.

Appendix 5

List of 18-pounder engagements during the Civil War

Location of engagement	**Date**	**Ranges in yards**	**Number of rounds**
Battle for Dublin, Four Courts and O'Connell Street	28 June – 5 July	120-160	approx. 400 at Four Courts, 250 at 'the Block'.
Drogheda	04 July	1300	40
Boyle	05 July		
Inch Fort Donegal	15 July	3000	4
Collooney	15 July	approx. 300-400	1
Strand Bks. Limerick	20 July	less than 200	33
Waterford	19-21 July	1200-2500	approx. 40
Bruree	31 July	800	2
Carrick-on-Suir, Cregg Wood	2 July	approx. 300	2-3
Kilmallock	04 August	approx. 3000	
Adare	04 August	200	12
Castleisland	05-Aug		'salvo'
Rathkeale	06 August	440	3
Newcastlewest	06 August	200	3
Rochestown and Douglas, Fota Demesne	8-10 August	1000	approx. 25
Advance to Clonmel	8 August	2000	3-5
Killarney to Rathmore Road	18 August		5
Trumpet Hill, Dundalk	19 August		6
Macroom	02-Sept.	1000	approx. 3
Milltown, Sligo	18-Sept.		1
Rahelly House, Sligo	18-Sept.		approx. 3

Appendix 6

Numbers of rounds fired by gun 10756. If not stated, they were fired in the Glen of Imaal. (MA, History sheet for gun 10756)

Date	**Number of rounds**
1 Sept. 1925	6
2 Sept. 1925	11
4 Sept. 1925	7
7 Sept. 1925	5
9 Sept. 1925	4
11 Sept. 1925	10 **(demonstration)**
1925	16 blank rounds (Kildare)
21 July 1926	6
23 July 1926	3
29 July 1926	10
11 Feb. 1928	5 blank rounds **(Dun Laoghaire Cosgrave gun salute)**
2 July 1929	12
4 July 1929	13
5 July 1929	18
9 July 1929	23
9 May 1935	2
10 May 1935	36
13 May 1935	55
15 May 1935	72
17 May 1935	65
21 May 1935	73
22 May 1935	78
23 May 1935	39
24 May 1935	7
17 May 1939	1
22 June 1939	10
23 June 1939	12
11 July 1940	28
14 Jan. 1941	32
15 Mar. 1941	5 blank rounds (O'Connell Bridge St. Patrick's Day)
11 June 1941	28
1 June 1942	22
3 June 1942	10
4 June 1942	4
15 June 1943	8
16 June 1943	14
17 Aug. 1943	3
6 Dec. 1943	12
9 May 1944	6
10 May 1944	4
11 May 1944	20
18 May 1944	3
19 May 1944	16

Appendix 7.
List of Irish 18-pounders of all variants, and location in June 1941. (MA)

No.	Mark	Year purchased	Location June 1941
5732	MkI	1922	7 Bty, 1 FA Bn Kildare
6460	MkI	1922	7 Bty, 1 FA Bn Kildare
7470	MkI	1922	7 Bty, 1 FA Bn Kildare
10392	MkI	1922	7 Bty, 1 FA Bn Kildare
7209	MkI	1922	Artillery School Kildare Unserviceable
2819	MkII	1922	1 Fd Bty 3 FA Bn Templemore
2908	MkII	1922	1 Fd Bty 3 FA Bn Templemore
9168	MkII	1922	1 Fd Bty 3 FA Bn Templemore
10756	MkII	1922	1 Fd Bty 3 FA Bn Templemore
L3484	MkII	Jul. 1940	9 Bty, III FA Bn Fermoy
C4770	MkII	Jul. 1940	9 Bty, III FA Bn Fermoy
L7554	MkII	Jul. 1940	9 Bty, III FA Bn Fermoy
L7765	MkII	Jul. 1940	9 Bty, III FA Bn Fermoy
8577	MkII	Nov. 1941	Not in Irish service yet
8976	MkII	Nov. 1941	Not in Irish service yet
4254	MkII	Nov. 1941	Not in Irish service yet
5605	MkII	Nov. 1941	Not in Irish service yet
L14470	MkIV		5 Fd Bty, 2 FA Bn Dublin
L15821	MkIV		5 Fd Bty, 2 FA Bn Dublin
L15598	MkIV		5 Fd Bty, 2 FA Bn Dublin
L12655	MkIV		5 Fd Bty, 2 FA Bn Dublin
L12945	MkIV		10 Fd Bty 2 FA Bn Dublin
L11866	MkIV		10 Fd Bty 2 FA Bn Dublin
L13142	MkIV		10 Fd Bty 2 FA Bn Dublin
L15318	MkIV		10 Fd Bty 2 FA Bn Dublin
L15384	MkV		3 Fd Bty 3 FA Bn Limerick
L15356	MkV		3 Fd Bty 3 FA Bn Limerick
L15395	MkV		3 Fd Bty 3 FA Bn Limerick
L15854	MkV		3 Fd Bty 3 FA Bn Limerick
L15422	MkV		11 Fd Bty 2 FA Bn Dublin
L15712	MkV		11 Fd Bty 2 FA Bn Dublin

L15714	MkV		11 Fd Bty 2 FA Bn Dublin
L15857	MkV		11 Fd Bty 2 FA Bn Dublin
L11866	MkV		4 Fd Bty 1 Fd Bn Kildare
L13142	MkV		4 Fd Bty 1 Fd Bn Kildare
L12945	MkV		4 Fd Bty 1 Fd Bn Kildare
L15318	MkV		4 Fd Bty 1 Fd Bn Kildare

Appendix 8
List of 'Star' Tests for armament artificers. (Army Ordnance Corps)

Test No.	Title
1	Small arms ammunition (SAA)
2	Grenades
3	Packing
4	Markings on packings
5	Securing and labelling packaging
6	Regulations
7	Instruments
8	SAA and grenades
9	Examination and proof of SAA
10	Examination of grenades
11	Markings on ammunition
32	Mathematics
33	Maintenance and the use of tools
34	Drawings
35	Soldering, brazing and fluxes
36	Standard fits
37	Knowledge and maintenance of drills
38	Drilling speeds and feeds
39	Hand-screwing
40	Chipping
41	Filing
42	Filing and scraping
43	Drilling and tapping
44	Marking off, filing and scraping
45	Factors of Safety in slinging and lifting weights
46	Gyns and pulley blocks
47	Types and uses of rivets
48	Riveting lap and butt joints
49	Working temperature of ferrous and non-ferrous metals
50	Forging
51	Heat treatment-ferrous metals
52	Annealing and brazing non-ferrous metals
53	Gun construction and types of metals used
54	Care and preservation of artillery equipment
55	Special inspection tools and gauges for examination of field artillery
56	Field artillery equipments, dismantle, overhaul and assembly
57	Electricity and magnetism
58	Safety precautions, welding equipment
59	Principals of welding
60	Rods fluxes and electrodes
61	V., double-v, butt and fillet welds
62	Knowledge of lathe
63	Machining operations in the lathe

64	Taking impressions and recognising defects in bores of guns
65	Special inspection tools and gauges, field, coast and AA artillery
66	Workshop practice
67	Field, AA and coastal artillery equipments, dismantle, overhaul and assembly

Appendix 9

Inspection records for Irish 18-pounders, combining information that was available from inspection reports. (MA)

Serial No.	Year of Manufacture	Mark	Year of Inspection	Rounds fired	Cartridge Head Clearance in inches	1in Commencement of Rifling measurement in inches	10in Commencement of Rifling measurement in inches	Force of Blow in/lbs	Stage of Life in Quarters
10392		I	1938	1440.5	0.015	3.3155	3.3045	35.7	Third
			1939		0.015	3.3155	3.3045	33	Third
5732		I	1938		0.001	3.3205	3.310	29	
			1939	309 ½	0.0075	3.325	3.310	31.6	Fourth
7470		I	1938	417	0.01	3.3085	3.3005	33	First
			1939		0.01	3.3085	3.3005	33	First
6460		I	1938	419	0.001	3.3275	3.312	34.3	Fourth
			1939		0.01	3.3275	3.312	29	Fourth
10756	1918	II	1918	7		0.009			
			1926	440		0.021			
			1938	1008 ¼	0.0125	0.0275	3.312	35	
			1940	1031 ¼		0.0305			
			1942	1059 ¼		0.0275			
			1942	1054 ¼	0.016	3.326	3.311	27.7	
			1943	1164 ¼		0.0275			
			1944	1241 ½	0.018	3.328	3.312		
			1945	1283 ½		3.3275			
2908		II		753	0.003	3.311	3.302	25.3	Second
14770		IV	1938		0.006			21.8	
12655		IV	1938		0.016			25.8	
15821		IV	1938		0.008			34.3	
15598		IV	1938		0.009			37.1	
L15714	1920	V	1938		0.0112	3.311	3.301	25.3	Second
L15395	1926	V	1938		0.008	3.310	3.302	24.1	First
L15857		V	1938		0.0054	3.310	3.301	20.7	First
L15356	1926	V	1938		0.01	3.310	3.301	37	First

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