Art of Shooting

An introduction to target shooting with rifle, pistol, shotgun and airgun

Prof. Philip Treleaven

Preface

This handbook is a 'primer' for the new target shooter: introducing the firearms, shooting disciplines and firearm technology, and drawing on the expertise of Bisley, the home of British and Commonwealth target shooting.

For someone interested in taking up target shooting, it is surprisingly difficult to find out what are the different shooting disciplines (or to give them their ISSF name *Events*), and perhaps more importantly what's available in their area. Naturally you won't find *Shooting for Dummies* in the local bookshop, but there are some excellent books and web sites, especially in the United States. Most cater for the experienced competitor in a specific discipline, like Smallbore or Benchrest, rather than the new shooter.

I am fortunate in that I live 40 minutes drive from the world famous Bisley Camp, the home of British and Commonwealth shooting (cf. Camp Perry in America). The great thing about shooting at Bisley is the wealth of knowledge and experience available covering all aspects of the sport. People who have shot in the Olympics and Commonwealth Games, national champions for every shooting discipline, experts in ballistics and hand loading, gunsmiths and armourers … and national coaches. Truly a *university of shooting* – akin to Cambridge or Harvard! However, even at Bisley it is a daunting challenge to find out what shooting disciplines are available, and who to ask for advice. It's like everyone else in the shooting world knows everything about shooting, marksmanship, ballistics and hand loading, and you the novice know nothing. Even simple things like how to properly clean a precision target rifle or target air pistol. I shudder to think how close I've come to ruining my £3,000 F-Class rifle and more recently my target air pistol though using inappropriate cleaning solvents.

People at Bisley (and Camp Perry) are passionate about shooting, but often you have to hunt for information. Therefore we (I and my friends in the NRA, NSRA and CPSA) decided to compile this handbook for the new shooter; a sort of crash course in target shooting.

The book is organised into nine sections and over 50 deliberately short chapters. First the basics:

- **Target Shooting Basics** – introduces the different shooting disciplines available.
- **Firearms and Shooting Equipment** – covers the different rifles, handguns, shotguns, black powder and airguns used by target shooters.

Then we look at the major shooting disciplines which I have grouped into:

- **Target Rifle Disciplines** – provides a short overview of each of the main target rifle disciplines, such as Fullbore, Smallbore, High Power, Benchrest and Air Rifle.
- **Target Pistol and Gallery Disciplines** – covers target pistol shooting on so-called Gallery ranges.
- **Historic Arms Disciplines** – introduces shooting with black powder and muzzleloader firearms.
- **Military and Practical Disciplines** – provides an introduction to disciplines involving service weapons and military-style competitions.
- **Field Sports Disciplines** – as the name suggests, target disciplines based around field sports, such as Clay Pigeon and Field Target (Air Rifle).

And finally we cover:

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- **Shooting Techniques** – introduces marksmanship with rifles, handguns, shotguns and airguns.
- **Specialist Skills** – a group of chapters introducing skills and knowledge, such as the correct cleaning of firearms, handloading ammunition, and the selection and fitting of sights.

We have tried to keep each 'chapter' as short as possible, and provide references to further information (especially on the Web). More importantly we provide contact details for each of the target shooting disciplines. We hope you enjoy this handbook, and it helps you get the most from target shooting.

Bisley Camp

Set in 3000 acres of Surrey heathland some 30 miles from Central London, Bisley has the unique combination of one of the best, most modern, and largest arrangement of shooting facilities in the world combined with colonial-style clubhouses. Bisley, apart from being able to offer a great variety of shooting, has other advantages. It is the largest multi-discipline range complex in the world near a major centre of population and has few restrictions such as those that now inhibit new ranges being built in populated areas.

It is in large part a Victorian and Edwardian time warp. Nearly all the original buildings survive and a recent massive restoration programme has put most of them in good order and to good use. Relatively little has been built since 1914 to spoil the charm of the Camp; and such as may be built hereafter must be in keeping with the older buildings now that the bulk of the Camp is formally designated a Conservation Area.

The ranges laid out in 1890/91 are substantially similar to those of today. **Stickledown** (the long-distance range) was extended from 24 to 40 targets in 1903 (later 50), and the greatest distance was increased from 1100 to 1200 yards in 1910. **Century** was so named in 1903 when the Great Butt was widened from 90 to 100 targets (now 108). These two very large ranges and the associated danger areas provide a framework for the siting of smaller, specialist ranges, and have proved adaptable for many new types of shooting disciplines which have evolved in the 100 years since they were designed. Brand new formal **Clay** facilities were constructed and the **Lord Roberts Centre** was built to house a Smallbore rifle range. On the 300m range it is now possible to shoot using the latest electronic targetry.

Further Information

[1]. The National Shooting Centre (www.nsc-bisley.org.uk), National Rifle Association NRA-UK (www.nra.org.uk) and National Smallbore Rifle Association NSRA (www.nsra.co.uk) web sites *are good places to find information on target shooting in the United Kingdom*.

[2]. National Small Bore Rifle Association (NSRA), www.nsra.co.uk, *the NSRA is the national governing body for all Small-bore Rifle & Pistol Target Shooting in the United Kingdom, including Airgun and Crossbow Shooting. A list of Smallbore clubs can be found at* www.nsra.co.uk/nsra/nsra_frame.htm

[3]. Clay Pigeon Shooting Association (CPSA), http://www.cpsa.co.uk/epromos.cfm, *provides a list of Clay Pigeon Associations throughout the UK, Europe, the Commonwealth and USA.*

[4]. Muzzle Loaders Association of Great Britain (MLAGB), www.mlagb.com, *the governing body for muzzle loading shooting in the UK.*

[5]. The UK Practical Shooting Association, www.ukpsa.co.uk, *the UK region of the International Practical Shooting Confederation*.

[6]. The National Rifle Association of America NRA-USA (www.nra.org/programs.aspx) and the NRA Headquarters (www.nrahq.org/compete/index.asp) web sites *provide a wealth of information on target shooting.*

[7]. Wikipedia, the free encyclopedia, http://en.wikipedia.org/wiki/, *contains a number of excellent articles on shooting disciplines, marksmanship and firearms technology.*

Acknowledgements

I would like to take this opportunity to thank the NRA, NSRA, CPSA, MLAGB, UKPSA and the other shooting organisations for there support in producing this Handbook. In particularly I am most grateful to the many experts at Bisley who contributed their knowledge and advice to this book: Glynn Alger, Jenny Andrews, Vince Bottomley, Alex Cargill Thompson, Mike Cherry, Mike Cripps, Martin Crix,

Roger Dorrington, Vanessa Duffy, Martin Farnan, Dave Froggett, Ken Garside, Ed Hall, Robb Harrison, Fred James, David Jennings, Geoffrey Kolbe, John Kynoch, Iain MacGregor, Donald McIntosh, Graham McLellan; Bob Maddison, Lou Martin, Chris McVerry, David Minshall, Paul Monaghan, John Morgan-Hosey, Charles Murton, Phil Northam, Terry Ord, Keith Paris, David Parish, John Perry, Bill Richards, Iain Robertson, Karen Robertson, Ian Shirra-Gibb, Derek Simpson, Pete Sparkes, David Spittles, Nick Steadman, Chris Stevenson, Clive Taylor, Frank Thibault, David Thomas, Alan Vickers, Stephen Way, Alan Westlake, Graham Wilkes, Rae Wills, Brian Woodall. Please contact me if I have missed anyone (p.treleaven@cs.ucl.ac.uk).

Screenshots, images and clip art

I would also like to thank the organisations and individuals acknowledged in the illustrations for permission to reproduce screen shots, and images. Again, please contact me if I have missed anyone (p.treleaven@cs.ucl.ac.uk).

Disclaimer

I have taken great care and effort to check all the information and advice in this handbook for accuracy. However, given the comprehensive nature of the material, mistakes are inevitable. I regret therefore, that I cannot be held responsible for any loss that you may suffer as a result of any omissions or errors.

All profits from the Handbook will be donated to supporting British Shooting (NRA, NSRA, CPSA etc.).

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Part A – Target Shooting Basics

Summary

Every week thousands of people in the UK and millions worldwide ‘go’ target shooting. For the novice big questions are how to get started and finding the shooting discipline that’s just right for you?

So this book is written for everyone who would like to take up the sport, it provides a crash course on what shooting disciplines are available, appropriate firearm and equipment, how they work, how to get started and most importantly how its both fun and safe.

Part A provides an overview of the different target shooting disciplines. It also covers the important elements of safety and the Laws governing ownership and use of firearms.

Chapter 1 -Target Shooting

In chapter 1 we look at ‘getting started’ in target shooting, the types of firearms (rifle, handgun, shotgun, black powder firearms, airguns), the shooting positions (prone, sitting, kneeling, standing, moving and a mixture of stances), types of ranges (indoor, outdoor, covered, series of stages), and types of target (static bull’s eye, silhouettes of animals, or moving targets).

Chapter 2 - Shooting Disciplines

This chapter look at each of the Shooting Disciplines you can pursue in the United Kingdom, and some additional disciplines that are popular in America, such as High Power Rifle and semi-automatic Pistol Shooting. Since many of the Shooting Disciplines use similar rifles, shooting positions and ranges, I have made an attempt to group them by style of shooting discipline.

Chapter 3 - Safety, Range Discipline and the Law

Shooting has an enviable safety record. Next we look at basic shooting safety rules, Club membership, Range safety and the UK and USA firearms laws.

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Chapter 1

Target Shooting

Every week thousands of people in the UK and millions worldwide 'go' shooting. As an indication of the popularity, the International Shooting Sports Federation (ISSF) claims to represent more than 75 million shooters worldwide.

And many thousands more would love to join them but don't know where to start. From Fullbore and High Power rifle shooting at 600 yards to air pistol at 10 metres; from muzzleloaders using black powder to clay pigeon shooting. What's available, how do you find the shooting discipline that's right for you, what's the right firearm and equipment, how do you legally purchase a firearm, how do you expertly clean it and so on? For a novice, finding the information can be a real challenge. So I and my friends in British shooting have put together this handbook as 'primer' for the new shooter.

When choosing a target shooting discipline, a good starting point is to ask yourself what firearms you will enjoy shooting? Below (left) is a target rifle. If Smallbore then it fires a .22LR round, and if Fullbore it fires a 7.62x51mm (NATO) round, highly accurate to over 1000 yards (900m). Figure 1.1b shows a WWII service rifle, also effective out to 1,000 yards. Next is a top of the range 12-bore (gauge) over & under shotgun for clay pigeon shooting. Finally we have a high-tech compressed air .177 calibre single shot air pistol capable of shooting 1 inch (2.5cm) groups at 10m.

Which is your shooting passion?

a) Target Rifle b) Service Rifle c) Over & Under Shotgun d) Target Air Pistol

Figure 1.1: Passion for Target Shooting

1.1 Getting Started

So what do you do if you have never handled a firearm, but are eager to have a go at target shooting? Obviously it helps if you have a good idea of what you want to do: target rifle, historic arms, military rifles, Gallery shooting with a rifle or pistol, field sports disciplines, black powder or airgun.

1.2 What's Right for You?

Simplistically, shooting disciplines can be grouped: a) by type of firearm, b) by shooting position, c) by type of range and d) by type of target:

- **Type of Firearm** – rifle, pistol, shotgun, black powder firearm, or airgun.
- **Shooting Position** – shooting prone, sitting, kneeling, standing (or offhand), moving, and a mixture of stances.
- **Type of Range** – indoor range, outdoor range, covered firing point, or a series of stages (or courses of fire).
- **Type of Target** – static bullseye targets, silhouettes of animals, or moving targets.

We will look at each of these in turn.

Type of Firearm

What firearms do you want to shoot? Target rifles with iron or telescopic sights; historic or modern semi-automatic military riles; single shot pistols, revolvers and semi-automatic pistols; over-and-under, side-by-side or semi-automatic shotguns; muzzleloaders and black powder rifles, pistols and shotguns, air rifles or pistols, or so-called Airsoft replicas of modern firearms. The great thing about target shooting is the galaxy of firearms available.

Shooting Position or Stance

The next choice is shooting position or stance: prone, sitting, kneeling, moving around a course of fire or series of stages, and disciplines that involve shooting in a variety of stances. For example, Fullbore and Smallbore target shooting is typically shot prone, Gallery Rifle and Clay Pigeon is shot standing, and Field Target (Air Rifle) is shot in a variety of stances, moving around a course of fire.

a) Prone b) Sitting c) Kneeling d) Standing e) Moving

Figure 1.2: Shooting Positions

Type of Range

Ranges come in a variety of configuration, the most common being indoor ranges from 10m to 25m from the firing point to the target; outdoor ranges with covered firing points from 25 yards to 100 yards (25m-100m); outdoor ranges from 300 to over 1200 yards (270m-1100m); and courses of fire that simulate military or hunting situations, which can be outdoors or indoors.

a) Indoor b) Covered Firing Point c) Outdoor d) Course of Fire

Figure 1.4: Types of Ranges

Figure 1.3 shows a typical outdoor range layout, comprising the raised firing point, mantlet, target and butt to stop the bullet after it has passed through the target. In Fullbore shooting where the targets are pulled down, scored by a human marker, then run up again for the next shot, the mantlet also provides protection for the marker.

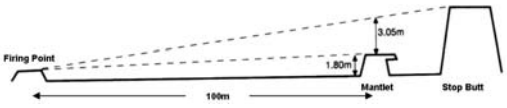


Figure 1.3: Range Layout

Type of Target

Finally we come to the types of target. They range from the traditional static ‘bullseye’ target; to static silhouettes of animals and humans; to ‘knock-down’ targets in the shape of animals; to moving targets in the shape of animals that move across the range on a trolley; and lastly the well-known clay pigeon propelled into the air by a throwing device.


a) Bullseye


b) Disruptive


c) Knock-down


d) Running Target


e) Clay Pigeon

Figure 1.5: Types of Target

1.3 Joining a Shooting Club

Having decided to take up shooting and chosen your shooting discipline, the next challenge is finding out what clubs are available in your area. At a national level a good starting point is one of the national shooting organisations, such the UK National Rifle Association (www.nra.org.uk), the UK National Smallbore Rifle Association (www.nsra.co.uk), the British International Clay Target Shooting Federation (www.bictsf.com), the Muzzle Loaders Association of Great Briton (www.mlagb.com), or the equivalent national associations in other countries, such as National Rifle Associations of America (www.nra.org) or Australia (www.nraa.org). All national associations provide courses and can put you in touch with a local club. In addition, many of the larger shooting centres, such as Bisley [4], hold open days when you can try a range of different shooting disciplines, and see which is right for you.

The web is obviously a good place to find details of both national associations and local clubs. Below I've listed the contact details for the main shooting bodies in the UK, and further contact details can be found in the chapters on specific shooting disciplines.

1.4 Further Information

[1]. Shooting Wiki, http://en.wikipedia.org/wiki/shooting and www.shootingwiki.org, *two extensive web sites cover all aspects of shooting.*

[2]. Target Shooting Canada, www.targetshooting.ca, *comprehensive Canadian web site on all aspects of target shooting.*

[3]. Target Shooting Magazine, *UK magazine dedicated to Target Shooting.*

[4]. National Rifle Association of the United Kingdom (NRA-UK), www.nra.org.uk, *the NRA-UK is the national governing body for Fullbore rifle shooting in the United Kingdom. The tab 'Clubs' gives an extensive list of UK shooting clubs.*

[5]. National Small Bore Rifle Association (NSRA), www.nsra.co.uk, *the NSRA is the national governing body for all Small-bore Rifle & Pistol Target Shooting in the United Kingdom, including Airgun and Crossbow Shooting. A list of Smallbore clubs can be found at* www.nsra.co.uk/nsra/nsra_frame.htm

[6]. Clay Pigeon Shooting Association (CPSA), http://www.cpsa.co.uk/epromos.cfm, *provides a list of Clay Pigeon Associations throughout the UK, Europe, the Commonwealth and USA.*

[7]. National Rifle Association of America (NRA-USA), www.nra.org, *Official National Rifle Association of America*.

[8]. International Shooting Sport Federation, www.issf-shooting.org, *governing body of international shooting sports.*

1.5 Contacts

The three principal associations in the UK are the National Rifle Association (NRA-UK), the National Smallbore Rifle Association (NSRA) and the British International Clay Target Shooting Association. In Ireland a principal association is the National Target Association of Ireland. A comprehensive list of target shooting organisations can be found in the appendix.

Organisation British Shooting Limited Telephone +44-1483-486948 Address Edmonton House, Bisley Camp, Brookwood, Woking, Surrey GU24 0NP Email admin@britishshooting.org.uk Web site www.britishshooting.org.uk	**Organisation** National Rifle Association of the UK Telephone 01483 797777 Address Bisley Camp, Brookwood, Woking, Surrey GU24 0PB Email info@nra.org.uk Web site www.nra.org.uk
Organisation National Smallbore Rifle Association Telephone 01483 485505 Address Bisley Camp, Brookwood, Woking, Surrey GU24 0NP Email info@nsra.co.uk Web site www.nsra.co.uk	**Organisation** British International Clay Target Shooting Federation Telephone 01483 485400 Address BICTSF, PO Box 1500, Brookwood, Woking, Surrey. GU24 0NP Email secretary@bictsf.com Web site www.bictsf.com

Organisation Muzzle Loaders Association of GB (MLAGB) Telephone 01926 458198 Address MLAGB, 7 Olympus Court, Tachbrook Park, Warwick CV34 6RZ Email membership@mlagb.com Web site www.mlagb.com	**Organisation** The UK Practical Shooting Association Telephone 07010 703845 Address PO Box 7057, Preston, Weymouth, Dorset DT4 4EN Email alan@mediainc.co.uk Web site www.ukpsa.co.uk
Organisation British Field Target Association Address BFTA, P.O Box 2242, Reading, Berks RG7 5YY Email Secretary@BFTA.net Web site www.bfta.net	**Organisation** The British Sporting Rifle Club (BSRC) Address c/o NRA, Bisley Camp, Brookwood, Woking, Surrey. GU24 0PB Email secretary@bsrc.co.uk Web site www.bsrc.co.uk

Organisation National Target Shooting Association of Ireland Telephone00 866 504 9073 Address PO Box 9, Blackrock, Co. Dublin, Ireland Web site www.targetshootingireland.org	**Organisation** Shooting Sports Association of Ireland Telephone087 900 7501 Address PO Box 9, Blackrock, Co. Dublin, Ireland Email SSAI@eircom.net Web site www.shootingsportsireland.com
Organisation National Rifle Association of Ireland Address NRA of Ireland, Leabeg, Blueball, Tullamore, Co Offaly, Ireland Email info@nrai.ie Web site www.nrai.ie	**Organisation** Irish Clay Pigeon Shooting Association Telephone 00 353 (0)87 2988030 Address Suite 20A, The Mall, Beacon Court, Sandyford, Dublin 18, Ireland Email icpsa@eircom.net Web site www.icpsa.ie
Organisation Irish Practical Shooting Association Address I.P.S.A. c/o Fitzgerald Kitchens, Bective Street, Kells, Co. Meath. Email pro@ipscireland.org Web site www.ipscireland.org	**Organisation** The National Silhouette Association Ireland Address NSA, P.O. Box 9, Blackrock, Co. Dublin, Ireland. Email silhouetteireland@eircom.net Web site http://homepage.eircom.net/~ntsai/nsai.html

Chapter 2

Shooting Disciplines

This chapter looks at the popular Shooting Disciplines (or to give them their ISSF name, *Events*) that you can pursue in the United Kingdom, such as Fullbore and Smallbore, and America, such as Highpower Rifle and Practical Pistol shooting. Since many of the Shooting Disciplines use similar rifles, shooting positions and ranges, I have made an attempt to group them by style of shooting discipline.

As introduced in Chapter 1, shooting disciplines are differentiated by:

- **Type of Firearm** – rifle, pistol, shotgun, black powder firearm, or airgun.
- **Shooting Position** – shooting prone, sitting, kneeling, standing, moving and a mixture of stances.
- **Type of Range** – indoor range, outdoor range, covered firing point, or series of stages (or courses of fire).
- **Type of Target** – static bullseye targets, silhouettes of animals, or moving targets.

2.1 Target Rifle Disciplines

Target rifle disciplines are shot with specialist bolt-action target rifles lying down in the prone position. As illustrated by Figure 2.1, rifles are either single-shot or bolt action magazine rifles, with iron sights or telescopic sights, and supported by a sling, a rest or a bipod. Rifles are Fullbore (e.g. firing centrefire cartridges 7.62, 5.56 and 6mm calibre etc.), Smallbore (e.g. .22LR) or Target Air Rifle (e.g. .177 calibre).

a) Single-shot, iron sights b) Magazine, telescopic sights

Figure 2.1: Target Rifle *(RPA)*

Ranges can be outdoors from 300-1200 yards (270-1100m), or indoors for Smallbore and Air Rifle. This also encompasses shooting disciplines such as F-Class and Benchrest that use telescopic sights and rests, because they share the same ranges and similar rifles.

Fullbore Target Rifle

Fullbore Target Rifle (TR) involves prone single-shot precision shooting using iron (aperture) sights at round bullseye targets at distances from 300 to 1200 yards (270-1100m), with each shot carefully scored and analysed. The usual calibre is 7.62mm.

Figure 2.2: Prone Target shooting

High Power Rifle

High Power shooting comprises: a) **Match rifles** - custom-made bolt action, magazine rifles; and b) **Service rifles** - generally unmodified M1, M14, M16 or AR15. Shooting is done with iron (aperture), or iron peep sights. A typical competition comprises 3-4 courses of fire each of twenty shots at distances of 200, 300, and 600 yards, shot standing, seated and prone, respectively.

Smallbore Target Rifle

Smallbore Rifle shooting is carried out using precision .22 rimfire rifles specially designed for target shooting. They are single-shot and use iron (aperture) sights, shooting at distances of 15, 20, 25, 50 and 100 yards. The International Shooting Sports Federation (ISSF) recognises two international competitions: a) **Prone** – competitions comprise 60 shots prone at 50m, and b) **3 Position** – competitions comprise 3 x 40 shots (Men), 3 x 20 shots (Women) shot prone, standing and kneeling at 50m.

International 300m Rifle

The International 300m Rifle discipline is fired at only one distance (i.e. 300 metres), but the rifle may be 'Standard' or 'Free' and in any calibre up to 8mm. Matches may be prone only, or prone, standing and kneeling (PSK), and are shot from a covered firing point.

F-Class Rifle

F ('Farquarson') Class, or F-Class is shot prone with any Fullbore target rifle, but shooters can use a variety of aids, such as telescopic sights, bipods, front-rests and sandbags, and any calibre of ammunition up to 8mm.

Benchrest Rifle

Benchrest shooting is a sport in which very accurate rifles are shot at targets from a bench with rests, and from a position seated on a stool. Shooters typically use single shot custom rifles with heavy stainless steel barrels, and handmade stocks of graphite, fibreglass, or carbon fibre. Popular ammunition is the 6mm PPC and the Remington BR line of cartridges.

Match Rifle

Match Rifle it is usually fired with the 7.62mm cartridge, at long distances from 1000 to 1200 yards (914-1100m), and is popular with UK and Commonwealth shooters. Telescopic sights and hand loaded ammunition are used, and the specification for rifles and the firing positions allowed are more open than Target Rifle. Whilst the majority of shooters shoot prone, a few still adopt the 'supine' position, reclining on their backs, feet pointing towards the target.

Target Air Rifle

Match Air Rifle is a highly popular discipline worldwide, being governed by the International Shooting Sports Federation and included in the Olympics. The Air Rifle competition is shot at 10m from the standing unsupported position and consists of 60 shots in 1 hr 45 mins for men, possible score - 600, and 40 shots in 1 hr 15 min for women, possible score - 400.

2.2 Target Pistol and Gallery Disciplines

Gallery shooting disciplines are shot on indoor or covered ranges using pistols and rifles firing ‘pistol’ calibre cartridges (e.g. .22LR or .357 calibre). The targets are usually static bullseye targets at 25m and 50m.

Figure 2.3: Target Pistol and Gallery

Pistols – Free, Rapidfire, Standard, Centrefire

The International Shooting Sport Federation (ISSF) recognises four pistol disciplines, referred to as: a) **Free** – competitions comprise 60 shots fired with .22LR single shot pistols in the standing position at a target 50 metres away.; b) **Rapidfire** - competition are fired with .22 five shot pistols, and consist of a series of five shots fired at five targets at 25 metres; c) **Standard** – competitions use semi-automatic .22 pistols and comprise a 60-shot match into 5-shot strings with different timings, shots at 25 metres; and d) **Centrefire** – competitors typically use semi-automatic .32 calibre pistols with competitions comprising two rounds each of 30 shots and shot at 25 metres.

Air Pistols – Single, Multi-shot

For Air Pistols, the ISSF recognises four competitions: 10m Air Pistol Men (60 shots), 10m Air Pistol Women (40 shots), 10m Standard Air Pistol and 10m Rapid Fire Air Pistol. All are shot in the standing position and single handed, with 4.5mm (.177”) calibre pistols propelled by gas (usually compressed air or CO2).

Bullseye Pistol

Bullseye, three-gun or conventional pistol shooting, hugely popular in the United States, comprises a “3-gun aggregate”, fired with a .22 rimfire, a centrefire, and a .45 calibre at paper targets at fixed distances and within time limits. However, most competitors use their .45 pistol both for the ‘open’ centrefire and .45 stages.

Gallery Rifle and Pistol

Gallery rifles are usually lever action or bolt-action carbines firing pistol ammunition, such as .22LR, .357, .38, 9mm, or .45 calibres. Rimfire carbines are often autoloaders with a rotary 10-shot magazine. Lever action rifles typically incorporate a 10-shot tubular magazine underneath the barrel. Although pistols are largely banned in the UK, it is possible to own and shoot gallery or long barrel pistols, as well as historic (called Section 7) pistols.

2.3 Historic Arms Disciplines

Historic arms disciplines – as the name suggests – shoot 'old' or replica firearms; especially muzzleloaders and black powder cartridge firearms. Rifles are shot on outdoor ranges, pistols on indoor ranges and shotguns on outdoor ranges.

Classic and Historic Arms

The Classic and Historic Arms group is dedicated to those with an interest in historic rifles with particular reference to British, Commonwealth and other significant Military Miniature Calibre Training and Target Rifles, such as those manufactured by Lee-Enfield and BSA.

Figure 2.4: Historic Arms Disciplines

Muzzle Loading Rifle and Pistol

Muzzleloading, black powder firearms (muskets, rifles, pistols and shotguns) cover any firearm into which the bullet is loaded from the muzzle of the gun. Shooting competitions range from 25 yards for pistols to over 1000 yards (23-915m) for rifles.

Black Powder Cartridge Rifles and Pistols

Shooting is conducted with a) original period rifles, b) replicas and c) modern purpose-designed rifles and pistols at distances up to 600 yards (550m). With rifling, specialist rifles in .451" calibre shoot well out to 1000 yards (915m).

Cowboy Action Shooting

Cowboy Action Shooting (CAS) uses four firearms: two revolvers, a lever action rifle and a double barrel shotgun. CAS requires competitors to use firearms typical of the mid- to late 19th century including single action revolvers, lever action rifles (chambered in pistol calibres) and side-by-side double barrel shotguns (e.g. with external hammers).

2.4 Military and Practical Disciplines

The Military Rifle disciplines shoot civilian equivalents of modern service rifles such as the M16 (firing 5.56mm calibre cartridge) or various sniper-type rifles (firing the 7.62x51mm calibre), and competitions as you might expect are military or law enforcement inspired. Practical, defensive and service pistol competitions are broadly the same, but regulated by different national bodies.

Practical 3-Gun Shooting – rifle, pistol, shotgun

Practical 3-gun shooting is highly popular in the United States, and involves shooting a rifle, pistol and pump-action shotgun on a simulated military or law enforcement course of fire (called stages).

Practical Rifle

Practical rifle shooters use civilian versions of modern service rifles, such as a 5.56 calibre AR15, with competitions involving a course of fire. To compete competitively a telescopic sight and large capacity magazines are a requirement (20 rounds is the norm although 10 rounds will suffice at a pinch).

Figure 2.5: Military Rifle Disciplines

Civilian Service Rifle

Civilian Service Rifle is a shooting discipline that involves the use of rifles that are used by military forces and law-enforcement agencies, both past and present use. These include ex-military rifles, sniper rifles (both past and present) and civilian versions of current use service rifles.

Practical Pistol and Air Pistol

Practical Pistol involves cartridge pistols, air pistols and Airsoft, with competitors shooting a simulated military or law-enforcement course of fire. Competitors use a magazine fed pistol or revolver capable of firing multiple shots before reloading. Due to the pistol ban in the UK (except Northern Ireland), the majority of pistols used for PP are CO2 powered, or air cartridge revolvers. The standard calibre is .177 but .22 is allowed.

Service Pistol

A service pistol is any pistol (revolver, or semi-automatic) issued to military personnel, or in some contexts, law enforcement officers. Service Pistol typically involves competitions between serving military personnel, recent personal and (where the Law allows) civilian enthusiasts. Shooting is often done on Military ranges.

Target and Practical Shotgun

Target and Practical Shotgun involves competitors shooting self-loading or pump action shotguns with magazines containing 7-14 rounds at steel plates, 'shoot/no-shoot' targets, 'pepper poppers' and paper targets.

Airsoft Rifle and Pistol

Airsoft is a shooting discipline in which players participate in simulated military or law enforcement-style combat using replicas (in appearance only) of real firearms firing small pellets. Airsoft guns (also known as Soft Air guns) are spring, electric, or gas powered air guns that fire small spherical plastic pellets of either 6 mm or 8 mm diameter (0.24 or 0.32 inches).

2.5 Field Sports Disciplines

Field Sports disciplines simulate static and moving targets found in traditional field sports, such as fox, buck or boar. Moving target disciplines include Running Boar and Running Deer shot with Smallbore and Fullbore rifles, respectively; and the enormously popular Clay Pigeon shooting. Shooting static 'game' targets includes Silhouette, popular in the United States, and Field Target shot with Air Rifles.

Silhouette Rifle, Pistol and Shotgun

Silhouette shooting comprises shooting at heavy metal targets of chickens, pigs, turkeys and rams, with the aim of knocking them over, using either rifles, pistols or shotguns.

Sporting Rifle

Popular with field sports shooters, the rifles used must be in the style of a 'sporting rifle' rather than that of a target, match or military rifle. It encompasses: a) static targets (e.g. fox, buck) that are shot prone, sitting, kneeling, standing and from the bench, and b) moving mechanical targets (e.g. deer, boar) that are shot standing.

Clay Pigeon Shooting

Clay pigeon shooting is the art of shooting flying targets (i.e. clays) with a shotgun. Formal Clay shooting consists of a number of disciplines, such as Trap and Skeet. Trap shooting has targets fired away from the participant at different angles as well as different heights. Skeet involves shooting at targets fired horizontally from a low and high house both as singles and pairs. Each round consists of 25 targets.

Figure 2.6: Field Sports Disciplines

Field Target (Air Rifle)

Field target shooting – shot with highly accurate air rifles – combines the outdoor field conditions of rough shooting, with the precision of target shooting. A typical course is laid out, outdoors with a route to walk and at set intervals are shooting points with a knockdown target (cf. Silhouette Shooting) at any distance from 7.5 metres to 55 metres.

2.6 International Shooting Disciplines

The International Shooting Sport Federation (ISSF) recognizes several shooting events (see Figure 2.7), some of which have Olympic status.

Event	Competition	ISSF		Olympic	
		Men	*Women*	*Men*	*Women*
Rifle					
10m Air Rifle	60 shots (M), 40 shots (W) standing	✓	✓	✓	✓
50m Rifle prone	60 shots prone	✓	✓	✓	
50m Rifle 3 position (free rifle)	3 x 40 shots (M) and 3 x 20 shots (W) prone, standing, kneeling	✓	✓	✓	✓
300m Rifle 3 position (free rifle)	3 x 40 shots (M), 3 x 20 shots (W) prone, standing, kneeling	✓	✓		
300m Rifle prone	60 shots prone	✓	✓		
300m Rifle standard	3 x 20 shots prone, standing, kneeling	✓			
300m Army Rifle		✓			
Running Targets					
10m Running Target	30 slow, 30 fast (M), 20 slow, 20 fast (W)	✓	✓		
10m Running Target Mixed	40 shots mixed	✓	✓		
50m Running Target	30 shots slow, 30 shots fast	✓			
50m Running Target Mixed	40 shots mixed	✓			
Pistol					
10m Air Pistol	60 shots (M), 40 shots (W)	✓	✓	✓	✓
10m Standard Air Pistol	40 shots (M), 30 shots (W) 5 taken in 10 secs	✓	✓	✓	✓
10m Rapid Fire Air Pistol	60 shots fired in two so-called half courses	✓	✓	✓	✓
25m Pistol (sporting pistol)	30 + 30 shots		✓		✓
25m Centre-Fire Pistol	30 + 30 shots	✓			
25m Standard Pistol	3 x 20 shots	✓			
25m Rapid Fire Pistol	60 shots	✓		✓	
50m Pistol (free pistol)	60 shots	✓		✓	
Shotgun					
Trap	125 targets (M), 75 targets (W)	✓	✓	✓	✓
Skeet	125 targets (M), 75 targets (W)	✓	✓	✓	✓
Double Trap	150 targets (M), 120 targets (W)	✓	✓	✓	
Automatics Trap	125 targets (M), 75 targets (W)	✓	✓		

Figure 2.7: International Shooting Sports Federation Disciplines

Examples of the ISSF and Olympic competitions are shown below.

Rifle

In the rifle events competitors shoot at 10-ring targets.

- **10m Air Rifle** – shots are fired in the standing position at a target 10 meters away with a .177 air rifle.
- **50m Rifle 3-Position** - The shooter fires three rounds of 40 shots (.22LR) each in the prone, kneeling and standing positions at a target 50 meters away.
- **50m Rifle Prone** (men only) - Sixty shots (.22LR) are fired in the prone position at a target 50 meters away.

Running Target

The running target event involves a 'slow run' and a 'fast run'.

- **10m Running Target** (men only) – two rounds of 30 shots are fired in the standing position, unsupported, at a target 10 meters away with a .177 air rifle.

Pistol

In the pistol events, competitors fire at a 10-ring target, holding and firing the pistol with one hand. Examples include:

- **10m Air Pistol** – the four competitions (Air Pistol Men & Women, Standard and Rapid Fire) are shot single-handed, in the standing position at a distance of 10 meters. For example, with Air Pistol the men's competition comprises 60 shots in 105 minutes and women's 40 shots in 75 minutes.

- **25m Sports Pistol** (women only) – A competition consists of 30 precision shots and 30 rapid fire shots. At a distance of 25 meters, a centre of 50 mm must be hit in the so-called precision semi-round. The pistols are 5-shot semi-automatics in .22 Short calibre.

- **25m Centre Fire Pistol** (men only) – A competition consists of two rounds of 30 shots each. The pistols are 5-shot semi-automatics in .32 S&W Long calibre.

- **50m Free Pistol** (men only) - Sixty shots (.22LR) are fired in the standing position at a target 50 meters away.

Shotgun

Clay pigeon shooting competitions comprise:

- **Trap** – competitors move through five adjacent shooting stations, each comprising three traps set at different heights and angles, with the shooter not knowing which of the traps will release. As each target is released the shooter is allowed two shots.

- **Skeet** – In the skeet event, two targets are released from separate trap houses at either end of a semicircle. The course of fire consists of either 'singles' - a single target is thrown from either house; or 'doubles' - consisting of two targets thrown simultaneously, one from each house. Competitors move through a semi-circular range featuring eight adjacent shooting stations.

- **Double Trap** - In the double trap, two targets are released simultaneously at different heights and angles from the centre bank of traps. The targets come off any of the three traps, ranging in height from 3 to 3 ½ metres, and the shooter fires one shot at each target.

For a more complete description of Olympic shooting see (www.targetshooting.ca/olympic.htm). Other Olympic events involving shooting are the Biathlon, Pentathlon and Paralympics shooting.

Modern Pentathlon

The Modern Pentathlon involves 10m air pistol shooting, together with fencing, horseback riding, running and swimming competitions.

Disabled (Paralympics) Shooting

Shooting is a Paralympics sport for persons with locomotor disabilities. Competitions are open to all athletes with a physical disability [3]. Athletes use .22 calibre rifles and air guns (pneumatic, CO2 gas or spring). Athletes compete in rifle and pistol events from distances of 10, 25 and 50 metres, in men's, women's and mixed competitions. There are only two primary classifications in shooting sports (SH1 and SH2). The SH1 levels are for shooters who do not require a rifle support stand. The SH2 classification levels are for shooters who do require a rifle support stand.

2.7 Further Information

[1]. Wikipedia, the free encyclopedia, http://en.wikipedia.org/wiki/Shooting_sports, *introduction to shooting sports.*

[2]. Shooting Wiki, www.shootingwiki.org, *the web site cover all ISSF / Olympic Shooting Disciplines*

[3]. Wikipedia, the free encyclopedia, http://en.wikipedia.org/wiki/Paralympic_shooting, *introduction to Paralympics shooting sports.*

[4]. National Rifle Association of the United Kingdom (NRA-UK), www.nra.org.uk, *the NRA-UK is the national governing body for Fullbore rifle shooting in the United Kingdom. The tab 'Clubs' gives an extensive list of UK shooting clubs.*

[5]. National Small Bore Rifle Association (NSRA), www.nsra.co.uk, *the NSRA is the national governing body for all Small-bore Rifle & Pistol Target Shooting in the United Kingdom, including Airgun and Crossbow Shooting. A list of Smallbore clubs can be found at* www.nsra.co.uk/nsra/nsra_frame.htm

[6]. Clay Pigeon Shooting Association (CPSA), http://www.cpsa.co.uk/epromos.cfm, *provides a list of Clay Pigeon Associations throughout the UK, Europe, the Commonwealth and USA.*

[7]. National Rifle Association of America (NRA-USA), www.nra.org, *official National Rifle Association of America*.

[8]. International Shooting Sport Federation, www.issf-shooting.org, *the governing body of international shooting sports.*

2.8 Contacts

The three principal associations in the UK are the National Rifle Association (NRA-UK), the National Smallbore Rifle Association (NSRA) and the British International Clay Target Shooting Association. In Ireland the principal association is the National Target Association of Ireland. A comprehensive list of target shooting organisations can be found in the appendix.

Organisation British Shooting Limited Telephone +44-1483-486948 Address Edmonton House, Bisley Camp, Brookwood, , Surrey GU24 0NP Email admin@britishshooting.org.uk Web site www.britishshooting.org.uk	**Organisation** National Rifle Association of the UK Telephone 01483 797777 Address Bisley Camp, Brookwood, Woking, Surrey GU24 0PB Email info@nra.org.uk Web site www.nra.org.uk
Organisation National Smallbore Rifle Association Telephone 01483 485505 Address Bisley Camp, Brookwood, Woking, Surrey GU24 0NP Email info@nsra.co.uk Web site www.nsra.co.uk	**Organisation** British International Clay Target Shooting Federation Telephone 01483 485400 Address BICTSF, PO Box 1500, Brookwood, Woking, Surrey. GU24 0NP Email secretary@bictsf.com Web site www.bictsf.com
Organisation Muzzle Loaders Association of GB (MLAGB) Telephone 01926 458198 Address MLAGB, 7 Olympus Court, Tachbrook Park, Warwick CV34 6RZ Email membership@mlagb.com Web site www.mlagb.com	**Organisation** The UK Practical Shooting Association Telephone 07010 703845 Address UKPSA, PO Box 7057, Preston, Weymouth, Dorset DT4 4EN Email alan@mediainc.co.uk Web site www.ukpsa.co.uk
Organisation British Field Target Association Address BFTA, P.O Box 2242, Reading, Berks RG7 5YY Email Secretary@BFTA.net Web site www.bfta.net	**Organisation** The British Sporting Rifle Club (BSRC) Address c/o NRA, Bisley Camp, Brookwood, Woking, Surrey. GU24 0PB Email secretary@bsrc.co.uk Web site www.bsrc.co.uk

Organisation National Target Shooting Association of Ireland Telephone 00 866 504 9073 Address PO Box 9, Blackrock, Co.Dublin, Ireland Web site www.targetshootingireland.org	**Organisation** Shooting Sports Association of Ireland Telephone 087 900 7501 Address PO Box 9, Blackrock, Co. Dublin, Ireland Email SSAI@eircom.net Web site www.shootingsportsireland.com
Organisation National Rifle Association of Ireland Address NRA of Ireland, Leabeg, Blueball, Tullamore, Co Offaly, Ireland Email info@nrai.ie Web site www.nrai.ie	**Organisation** Irish Clay Pigeon Shooting Association Telephone 00 353 (0)87 2988030 Address Suite 20A, The Mall, Beacon Court, Sandyford, Dublin 18, Ireland Email icpsa@eircom.net Web site www.icpsa.ie
Organisation Irish Practical Shooting Association Address I.P.S.A. c/o Fitzgerald Kitchens, Bective Street, Kells, Co. Meath. Email pro@ipscireland.org Web site www.ipscireland.org	**Organisation** The National Silhouette Association Ireland Address NSA, P.O.Box 9, Blackrock, Co. Dublin, Ireland. Email silhouetteireland@eircom.net Web site http://homepage.eircom.net/~ntsai/nsai.html

Chapter 3

Safety, Range Discipline and The Law

Shooting has an enviable safety record and everyone works hard to maintain that record.

3.1 Basic Safety Rules

There are a number of standard safety rules, mostly fairly obvious, which must be adhered to whether using a rifle, pistol, shotgun or airgun. These include always assuming the firearm is loaded, never pointing it at anyone, and ensuring the firearm is held horizontally, pointing down range, when loading a round. To summarise:

- **Handling a firearm** - always assume every firearm is loaded until you have proved otherwise, and prove that a firearm is unloaded before passing it to someone, or when receiving it.
- **Unloaded** – firearms should be unloaded when not in use, and should have a breech flag inserted (where possible) or in the case of bolt action rifles have the bolt removed (or both).
- **Barrel** – before firing check the barrel is free of obstructions, preferably by looking up the barrel from the breech end.
- **Calibre** – always check that the calibre of the firearm and the calibre of the ammunition match exactly. Clearly 7.62x51 (NATO) is different from 7.62x39 (Russian). Although 7.62 NATO and .308 Win firearms are considered equivalent, 7.62 firearms are engineered for higher powder pressures.
- **Firing Point** – you should enter a range from directly behind the firing point, and never cross a range unless you have confirmed with Range Control that it is safe to do so. You should alert other shooters (by shouting “Stop, Stop, Stop”) if any person or animal enters the danger area.
- **Muzzle control** – always keep the firearm pointing down range in a safe direction, and you must never point a firearm at any other person or at your self.
- **Loading** – when loading a round into the chamber, ensure the muzzle is pointing down range and the barrel is horizontal. This is so that if there is a negligent discharge, the bullet will be contained by the stop butt or within the Range Danger Area. (Obviously Black Powder firearms are loaded in a vertical position.)
- **Trigger finger** – always keep your finger off the trigger until ready to fire. Putting your finger in the trigger guard is a dangerous practice since your finger may accidentally touch the trigger causing a negligent discharge.
- **Target** – make sure you positively identify your target, and equally important what lies in front and behind it, before firing.
- **Misfires** – if the round fails to fire when you operate the trigger this may be due to a ‘hang fire’ where the powder in the case has not ignited immediately. It is essential that the firearm continues to point down range for at least 30 seconds. You must then inform the Range Conducting Officer (RCO) and carry out the ‘Misfire Unload Drill’ under his supervision. If in any doubt ask for assistance in removing the round.

If you break any of these rules you may expect, at the very least, to be reprimanded by the RCO or other more experienced shooters. In serious cases you may be asked to leave the range and disciplinary action may be taken.

3.2 Club Membership

To take up target shooting, you normally need to join an officially approved club; in the UK a Home Office Approved Club. If you have already decided on what shooting discipline is of interest to you the appropriate National Governing Body will be able to advise you on your nearest shooting club for that discipline.

In most countries, including the UK, clubs must follow a formal probationary membership procedure to ensure you are properly trained and more importantly safe to use a firearm.

- **Probationary Club Membership** - you start as a Probationary Member and follow a Probationary Course that covers range and safety procedures, firing a firearm, and club rules. This is to ensure you are both properly trained in range safety and are also safe and responsible in the handling of firearms. In the UK, this probationary period will last for a minimum period of three months (though many clubs have longer probationary periods of up to a year). When you apply to join the club your name and address will be forwarded to your local (UK) police who will check if there are any reasons why you should not be entrusted with firearms. Once full club membership has been granted you may apply for a Firearms or Shotgun Certificate.

- **Club's Firearms & Ammunition** – whilst a Probationary Member you will be able to use the Club's firearms and ammunition under supervision, but it goes without saying that you can't remove them from the range. Once you become a full Member, you can continue to use the Club's firearms and ammunition, or those belonging to other members of the Club, until you have obtained the necessary certificate to purchase your own firearm.

- **Applying for a Firearm or Shotgun Certificate** – to possess a rifle, shotgun, muzzle loading or front loading revolver or certain types of cartridge revolvers in the UK requires a certificate from the local police, one requirement being that you are an active full member of a designated shooting club (or you have permission to shoot on suitable land). However, airguns up to a designated muzzle energy (12 ft-lb for rifles, 6 ft-lb for pistols) can be purchased without a certificate so they are a good starting point, if you have never shot before.

- **Keeping up Membership** – once you have obtained a firearm or shotgun certificate, the (UK) police will check that you are an active member of the club. Clubs are therefore required by law to keep records of every time you shoot. Some police forces stipulate a minimum number of times they expect you to shoot each year to continue to have 'good reason' for the possession of the firearm(s) concerned.

- **Club Visitors** – if you (or a friend) are a full member of a Home Office Approved shooting club or have a firearm certificate, then you can (with permission) shoot at another club's range. If a friend or relative does <u>not</u> have club membership or the required certificate, then for:
  - <u>Rifles</u> – for centrefire rifles, before shooting the Club Secretary needs to apply to the local police for permission for the named individual to shoot at a designated time and then under supervision of a qualified RCO. This will then be considered a 'one-man Guest Day' and will count as one of the 12 Guest Days each Club are entitled to hold each year.
  - <u>Pistols</u> - similar arrangements **<u>cannot</u>** be made for long barrelled revolvers or long range revolvers since these may only be used by the person whose name is on the FAC. The only type of pistol which may therefore be used on such a Guest Day would be muzzle loading or Front Loading pistol.
  - <u>Shotguns</u> – for standard shotguns, friends and relations can shoot under supervision of a qualified person without application to the police.
  - <u>Airguns</u> – since a license is not required to shoot an airgun under the designated muzzle energy, you can let friends and relations shoot, but as a courtesy you should discuss this with the Club officials before shooting.

3.3 Range Safety

In the interest of safety all (rifle and pistol) shooting ranges are formally designated for the permissible muzzle velocities and muzzle energies that may be used, and when in use a trained officer – the Range Conducting Officer (RCO) – must conduct all firing practices to ensure safety procedures are being followed. The following is a summary:

- **Muzzle Velocities and Muzzle Energies** - each range of each type (Indoor, Outdoor, Smallbore, and Fullbore) has a set of designated MV and ME that are safe to use. This covers limits on the muzzle velocities and muzzle energies of the ammunition (due to the danger of ricochets). For Gallery ranges this might be a muzzle velocity of 2150 ft/sec (655m/s) and muzzle energy of 1496 ft-lb's (2030 Joules). Hence the .17 HMR is normally banned from .22LR ranges even though a smaller calibre, due to its 2550 ft/s (775 m/s) muzzle velocity.

- **RCO** – a Range Conducting Officer is responsible for the safe running of all live firing on the range and must be present during all firing. The only MoD-recognised RCO Courses are those run by the NRA (for Fullbore and Smallbore) and the NSRA (for Smallbore only). Any club which wishes to use MoD ranges of any sort must have at least one qualified RCO present while firing is taking place. All persons present on a range, including spectators and visitors, come under the control of the RCO whose orders must be obeyed at all times.

In addition to the basic rules of safe firearm handling, there are a number of safety rules that are expected of shooter. These rules include: a) ear and possibly eye protection are required of all shooters and spectators on the firing point, b) when anyone wishes to go down range, they must first request permission of the RCO, c) no handling of firearms is permitted when anyone is beyond the firing line, and d) if anyone observes an unsafe situation they are to immediately shout 'Stop, Stop, Stop', etc.

3.4 UK Firearms Laws

A 'firearm' within the definition of the UK Firearms Acts means any lethal barrelled weapon. The Metropolitan Police web site (www.met.police.uk/firearms-enquiries) is a good source of information on UK firearms laws, and procedures for getting a Firearm or Shot Gun Certificate.

Application for a Certificate

Before you can purchase a firearm or ammunition you require a certificate. Rifles and pistols are covered by a Firearm Certificate; shotguns by a Shotgun Certificate. The following are the broad requirements generally needed to obtain a certificate:

- **Good Reason** – before you can obtain a Firearm or Shotgun certificate you need to show 'good reason', such as being an active member of a Home Office Approved shooting club and that the firearm you request is appropriate for the shooting discipline.

- **Firearm Certificate** - a Firearm Certificate designates each rifle and pistol (by type and calibre) that you may purchase and possess together with the amount of ammunition you may purchase at a time and the total amount you may possess.

- **Shotgun Certificate** – a Shotgun Certificate allows you to purchase a number of shotguns. However, the police may question the need if a significant number are purchased.

- **Air Rifles and Air Pistols** – the majority of airguns - for air rifles below 12 ft lbs and air pistols below 6 ft lbs muzzle energy - do not require a certificate.

- **Age Limits** – restrictions are placed on young people under 17 years using, owning and purchasing a firearm or shotgun (see www.met.police.uk/firearms-enquiries).

- **Variation** – if you wish to apply for permission to purchase an additional firearm, or you have an unused slot on your Firearm Certificate that you wish to change to a different calibre, you will need to apply to the UK Police for what is called a *Variation*.

Purchasing or Transferring a Firearm

Naturally there are also strict rules to follow when purchasing or selling a firearm depending on whether it is a rifle, pistol or shotgun:

- **Rifles** – to purchase a rifle, your certificate must have an unallocated slot for the precise type and calibre of the firearm. The seller will enter the details of the transfer, including the firearm number, on the certificate, and both seller and purchaser need to inform the Police.

- **Pistol** – although pistols are banned in the UK, it is still possible to purchase certain 'long barrelled' pistols and black powder pistols. Permission to purchase is covered by a Firearm Certificate and the procedure is the same as for rifles.

- **Shotguns** – as discussed, a Shotgun Certificate covers the purchase of a number of smoothbore shotguns of any bore size or calibre. The seller will enter the details of the transfer, including the firearm number, on the certificate, and both seller and purchaser subsequently need to inform the Police.

- **Airguns** – when purchasing or transferring an airgun below the designated muzzle energy (rifles < 12 ft/lbs, pistols < 6ft/lbs), it is not necessary to inform the Police. (Muzzle energy is a projectile's energy at the time it leaves the muzzle of a gun.)

- **Ammunition** – the amounts of ammunition that can be purchased and possessed depends on the type of firearm.
  - *Rifle and Pistol Ammunition* – a Firearms Certificate specifies for each allowed calibre of ammunition both the maximum amount that can be purchased at a time, and the total amount that can be held.
  - *Shotgun Cartridges* – a Shot Gun Certificate allows the owner to purchase any quantity and calibre of shotgun cartridges.
  - *Black powder* – you need to have been granted an Explosives Licence, and have approval from the Police, before you can purchase and keep black powder at home. However, black powder substitutes are treated in the same way as nitro powder.
  - *Airgun Pellets* – any quantity of pellets can be purchased without a certificate.

Storage of a Firearm

The UK Firearms Acts are not specific regarding security except to state that a firearm and ammunition must be kept safe and secure at all times so as to prevent unauthorized access, as far as is reasonably possible.

- **Club Armoury** – many clubs have a secure armoury at the range where you can permanently or temporarily store your firearm. This avoids the necessity of installing an approved steel cabinet for home storage and having your security arrangement checked by the local Police Firearms Enquiry Team.

- **Firing Range** – at the range a firearm must be supervised at all times and if left temporarily in a vehicle, it must be out of sight and the vehicle secured.

- **Home Storage** – at home firearms are required to be stored in a Police-approved steel cabinet, securely attached to a brick wall. When applying for the grant of a Firearm or Shotgun certificate it may be best to do nothing in relation to security, until a Firearms Enquiry Officer has paid a visit and advised on security measures.

- **In Transit** – when in transit, a firearm and ammunition should be stored in a suitable case, and must be kept out of sight. It is advisable not to leave a firearm in an unattended but locked vehicle, unless for short periods at the firing range. You should also carry your Firearm and Shotgun certificate to show that you have the right to possess the firearm.

Figure 3.1 attempts to summarise the UK registration and storage requirements for firearms and ammunition.

	Police Registration				Storage (approved)		
	Firearm Certificate	**Shotgun Certificate**	**No Certificate Required**	**Restrictions**	**Club Armoury**	**Home Cabinet**	**No Restrictions**
Rifles	Lists all Rifles and amounts of Ammunition	NA	NA	Permission required before each purchase	yes	yes	NA
Shotguns	NA	Lists all Shotguns	NA	Notification required after each purchase	yes	yes	NA
Pistols	Lists all Pistols and amounts of Ammunition	NA	NA	Permission required before each purchase. Only long-barrelled allowed	yes	yes	NA
Black Powder	Lists of all BP firearms and approval to store BP at home	NA	NA	Permission required to purchase BP firearm and to store BP	yes	yes	NA
Airguns	Rifles (>12ft-lbs) Pistols (> 6ft-lbs)	NA	See restrictions	Rifles (>12ft/lbs), Pistols (> 6ft/lbs)	NA	NA	yes

Figure 3.1: UK Firearms Laws covering Purchase and Storage

Black Powder

Given the increasing popularity of black powder, it is worth summarising black powder firearms regulations. The regulations governing black powder firearms are essentially the same as for conventional (nitro) rifles and pistols. Before you can purchase a BP firearm you need to get a 'slot' on

your firearm certificate for the calibre. The main difference is that before you can store black powder, you need to hold an Explosives Licence. (However as discussed above, the rules governing the storage of black powder substitutes are the same as for nitro powders.) When storing black powder at home it needs to be kept in a secure wooden container of a very specific design, to reduce the risk of explosion.

Finally, for interest, I've also included an overview of international regulations.

3.5 International Rules and Regulations

The rules and regulations for the ownership and use of firearms obviously vary with each country, and also whether you are going as part of a target shooting team or as an individual. You will need to seek advice both from your local Firearms Enquiry Team and also from the equivalent firearms officials in the country you will be visiting.

Visitors from Abroad

Visitors from outside the UK can apply for a Visitor's Permit for (a) one person or (b) up to 20 people from outside the UK to shoot in Britain. These visitors must be sponsored by a person or organisation for the duration of the visit and for the shooting activities in which they will be taking part. Applications can be made for a Visitor's Firearm Permit or a Visitor's Shotgun Permit from your local Firearms Enquiry Team but will also need to be completed by the sponsor(s) in the UK.

European Firearms Passport

If you intend to take firearms or shotguns to another European Union State you require a European Firearms Pass [4]. Both your firearms and shotguns are listed on the same EFP, and it is obtained from your Firearms Licensing Authority. In general, if you are going to another EU State as a:

- **Team Member** – as part of a Target Shooting Team or an organised hunt, you will not need to get permission, only keep your EFP with you at all times.
- **Individual** – as an individual shooter you must contact the authorities of the EU State, and their permission entered on your EFP.

Shooting and Purchasing a Firearm Abroad

When you plan to shoot abroad, your host or sponsor typically needs to apply for a Visitor's Certificate, and you will need to present this to the Immigration service at the point of disembarkation.

When purchasing a firearm, the rules and regulations for the use and purchase of firearms by foreigners obviously vary with each country. Probably a starting point is the appropriate National Shooting Association:

- **EU State** – you will need a slot on your UK Firearm or Shotgun Certificate, a European Firearms Pass (EFP) and an (export) licence from the EU State. The EFP alone does not entitle you to purchase a firearm or ammunition in another EU State.
- **United States** – you can only buy a firearm if you've been resident for 90 days, can prove it, have State ID, and have a hunting license. You also have to complete the general purchasing requirements that apply to all US citizens.

3.6 Further Information

[1]. P F Hicks, "UK NRA Target Rifle Coaching Course Notes", National Rifle Association (2003).

[2]. Metropolitan Police Firearms web site, www.met.police.uk/firearms-enquiries/firearms.htm, *comprehensive web site explaining UK firearms laws*.

[3]. NRA-ILA, "A Citizen's Guide to Federal Firearms Laws", www.nraila.org/GunLaws, *summary of the United States Gun Laws both Federal and State, and the transportation of firearms.*

[4]. Shooting in Europe, www.shooters.co.uk, *overview of shooting laws in Continental Europe.*

3.7 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation Home Office Police	**Organisation** National Rifle Association of the UK
Telephone 0207 035 4848	Telephone 01483 797777
Address Direct Communications, 2 Marsham Street, London SW1P 4DF	Address Bisley Camp, Brookwood, Woking, Surrey GU24 0PB
Email public.enquiries@homeoffice.gsi.gov.uk	Email info@nra.org.uk
Web site http://police.homeoffice.gov.uk/operational-policing/firearms.html	Web site www.nra.org.uk

Part B – Firearms and Shooting Equipment

Summary

Your choice of shooting discipline often rests on the firearms you would like to own and what you will enjoy shooting.

So in this section we look at the different firearms available for target shooting, how they work and information about cartridges and bullets. Once you are hooked on shooting, pretty soon you will want to fine-tune your ammunition, either by trying different factory loaded ammunition or by hand loading your own ammunition. This section also includes chapters on firearm sights, and on clothing and equipment.

The best advice for any novice taking up a new shooting discipline is that before rushing out and spending a small fortune on an expensive firearm, equipment and accessories get as much advice as possible and see what the old-hands are using.

Chapter 4 – Rifles

We start by looking at the galaxy of rifles available for target shooting. What you enjoy shooting will go a long way in determining your choice of shooting discipline. This section gives you a cursory review of what's available for the rifle-shooting enthusiast. One way of grouping target rifles is by their action: bolt action (single, magazine), lever action, pump action, semi-automatic action and break (hinge) action.

Chapter 5 – Pistols

Pistols cover: a) single-shot pistols used for target competition, b) semi-automatic pistols, and c) revolvers. This chapter looks at what's available, how they work and details of the firing mechanisms.

Chapter 6 – Shotguns

Shotguns refer to a firearm with any number of barrels with smooth bores; without rifling. Shotguns most commonly use breech or break actions, with double barrel, over-and-under shotguns being used for clay pigeon target shooting, and side-by-side shotguns for field sports.

Chapter 7 - Cartridges and Bullets

This chapter covers rifle/pistol cartridges and shotgun cartridges/shotshells. A rifle or pistol cartridge comprises the bullet, propellant powder and the primer in a metallic case. The primer is a small charge of impact-sensitive chemical material, located either in the centre of case head (centerfire ammunition) or in the rim (rimfire ammunition).

Chapter 8 - Black Powder and Muzzleloaders

Black powder is the original gunpowder and the standard propellant and explosive used until the middle of the 19th century. In recent years, Black Powder rifle, pistol and shotgun shooting have become highly popular worldwide. Broadly, black powder firearms divide into: muzzleloaders, percussion (or cap 'n' ball) muzzle loading pistols, and black powder cartridge firearms.

Chapter 9 - Airguns – pellets, BBs, airsoft

An airgun is a pneumatic firearm which fires projectiles using compressed air, CO2, spring-loaded piston or other high pressure gas as a propellant. This chapter looks at airgun 'ammunition': pellets, BBs and airsoft.

Chapter 10 - Iron and Optical Sights

This chapter looks at open, aperture and optical sights. The term 'sight' refers to any system used to assist the aiming of a firearm. Although we talk about iron and telescopic sights, there are a number of

different categories: a) open sights as on pistols and shotguns, b) aperture sights found on target rifles, c) shotgun beads, d) telescopic rifle sights, e) red dot on pistols and gallery rifles, and f) laser sights on military rifles.

Chapter 11 - Clothing, Equipment and Accessories

Each shooting discipline has its own set of equipment and dress code from the tight fitting jacket and trousers of the prone target rifle shooter, to the loose shooting vest of the clay pigeon shooter. This chapter reviews the equipment and clothing used in the various different shooting disciplines.

Chapter 4

Rifles

As you can imagine there is a galaxy of rifles available for target shooting, and what you enjoy shooting, will go a long way in determining your choice of shooting discipline. So this section gives you a cursory review of what's available for the rifle-shooting enthusiast. One way of grouping target rifles is by their action: bolt action (single-shot, magazine), lever action, pump action, semi-automatic action and break (hinge) action.

4.1 Rifle Basics

We start with the basics, a rifle's operation and at the various common mechanisms, such as actions, triggers etc.

Terminology

Rifles (as illustrated by Figure 4.1) comprise a stock (butt, cheekpiece and grip); an action (bolt, chamber and trigger), barrel and sights (either an iron rear-sight and foresight, or a scope). Target rifles may have a number of specialist features. For example, stocks may incorporate adjustable butt plates, combs and cheek-pieces, to give a perfect fit when they are shouldered, together with a thumbhole at the grip.

Figure 4.1: Rifle Terminology

Target rifles are typically bolt-action, and may be single-shot or fed from a magazine holding 5-10 cartridges. The magazine itself may be built-in or removable.

The barrel of a target rifle is typically heavy. It may also be:

- **Floating** - meaning the barrel does not touch the fore-end or fore-stock.
- **Fluted** - having parallel grooves cut into it to reduce weight and assist cooling, and for rigidity.

It may have front and rear sights or a rail to mount a telescopic sight. The iron rear sight is mounted on the receiver or action.

Information on barrels, including manufacture, rifling and twist rates, is given in the Chapter on Firearm Barrels.

Firing Mechanism

When the rifle is loaded and the trigger is pulled, as illustrated by Figure 4.2, the firing pin is driven forward by a spring and strikes the primer, igniting the propellant [1], which creates the pressure to propel the bullet down the barrel and out of the muzzle. The action is then opened to extract the fired cartridge and the firing pin is pushed back and held back under spring tension and load the next cartridge. This is either manually or (in semi-automatic firearms) the discharge forces back the bolt. The case is then ejected and the next round loaded into the chamber. The action is closed, to be released again by the trigger.

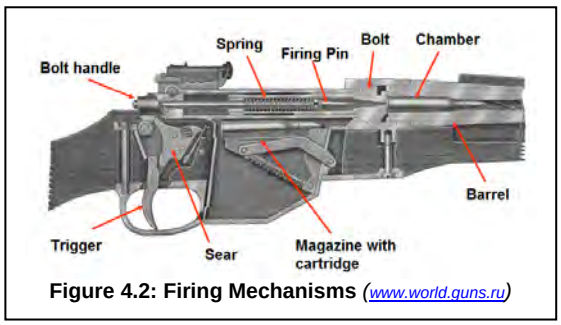


Figure 4.2: Firing Mechanisms (www.world.guns.ru)

4.2 Rifle Types

At a simple level rifles can be grouped into: a) custom target rifles either single-shot or with a magazine, b) military or service rifle, c) sporting rifles, d) black powder muzzleloaders and cartridge rifles, and e) carbines, with barrel length up to 22in/56cm, such as lever-action rifles.

Target Rifles (Centerfire, Rimfire)

Target rifles are typically custom-made bolt-action rifles with a heavy barrel, and a stock often with an adjustable butt-plate and comb/check-piece. The majority are single-shot; however, many disciplines require bolt-actions with a magazine holding 5 or 10 cartridges.

Military Rifles (Modern, Historic)

Military/Service rifles cover historic bolt-action rifles used by the military (e.g. Lee Enfield) and modern civilian versions of semi-automatic military rifles (e.g. AR15) that may be restricted to manual operation.

a) Target b) Military/Service c) Sporting Rifle d) Black Powder

Figure 4.3: Rifles Types

Sporting Rifles

Sporting rifles are designed for field sports such as deer stalking, and are used for shooting at static and running targets simulating game. These rifles often have highly-figured walnut stocks, but when adapted for target shooting are frequently equipped with synthetic stocks and heavy or fluted barrels.

Black Powder

Black powder firearms cover smoothbore muskets, old and modern muzzleloaders, and any rifle firing black powder cartridges.

Carbines/Gallery Rifles

A carbine is a short, lightweight rifle with a barrel length of typically up to 22in (56cm). The term is often used for lever-action rifles that fire pistol-calibre ammunition.

4.3 Actions

Next we look at actions. In firearms terminology, the 'action' is the type of system that the firearm employs to load consecutive rounds. The name of an action is usually derived from how it gets its motive force (i.e. how it is operated), and how it locks the breech.

Modern firearms can be classified as: single-shot, manual repeating, and self-loading repeating. This classification can in fact be used for rifles, pistols and shotguns.

Single-shot Action

Single-shot firearms hold only a single round of ammunition, and must be reloaded after each shot. Single-shot designs are less complex than magazine-fed firearms, and are the principal type for target rifle disciplines.

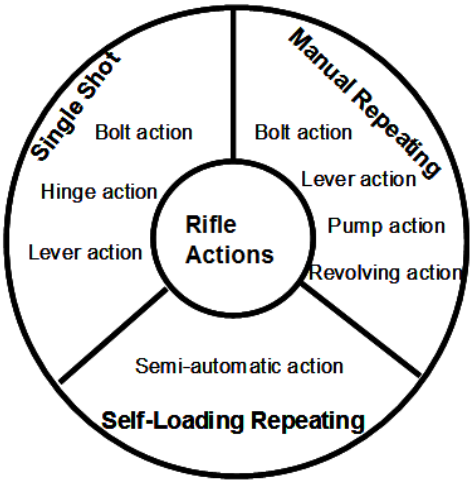


Figure 4.4: Firearm Actions

- Bolt-action - raising and pulling back the bolt opens the breech. The fired case is then either ejected, or is manually removed by the shooter (often preferred by target shooters who hand-load their own ammunition).
- Lever-action - pushing forward the lever, opens the breech, and causes the fired case to be ejected. A new cartridge is then manually loaded.
- Break/Hinge action - most (expensive) double rifles have a hinged action with the cartridges being loaded manually into the breech.

Manual Repeating Action

With manual-repeating firearms, operating the loading mechanism (bolt, lever, pump etc.) ejects a cartridge from the chamber and then loads a new cartridge from the magazine.

- Bolt-action – raising and pulling back the bolt opens the breech, causes the fired case to be ejected by a small pin, a new cartridge is loaded from the magazine, and the firing pin spring cocked.

- Lever-action – pushing forward the lever opens the breech causes the fired case to be ejected, and pulling back the lever loads a new cartridge from the magazine and cocks the firing pin.

- Pump-action – pulling back the sliding fore-end, opens the breech, causes the fired case to be ejected, and pushing the fore-end forward causes a new cartridge to be loaded from the magazine, and the firing pin cocked.

- Revolving-action – less common is the revolving action; pulling the trigger causes the cylinder to rotate, positioning a new cartridge in the breech, and cocking the hammer.

Self-loading (semi-automatic, automatic) Action

Self-loading firearms – semi-automatic and fully automatic - contain a magazine. When the trigger is pulled, the cartridge in the chamber is discharged; the bolt recoils under pressure, and ejects the spent cartridge. Next the closing of the action strips a a new cartridge from the magazine and feeds into the chamber.

- Semi-automatic – with each squeeze of the trigger one cartridge is fired, the spent case ejected, and then a new cartridge loaded from the magazine into the chamber.

- Automatic - with a single squeeze of the trigger the firearm keeps shooting until the trigger is released or the magazine runs out of ammunition.

Various recoil and blowback mechanisms are employed in (semi-) automatic weapons, including recoil operation, blowback/forward, delayed blowback, locked breech blowback, and gas-actuated [3].

4.4 Locking Mechanisms

Most rifles use a 'bolt' to seal or block the rear of the chamber forcing all the expanding gas forward. A bolt typically is a metal tube containing the firing pin and spring (see Figure 4.5).

a) Bolt Lugs & Extractor b) Disassembled Bolt

Figure 4.5: Rifle Bolt

Lugs

When the bolt is closed 'lugs' (knobs) at the front lock the bolt in place. This operation can be done via a rotating bolt, a lever, roller lock, tilt lock, or radial lock [3]. The number of lugs varies according to the type, calibre and manufacturer. Small to medium calibres generally use a two-lug system, frequently based on the Mauser bolt. Larger calibers may use more lugs [2].

Extractor

An integral part of the bolt is the extractor (see Figure 4.5); a 'claw' that grips the rim of the cartridge and pulls the cartridge from the chamber once it has been fired.

Ejector

The final action mechanism is the ejector that pushes the cartridge case out of the action.

4.5 Trigger

Rifles have different trigger mechanisms depending on their intended use [3]. Common trigger mechanisms are:

- Immediate or Single-action Trigger – the trigger is 'single-stage' with little or no takeup. When the trigger is pulled the shot fires (cf. shotgun).

- Pressure point or Two-stage Trigger – a two-stage trigger is designed to have a distinct takeup, with the trigger working against a significant amount of spring pressure. At the end of the takeup there is a small but noticeable increase in pull as the sear begins to disengage. This is typical of some target rifles.

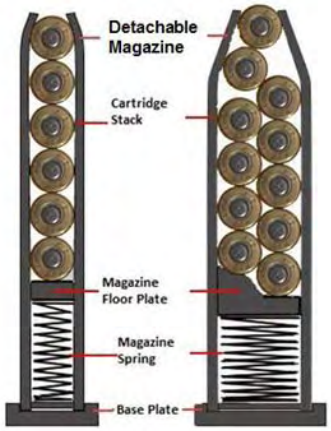
- Pre-set Trigger – this mechanism allows the trigger pressure to be reduced by pushing forward either the trigger or a small catch next to the trigger.

- Match Trigger - this mechanism provides an extensive range of trigger adjustments, controlling the trigger pressure, position, pressure point and follow-through after firing.

- Double-Set Trigger – not to be confused with a two-stage trigger, this is often found on expensive hunting rifles, this mechanism uses two triggers, the rear being used to activate the front trigger to work at a lower trigger pressure.

4.6 Magazines

The magazine is an ammunition storage and feeding device within or attached to a firearm, either integral to the firearm (fixed or internal) or removable (detachable). The most common type is the 'box' magazine.



a) single stack b) multi stack

Figure 4.6: Box Magazines

- **Box** - the box magazine stores cartridges in a parallel column, or stack, one above the other. An internal box magazine is built into the firearm, while a detachable box magazine is a self-contained magazine, capable of being loaded or unloaded while detached from the firearm.

- **Tubular** - a tubular magazine stored cartridges point to base inside of a spring-loaded tube fixed to and running parallel to the barrel. This type of internal magazine is typical of lever-action, repeating rifles.

- **Cylindrical** – various types of cylindrical or rotary magazines (e.g. drum, pan, helical) are used in firearms. Cartridges are stored parallel to the axis of rotation, and a moving partition pushed by a spring within the magazine forces loose rounds into an exit slot.

4.7 Ammunition

Rifle and carbine cartridges are available in a vast range of calibres, powder loads and bullet types and weights. Certain calibres, such as the ubiquitous .22LR (Long Rifle), can be used in rifles, carbines and pistols. The most popular cartridge has to be the .22LR that has been produced in higher quantities and in a variety of versions, more than any other cartridge. Other widely used calibres include the .223 Remington (5.56x45mm NATO) popular in military-style weapons, .303 British (used in historic firearms), .308 Winchester (7.62x51mm) the mainstay of Fullbore target shooting, together with 6mm cartridges, such as 6mm PPC (Palmisano & Pindel Cartridge) and the 6.5-284, popular with Benchrest and F-Class shooters.

4.8 Further Information

[1]. Wikipedia, the free encyclopedia, http://en.wikipedia.org/wiki/Firearm_action, *overview of rifle actions, in particular automatic and semi-automatic firearms*.

[2]. A. E. Hartink, "The Complete Encyclopedia of Rifles & Carbines," Rebo Publishers (2005), ISBN-13: 9789036615129.

4.9 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation National Rifle Association of the UK Telephone 01483 797777 Address Bisley Camp, Brookwood, Surrey GU24 0PB Email info@nra.org.uk Web site www.nra.org.uk	**Organisation** National Smallbore Rifle Association Telephone 01483 485505 Address Bisley Camp, Brookwood, Surrey GU24 0NP Email info@nsra.co.uk Web site www.nsra.co.uk
Organisation National Rifle Association of Ireland Address NRA of Ireland, Leabeg, Blueball, Tullamore, Co Offaly, Ireland Email info@nrai.ie Web site www.nrai.ie	

Chapter 5

Pistols

Pistols cover: a) single-shot target pistols, b) semi-automatic pistols, and c) revolvers.

5.1 Pistol Basics

Arguably, to shoot a Pistol effectively you need to appreciate how it works. This is true of all firearms.

Terminology

A simple division of Pistols is into: single shot pistols, semi-automatic pistols and revolvers. The majority of semi-automatic pistols have straight 'factory' grips, a detachable magazine located in the grip, a slide covering the mechanism, plus front and rear iron sights. However, specialist target pistols will have anatomical grips (see Figure 5.1) with the possibility of a magazine forward of the trigger.

Revolvers have simple grips, a revolving cylinder containing (typically) 6 rounds plus an external hammer, and a barrel with a fixed foresight.

Figure 5.1: Pistol Terminology

Firing Mechanism

The slide of a semi-automatic pistol (see Figure 5.2) has broadly the same action as the bolt of a rifle.

To initially load a semi-automatic, you fit a loaded magazine into the pistol, then pull back on the slide and release. This causes the first round to be loaded into the chamber and the hammer cocked. When the pistol is loaded and the trigger is pulled, the firing pin is driven forward by the hammer, and strikes the primer of the cartridge, igniting the propellant inside the cartridge case [1]. This creates the pressure to propel the bullet down the barrel and out of the muzzle. The discharge forces back the slide with the cartridge case gripped by the extractor, the action is then opened, the case ejected. The next round is then lifted into position from the magazine. The recoil spring then closes the action forcing the round into the chamber of the barrel. The hammer having been pushed back by the rearward movement of the slide is held back under spring tension, to be released again by the trigger when the pistol is next fired.

Figure 5.2: Firing Mechanism of Semi-Automatic Pistol
(Boberg Eng. http://world.guns.ru)

5.2 Pistol Types

There are broadly four types of Pistol a) single-shot pistols used for target competition, b) semi-automatic target pistols, c) semi-automatic military-style pistols, and d) revolvers.

Single-shot

Precision single-shot target pistols usually have anatomical grips (see Figure 5.3) moulded to the shooter's hand, a simple action, and a precision barrel with rear iron sights adjustable for elevation and windage and a fixed front sight.

a) Single-shot b) Semi-Auto (Target-style) c) Semi-Auto (Military-style) d) Revolver

Figure 5.3: Pistol Terminology

Semi-Automatic Pistols

Semi-automatic target pistols (usually .22LR or .32 calibres) typically have anatomical grips, a magazine forward of the trigger guard, and a fixed blade front sight and an adjustable rear iron sight. Semi-automatic pistols designed for self-defence have straight 'factory' grips; a detachable magazine located in the grip, and fixed front and rear iron sights. Hammers may be internal or external.

Revolvers

Revolvers have simple grips, a revolving cylinder contain (typically) 6 rounds plus an external hammer, and a barrel with a fixed foresight.

Black Power

Besides the above 'nitro' cartridge Pistols, there is a wide range of firearms using black powder propellants. These include muzzleloaders, so-called Cap and Ball revolvers where each chamber is loaded by hand, and black powder cartridge revolvers.

Air Pistols

Target air pistols and Airsoft pistols may be single-shot or have a simple magazine containing (usually) five pellets. A precision target air pistol is powered by compressed air or a CO2 capsule, with a fixed front site and a rear site adjustable for windage and elevation.

5.3 Actions

The action of a Pistol defines how the hammer is cocked. The terms single-action and double-action, are used both to describe the action and also, as discussed below, the trigger mechanism.

Single-shot

Often over looked in Pistol books, the single-shot design is arguably the mainstay of competitive target pistol shooting. A single-shot pistol is loaded by manually opening the breech (usually which also cocks the pistol), extracting the spent cartridge case, inserting a new cartridge in the chamber and closing the breech.

Self-Loading Pistol

Semi-automatic or self-loading pistols use the recoil or gas energy of each round to cycle the action, extract the spent case, and load the next cartridge. Target pistols are generally single action, while most modern defensive and military Pistols may be double action, single action or a combination of both.

- **Single-action** – the pistol is cocked prior to firing by pulling back the slide to load the first round from the magazine into the chamber, and is re-cocked at each shot by the slide as it flies back to eject the spent case and feed the next round into the chamber.

- **Double-action** – pulling the trigger manually cocks the hammer, so when the bolt moves forward to feed the round into the chamber the hammer is not held back in the cocked position,. Some pistols with external hammers can also be cocked manually as in the single-action mode.

Revolver

Revolvers can be divided into:

- **Single-action** – normally found on Muzzle loading revolvers and older cartridge revolvers, the hammer must be cocked manually prior to firing. Usually with a single-action revolver, the cylinder is fixed in the frame, and cartridges have to be unloaded and loaded through a loading port at the back of the cylinder.

- **Double-action** – pulling the trigger manually cocks the hammer, and rotates the cylinder to bring the next round into line with the firing pin and barrel. In addition, the hammer can be cocked manually to fire the revolver in single-action mode. Most double-action revolvers have a hinged cylinder for loading.

5.4 Locking Mechanisms

Whereas single-shot pistols and revolvers are based on relatively few locking mechanisms, in contrast semi-automatic pistols because of their mechanical complexity use a wide range of locking mechanisms.

Semi-Automatic Pistol

Some of the common locking mechanisms are listed below.

- **Blowback system** – used in pistols up to 7.65mm and occasionally 9mm, the 'locking' function is supplied merely by the weight of the slide and the recoil spring holding the breech in the closed position.

- **Browning (or short recoil) system** – with this system the barrel has 1-3 lugs which correspond to 1-3 corresponding grooves on the inner side of the slide, these lock together when closed. After firing the barrel will, by means of a simple cam, drop slightly, to disengage the slide, allowing it to move backwards.

- **Rotating breech system** – with this system the breech or the bolt has a number of bolt-locking lugs. When the breech is closed these lugs engage in grooves at the rear of the barrel, locking the breech. When fired, the gas pressure causes the breech to rotate, the lugs to disengage and the slide to move backwards.

Other locking systems are described in reference [2].

Revolver

The locking system in a revolver ensures that during firing: firstly the cylinder does not rotate unintentionally and secondly does not swing out of the frame during use.

- **Cylinder stop system** – at the base of the revolver frame is a lug (or cam) operated by the trigger. As the next chamber rotates into the firing position, this lug engages with the corresponding external groove in the cylinder to hold the cylinder in place for firing.

- **Cylinder axis system** – the cylinder rotates around a central axis pin that holds it in place during firing. To swing out the cylinder for reloading this pin must be disengaged by pressing on a release catch; the cylinder can then be swung out on its crane.

5.5 Trigger

There are various types of Pistol trigger mechanisms, although they broadly subdivide into single-action (SA) or double-action (DA):

- **Single-action** (SA) – performs the single action of releasing the hammer or striker. In addition, a single-action may be equipped with so-called Set Trigger whereby the trigger can be manually 'set' to fire with a reduced trigger pull weight.

- **Double-action** (DA) – performs the dual functions of firstly cocking and then releasing the hammer or striker. Traditional double-action Pistols also operate in single-action mode, but can be double-action only (DAO).

	Single Action	Double Action (DA/SA)	Double Action Only
Single shot	Manually opening the breech cocks the pistol.		
Semi-Automatic	The hammer will be cocked by the slide when the first round is loaded into the chamber. The hammer will be re-cocked automatically during the loading of the next round.	If the pistol is not already cocked, during the trigger pull the mechanism cocks the hammer before firing. After firing, in an DA semi-automatic, the hammer will be re-cocked during the loading of the next round.	The trigger pull cocks the hammer for each and every round. These pistols may have internal or external hammers.
Revolver	The hammer must be manually cocked. Pulling the trigger will not cock the hammer.	If the revolver is not already cocked, during the trigger pull the mechanism cocks the hammer and turns the cylinder, before firing. The revolver can also be manually cocked as with SA.	During the trigger pull the mechanism cocks the hammer and turns the cylinder, before firing. These are usually "hammerless" revolvers, where the hammer is an internal mechanism or does not have a thumb spur.

Figure 5.4: Pistol Trigger Actions

©

5.6 Ammunition

Cartridges for Pistols come in many calibres and with a variety of bullet types. The most common is the .22 family of rimfire cartridges, notably the .22LR. Other popular calibres are the .32 (e.g. Smith & Wesson Long) used in Centrefire target pistols, 9mm (e.g. 9x19mm Parabellum) used by military and police forces, plus the .38 Special and the many variants of the .45 calibre.

For a comprehensive description of the actions, locking, and safety mechanisms found in pistols and revolvers see reference [2].

5.7 Further Information

[1]. Wikipedia, the free encyclopedia, http://en.wikipedia.org/wiki/Pistol, *overview of pistol actions, in particular revolvers and semi-automatic firearms*.

[2]. A. E. Hartink, "The Complete Encyclopedia of Pistols and Revolvers," Rebo Publishers (1997), ISBN-13: 9780785815198.

5.8 Contacts

Given the different firearm laws governing the ownership of pistols in the United Kingdon and Ireland, please consult the list of target shooting organisations found in the appendix.

Organisation National Smallbore Rifle Association Telephone 01483 485505 Address Bisley Camp, Brookwood, Surrey GU24 0NP Email info@nsra.co.uk Web site www.nsra.co.uk	**Organisation** British Pistol Club Telephone 01483 486293 Address B.C.M 5114 London WC1N 3XX Email britishpistolclub@ntlworld.com Web site www.britishpistolclub.org
Organisation National Target Shooting Association of Ireland Telephone 00 866 504 9073 Address PO Box 9, Blackrock, Co. Dublin, Ireland Web site www.targetshootingireland.org	**Organisation** The National Silhouette Association Ireland Address NSA, P.O.Box 9, Blackrock, Co. Dublin, Ireland. Email silhouetteireland@eircom.net Web site http://homepage.eircom.net/~ntsai/nsai.html

Chapter 6

Shotguns

Shotguns refer to a firearm with any number of barrels with smooth bores, without rifling. Shotguns most commonly use break or hinge actions, with double barrel, over-and-under shotguns being used for clay pigeon target shooting, and side-by-side shotguns for field sports.

6.1 Shotgun Basics

Shotguns use many of the same actions as rifles, so besides the ubiquitous breech-loading double barrel shotgun, you will also find semi-automatic, pump action and bolt action shotguns in use across the panoply of shooting disciplines. The calibre of shotguns is measured in terms of its bore (UK term) or gauge (US term). The bore/gauge is determined by the number of solid spheres of a diameter equal to the inside diameter of the barrel that could be made from a pound of lead. The most common gauges are 12-bore (0.729in, 18.5mm) and 20-bore (0.614in, 15.6mm).

Figure 6.1: Shotgun Terminology

Terminology

As with the rifle, a shotgun comprises the stock, action and barrel as illustrated in Figure 6.1. Likewise, it is increasingly common to see clay pigeon shotguns equipped with stocks with adjustable butt plates and combs. A feature unique to shotguns is the so-called *choke*, a constriction at the muzzle end of each barrel that controls the shot as it leaves the barrel. Chokes may either be formed as part of the barrel at the time of manufacture (known as fixed-choke), or by threading the inside of the muzzle and screwing in an interchangeable choke tube.

Firing Mechanism

The firing mechanism of a breech-loading shotgun is illustrated in Figure 6.2.

Figure 6.2: Shotgun Firing Mechanism

When the shotgun is loaded and the trigger is pulled (see Figure 6.2) the firing pin is driven forward by the hammer spring and strikes the primer, igniting the propellant [1], which creates the pressure to propel the shot down the barrel and out of the muzzle. The action is then opened manually by pushing the top lever to the right. As the action hinges open, the ejector mechanism extracts the spent cartridge(s), and also cocks the hammer. A new cartridge is then inserted, and the action is closed. The safety catch can be either automatically or manually re-set.

6.2 Shotgun Types

As illustrated by Figure 6.3, the common types of shotgun are: over-and-under, side-by-side, semi-automatic and pump action.

a) Over-and-Under b) Side-by-Side c) Semi-Automatic d) Pump Action

Figure 6.3: Shotguns

Shotguns can be subdivided by the *barrels* into: single-barrelled, double-barrelled and combination guns; or by *actions* into: breech loading, pump action, semi-automatic, lever action or bolt action.

Single-barrelled shotguns

- **Single shot breech loading** – these are single-shot, single-barrel, breechloaders with the barrel hinged at the action.
- **Semi-automatic repeaters** – semi-automatic shotguns have a single barrel and a tube magazine, holding 2-5 shotgun shells, underneath. These can either use gas from the fired cartridge or a recoil mechanism, to reload the action.
- **Pump-action repeaters** – In pump-action shotguns, a sliding fore-end (or fore stock) - the pump - works the action, extracting the spent shell and inserting a new one as the pump is worked.
- **Bolt-action repeaters** – the shotgun is equipped with a manually operated bolt just like a rifle.

Double-barrelled shotguns

Side-by-side and over-and-under shotgun is well known:

- **Side-by-Side** – with side-by-side shotguns the barrels are arranged horizontally, and the guns are typically equipped with double triggers. Side-by-side shotguns are either hammerless (i.e. with internal hammers) or hammered.
- **Over-and-under** - the over-and-under designation comes (obviously) from the vertical arrangement of the barrels. Frequently they have a single trigger that fires the bottom then the top barrel. Specialist over-and-under shotguns are available for skeet, trap and sporting clay pigeon shooting.

Combination Guns

For completeness we should also include combination firearms found in Continental Europe that combine shotgun and rifle barrels. Examples (using German terms) include: a) **Drillings** - a combination gun that has three barrels, and b) **Vierlings** - a firearm with four barrels.

6.3 Shotgun Actions

Although there are many shotgun action types (e.g. breech loading, pump or semi-automatic), most clay pigeon and sporting shotguns are double-barrelled, breech-loaders. The common action mechanisms: Anson & Deeley Boxlock, Holland & Holland Sidelock.

With the Anson & Deeley Boxlock system, when the breech is opened by ‘breaking’ the shotgun, the cocking levers pivot like a see-saw with the rear part of the levers pushing the hammers backwards against the firing springs. The hammers or firing mechanism then engages with notches (sears) in the trigger mechanism and are ready to fire (see Figure 6.2). In contrast, with the Holland & Holland Sidelock system the firing mechanism is located on side plates screwed to the action and use a flat spring.

6.4 Shotgun Locking Mechanisms

This section provides a summary of different types of locking mechanism used in shotguns [2]:

- **Barrel-block** – most shotgun use barrel-block or barrel-catch locking, where lugs on the underside of the barrel block have grooves machined into them on the front edge. A locking lever causes a horizontal slider to engage with the grooves and ‘lock’ the barrels to the breech.
- **Greener** – with Greener locking a vertical plate with a hole extends from the rib and fits into the breech. The locking lever then pushes a transverse bolt through the hole, locking the barrels to the breech.
- **Kersten bolt** – two locking plates similar to the Greener, lock the barrels to the breech when closed.
- **Pin locking** – with an over-and-under, two grooves are machined on either side of the barrel, and two corresponding pins are located in the breech. When the shotgun is closed the pins engage with the grooves on the barrel block.

- **Pump action** – the manually operated pump action employ a similar locking mechanism to the falling block, where the breech block moves vertically, or nearly so, inside of the receiver walls to load a round.

6.5 Ammunition and Bore

There is an enormous range of shotgun cartridges or shotshells, by their composition subdivided into Felt wad and Plastic wad.

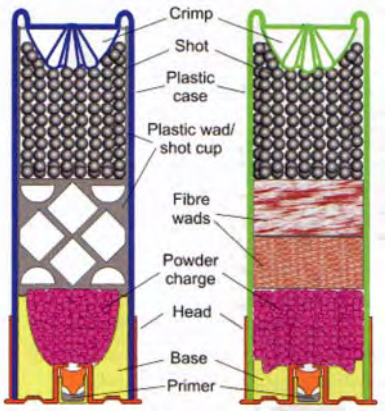


Figure 6.4: Shotgun Cartridges

Shotgun Cartridges

A shotgun cartridge or shotshell (see Figure 6.4) comprises: a) the brass **head** (or base), b) the **primer** or cap containing a small charge of impact-sensitive chemical material, c) the **case** of plastic or paper, d) the **powder** charge, e) the **wad** of felt or plastic, f) the **shot**, and g) the **crimp** or closure.

As with rifle and pistol cartridges, when the trigger is pulled, the firing pin is driven into the primer, which in turn ignites the powder. Burning gases from the powder expands the case to form a seal against the chamber wall. The shot is then propelled down the barrel. After it has left, the cartridge case is gripped by the extractor and pulled out of the chamber.

Bore/Gauge and Chamber Length

Shotgun cartridges are designated by bore (UK) or gauge (USA), and by cartridge length. The most common is the 12 bore with a cartridge length of 2¾" (70mm). Shotgun cartridges are available in .410, 28 bore, 16 bore, 20 bore, 12 bore, 10 bore and even larger 8 and 5 bores (for duck).

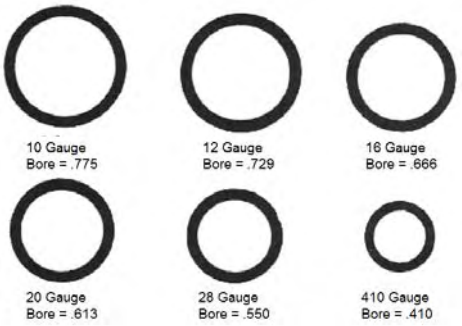


Figure 6.5: Shotgun Bore Sizes

The bore size is derived from the number of spheres of pure lead to a pound (1lb/453.59g) that will precisely fit the bore. For the 12 bore this is 12 spheres with the actual bore being .729in (18.52mm).

The length of the shotgun chamber is defined in inches or millimetres. The popular 12 bore chamber length is 2¾" (70mm). The chamber length is important. Although shooting a shorter cartridge (say a 2½in in a 2¾in chamber) is not dangerous, placing too long a cartridge (say a 3in in a 2¾in chamber) can lead to excess gas pressure due to insufficient space for the cartridge to open.

Shotgun Pellets

Shotgun pellets can be made of bismuth, lead, Molyshot, steel, tin or zinc. The choice and size of shot depends on a number of factors: a) gauge of the gun, b) the type of target (or game) shooting, c) desired shot pattern, d) the range, and e) the sensitivity of the shooter to recoil. For a given shotgun gauge, the size of shot may be given in millimetres or can also be a number.

For clay pigeon shooting, the ISSF place restrictions on the pellets used in competitions. These include: case length after firing must not exceed 70mm, shot charge must not exceed 24.5g, pellets must be made of lead or lead alloy, and pellets must not exceed 2.6 mm in diameter.

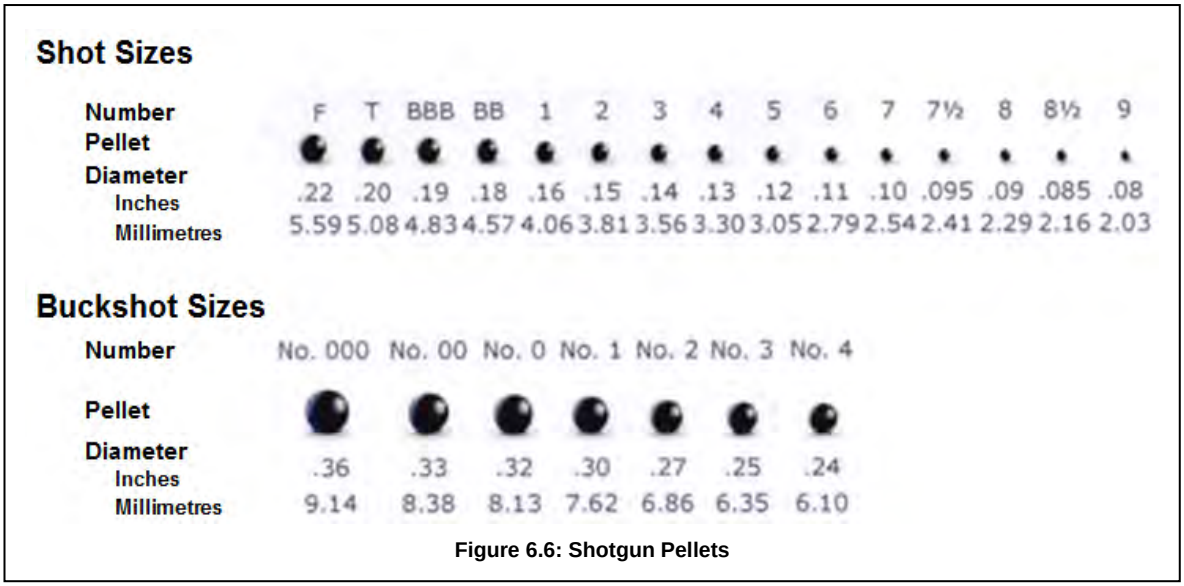


Figure 6.6: Shotgun Pellets

Choke

Finally we look at barrel choke. The choke controls how much shot will hit in a certain area at different ranges.

- **Cylinder choke** - is an un-constricted barrel. The shot pattern spreads quickly.
- **Improved Cylinder choke** - has a slight constriction. It allows the shot pattern to spread fairly quickly.
- **Quarter choke** - has a minor constriction. It allows the shot pattern to spread fairly quickly.
- **Half or Modified choke** - has moderate constriction, allowing the shot to stay together longer, making the pattern denser and more useful at longer ranges.
- **Three-quarter choke** - has tighter constriction, with the shot holding together even longer.
- **Full choke** - has tight constriction, with the shot holding together even longer, for even denser patterns at long range.

6.6 Shotgun Selection

Although it is clearly possible to shoot clays and game with the same shotgun, over the years shotguns (especially over-and-under) have been developed for the individual disciplines, such as Trap, Skeet and Sporting clays, and Game shooting:

- **Trap guns** – trap targets fly away from the shooter, therefore for sighting trap guns have a stock with a higher comb (like a Monte Carlo) set parallel to the rib, with fixed chokes and the guns are usually heavier than other types.
- **Skeet guns** – skeet targets are fast, rising and then descending, and shot at close range. This favours a lighter gun, quick to swing and short barrels (e.g. 28” or less), with Cylinder or Skeet chokes.
- **Sporting (clays) guns** – clay targets literally fly in all directions, so a multi-purpose gun combining elements of the other types of shotgun and with interchangeable chokes.
- **Game guns** – these are usually carried long distances and therefore lightweight side-by-sides or lighter over-and-unders are favoured.

6.7 Further Information

[1]. Wikipedia, the free encyclopedia, http://en.wikipedia.org/wiki/Shotguns, *overview of shotgun actions.*

[2]. A. E. Hartink, “The Complete Encyclopedia of Hunting Rifles,” Rebo Publishers (2004), ISBN-10: 0785818901, *don’t be put off by the title its really an encyclopedia of shotguns*.

[3]. Peter Blakeley, “Successful Shotgunning”, Stackpole (2003), ISBN-10: 0811700429

6.8 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation British International Clay Target Shooting Federation Telephone 01483 485400 Address BICTSF, PO Box 1500, Brookwood, Surrey. GU24 0NP Email secretary@bictsf.com Web site www.bictsf.com	**Organisation** Clay Pigeon Shooting Association Telephone 01483 485400 Address CPSA, Bisley Camp, Brookwood, Woking, Surrey. GU24 0NP Email info@cpsa.co.uk Web site www.cpsa.co.uk
Organisation Scottish Clay Target Association Telephone 01738 710041 Address SCTA Ltd., PO Box 7588, Perth PH1 4WD Email janice.clerk@scta.co.uk Web site www.scta.co.uk	**Organisation** Welsh Clay Target Shooting Association Telephone 07751 353020 (Phone after 6PM only please) Address Glanyrhafon, Caersws, Powys SY17 5SA Email wctsa.membership@hotmail.com Web site www.wctsa.co.uk
Organisation Ulster Clay Pigeon Shooting Association Telephone 028 25898 075 Address UCPSA, 60 Shankbridge Road, Ballymena, Co Antrim, BT42 3DL Email ucpsasec@hotmail.com Web site www.ucpsa.com	**Organisation** Irish Clay Pigeon Shooting Association Telephone 00 353 (0)87 2988030 Address PO Box 33, Athlone, Co. Westmeath, Ireland Email icpsa@eircom.net Web site www.icpsa.ie

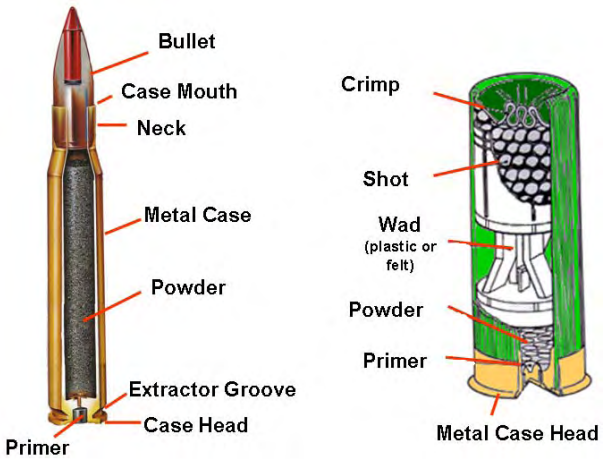
Chapter 7

Cartridges and Bullets

As your shooting improves you will naturally start to experiment with different cartridges to match your firearm and the distance you at which you shoot, to get optimum performance. It is great fun but also addictive, and eventually leads you into loading your own ammunition and using ballistic calculator software. In this chapter we look principally at rifle and pistol ammunition.

7.1 Ammunition Basics

Figure 7.1 shows both a rifle/pistol cartridge and for completeness a shotgun cartridge/shotshell. A rifle or pistol cartridge comprises the bullet, propellant powder and the primer in a metallic case. The primer is a small charge of impact-sensitive chemical material, located either in a cap in the centre of case head (centrefire ammunition) or in the rim (rimfire ammunition).



a) Rifle (centrefire) b) Shotgun (shotshell)

Figure 7.1: Cartridges

When the trigger is pulled, the firing pin is driven into the primer, which in turn ignites the powder. Burning gases from the powder expand the case to form a seal against the chamber wall. The bullet or shot is then propelled down the barrel. When the breech is opened the cartridge case is gripped by the extractor and pulled out of the chamber.

7.2 Cartridges

Cartridges are specified in terms of calibre (e.g. .22LR, .308" or 7.62mm), overall length, bullet weight in grains, muzzle velocity, muzzle energy, the type of bullet (e.g. BTHP – boat tail, hollow point), and whether centrefire or rimfire. For example, the standard Fullbore Target Rifle (TR) cartridge, 7.62 x 51mm, the 7.62mm refers to the diameter of the lands in the barrel (the raised helical grooves in rifled gun barrels) and a case length of 51mm, a bullet weight of 155 grains, a muzzle velocity of around 2900 feet per second (884 metres per second), and a muzzle energy of around 3900-4000 Joules.

Cases

Cartridge cases are typically designated by the style of the head. Figure 7.2 shows the common types, which include: a) rimmed (ex. .22LR, 7.62x39mm Russian), b) semi-rimed (ex. .25 ACP, .38 Super), c) belted with a bulge where the head joins the body (e.g. .300 Winchester), d) rimless where the head is the same diameter as the case (e.g. 7.62 NATO, 9mm Para) and e) rebated (e.g. .284 Winchester) where the case head is below case diameter.

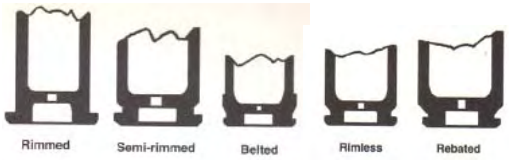


Figure 7.2: Cartridge Case Types

Primers

Primers (as illustrated by Figure 7.3) subdivide into: Rimfire and Centerfire, with centerfire being further subdivided into Boxer and Berdan type primers. Boxer, the most widely used centrefire primer, employs what is called a self-contained anvil with the primer having a single flash hole in the centre that uses the explosion of the primer to

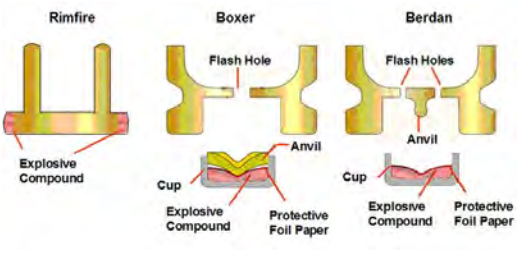


Figure 7.3: Cartridge Case Primers

ignite the main powder charge. All US and most European commercial cartridges use Boxer primers, and Boxer primers are normally used for hand loading.

Berdan primers (still used in the UK and Europe) have an integral anvil in the in the primer pocket in the case head with two flash holes (one on either side of the anvil). Their disadvantage is that conventional US reloading dies cannot decap cases.

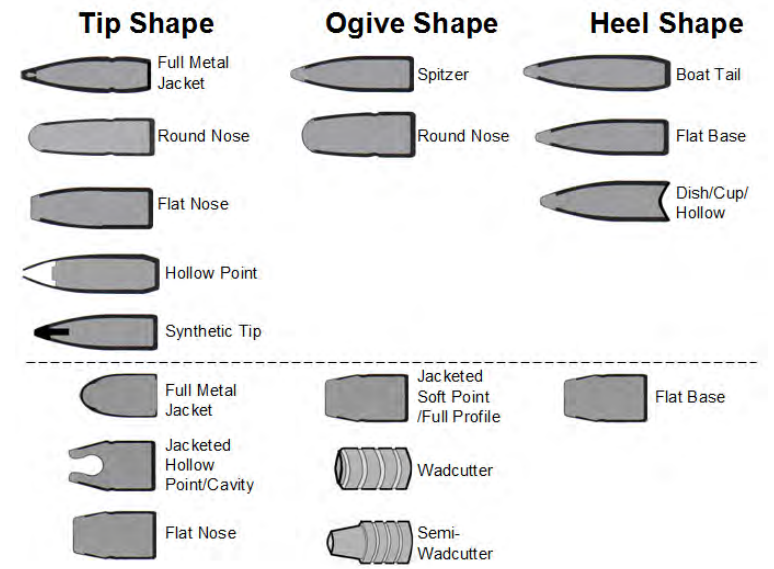


Figure 7.4: Rifle and Pistol Bullet Types

Calibres and Headstamp

A cartridge's calibre is identified by its Headstamp.

A cartridge case needs to fit perfectly into the chamber of the firearm, and seal the firing chamber in all directions except down the bore. Firing the wrong size cartridge in a firearm is incredibly dangerous, and can cause the firearm to explode. So it's important to match exactly the cartridge and firearm calibre. For example, while the 5.56x45 mm and .223 cartridges are considered the same by most shooters, they are not identical. Military cases are made from thicker brass than commercial cases, which reduces the powder capacity (an important consideration for hand loaders), and the military specification allows a higher chamber pressure.

There are basically three cartridge designation systems:

- **American** – this comprises the bullet diameter (in hundredth of an inch), followed by the number of grains of powder, plus the originating company. For example, .44/40 Winchester.
- **British** – this system designates the case diameter and case length. For example, .577/3".
- **European (Metric)** – this system (the most widespread) uses two or more fields defining the bore diameter in millimetres and case length, plus additional designations. For example, 5.56x45mm NATO.

Cartridges are identified by their **Headstamp**, the markings on the base of the cartridge case. Cartridges intended for sporting or civilian use typically have two elements: one identified the calibre and the other the manufacturer who originally developed the calibre. Military cartridges may have anywhere from one to five elements including the calibre, date and place of manufacture, plus other identifying markings. Worldwide there are over 400 commercial headstamps and over 800 military headstamps that have existed at various times.

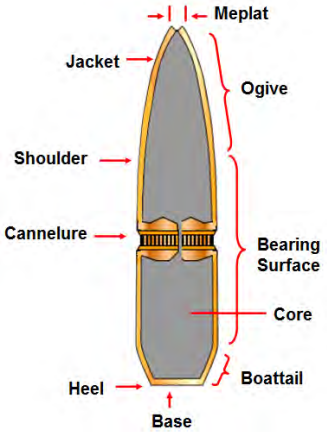


Figure 7.5: Bullet Terminology

7.3 Bullets

Next we look at bullet design. Bullets can be optimised for a range of ballistic properties: maximum range, minimum crosswind sensitivity, minimum drop, and maximum retained kinetic energy, or minimum dispersion and maximum penetration. However, a bullet optimised for one parameter is often a poor solution for another parameter. The principal terms for describing a bullet are shown in Figure 7.5.

In terms of ballistics the important features are the Ogive shape, the Tip/Meplat shape and the Heel/Base shape:

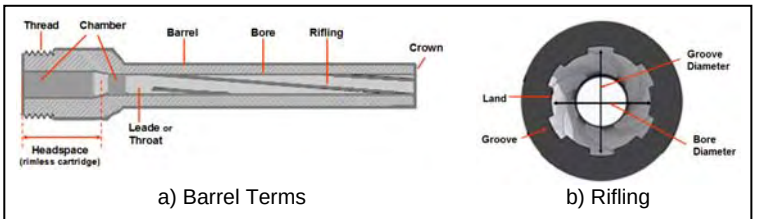
- **Tip shape** – the main tip styles are the so-called full metal jacket, soft point and hollow point.
- **Ogive shape** – this defines the curvature of the bullet, with the main types being the Spitzer used in centerfire bullets, the round nose and wadcutter used with pistol calibre ammunition.
- **Heel shape** – the heel or base shape subdivides into flat base and so-called Boat tail.

For supersonic velocities, the Spitzer (German for 'pointed'), Hollow Point, Boat Tail bullets have a better aerodynamic shape than a Round-nosed or Flat-nosed bullet. The latter are considered to be good close-range designs.

7.4 Barrels

Modern firearm barrels are typically made of ordinance steel (e.g. Chrome Moly or Stainless Steel), which is made to withstand the pressures created by the rapidly expanding gases of the cartridge as well as resist corrosion. A rifle gets its name – obviously - from the presence of spiral grooves in the bore called 'rifling', that spin the bullet, thereby increasing the rifle's range and accuracy [1].

Figure 7.6 shows the important barrel terms:



a) Barrel Terms b) Rifling

Figure 7.6: Rifled Barrel Terms

- **Thread** – attaches the barrel to the action; common types are Mauser and Remington 700.
- **Chamber** – holds the cartridge.
- **Leade/Throat/Forcing cone** – is where the bullet is located prior to firing.
- **Bore** – is the inside of the barrel.
- **Rifling** – are the grooves and lands that spin the bullet.
- **Twist** - the rate of twist of the rifling, expressed as one turn in so many inches (i.e. 1 in 12"), is designed to stabilise the range of bullets normally used in a particular calibre.
- **Crown** – is the end of the muzzle.

7.5 Powders

Smokeless 'nitro' propellant consists of nitrocellulose (single-base powders), frequently combined with up to 50 percent nitro-glycerine (double-base powders), and sometimes nitro-glycerine and nitro guanidine (triple-base). The two main types of nitro powder used in rifle cartridges are:

- **Extruded** – used in most high quality or competition ammunition. The powder looks like little rods or tubes. Burning rate is controlled by composition, grain diameter and length, web thickness, and deterrent coating.
- **Ball** – used in most military ammunition, since it is inexpensive to make and easy to machine load. The power looks like tiny ball bearings. All ball powder is double base and burning rate is determined by chemical composition, grain size, and deterrent coating.

7.6 Ballistics

Next we include a brief discussion of ballistics. There are three types of ballistics: a) **Internal** – what happens inside the firearm barrel and is of concern to the hand loader; b) **External** – what happens during flight and is of concern to all shooters; and c) **Terminal** – what happens inside the target, interesting to hunters. We will limit ourselves to External ballistics.

New shooters are often surprised at the amount of land behind the firing range; called the range danger area. Although you may be firing a 7.62mm bullet at a target 1,000 yards away, if the bullet passes over the butts it may continue on for a further 2½ miles (4km). Even the little .22LR can travel 2 miles (3km).

Understanding external ballistics, simply involves being familiar with a few fundamental concepts. These include (see Figure 7.7):

- **Line of Sight (LOS)** – a straight line from the shooter (or the sights) to the target.
- **Line of Departure (LOD)** – the line through the centre of the bore, at which the bullet is launched.
- **Bullet Path** – the arc of trajectory of the bullet relative to the LOS, during flight.

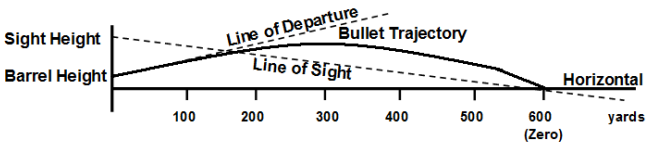


Figure 7.7: Ballistic Trajectory

- **Drop** – the actual drop of the bullet relative to the LOD.
- **Elevation** – the vertical setting of the sights above the horizontal plane that sets the LOD. Gravity imparts a downward acceleration on the projectile, causing it to drop from the line of sight, and the air resistance decelerates the projectile with a force proportional to the square of the velocity.
- **Windage** – the horizontal deflection of the bullet to the right or left cause by the wind.
- **Ballistic Coefficient (BC)** – once a bullet is fired, its trajectory is determined by its velocity, shape and weight. The so-called ballistic coefficient is a measure of a bullet's ability to overcome air resistance in flight. A bullet with a high BC will travel farther than one with a low BC.

7.7 Ballistic Software

As you become increasingly serious (some would say addicted) about improving your shooting, you will probably want to know more about the ballistic properties of the available ammunition, especially if you are hand loading. Here ballistic software can be invaluable, and fortunately there are a number of computer programs available, some of which are free for downloading from the Web [5, 6]. The popular 6mmbr.com has an article (www.6mmbr.com/ballistics.html) on free software. Ammunition manufacturers such as Remington, Federal and Winchester provide free ballistics software for their ammunition, and many of the specialist handloading companies such as Sierra and Barnes, offer sophisticated software products.

7.8 Further Information

[1]. Wikipedia, the free encyclopedia, http://en.wikipedia.org/wiki/, *contains a number of articles on cartridges, rifling and ballistics.*

[2]. FirearmsID.com, "Introduction to Forensic Firearm Identification," www.firearmsid.com/A_bulletIDrifling.htm, *source of information on ballistics*

[3]. Steven Boelter, "Rifleman's Guide to Rimfire Ammunition", Zediker Publishing (2007), ISBN-10: B000NJKFM6.

[4]. Geoffrey Kolbe, "The making of a Rifle Barrel," www.border-barrels.com/articles/bmart.htm, *excellent article by Border Barrels*

[5]. 6mmbr.com, "Ballistics – a review of ballistic software", www.6mmbr.com/ballistics.html

[6]. Sniper country web site, (www.snipercountry.com/ballistics/index.html), *list of available ballistic software*.

7.9 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation Eley Ltd Telephone +44 (0)121 313 4567 Address Minworth Industrial Estate, Minworth, Sutton Coldfield, B76 1BA Email http://www.eley.co.uk/about-eley/contact-us.aspx Web site www.eley.co.uk	**Organisation** HPS TR Ltd. Telephone +44 (0)1452 729888 Address PO Box 308, Gloucester South, England, GL2 2YF Email info@hps-tr.com Web site www.hps-tr.com
Organisation ROF Radway Green Web site http://en.wikipedia.org/wiki/ROF_Radway_Green	

Chapter 8

Black Powder Firearms: Muzzle Loaders and Breech Loaders

Black powder is the name commonly applied to gunpowder, the standard propellant and explosive used until the latter part of the 19th century. In recent years, black powder musket, rifle, pistol and shotgun shooting has become highly popular worldwide. Broadly, black powder firearms divide into:

- **Muzzleloaders** – those muskets, rifles, pistols and shotguns loaded with loose powder and bullet or shot from the muzzle.
- **Percussion Revolvers -** pistols with revolving chambers that are loaded with loose powder, ball and cap.
- **Black Powder Cartridge Firearms** – breech loading firearms that are loaded with cartridges containing black powder.

8.1 Black Powder Basics

In terms of propellants, shooters can choose between traditional black powder and various black powder substitutes, such as Pyrodex.

Black Powder

Black powder is formed from a blend of natural ingredients: sulphur, potassium nitrate and charcoal. Good quality black powder will produce consistent and accurate results with firearms intended for its use. Examples of common black powder brands include Goex (USA), WANO (Germany) and Swiss Black Powder (Switzerland).

Black Powder Substitutes

Pyrodex is the most common black powder substitute. BP substitutes evolved because of a desire primarily from the US hunting market to have a propellant suitable for muzzle loading firearms that could move more easily from manufacturer to wholesaler to dealer to customer without having to go through the same shipping regulations required of commercial explosives.

New Replacement Powders

These propellants are carbon-burning (sugar based) propellants, rather than being based on sulphur and charcoal, and in fact are more modern than nitrocellulose-based powders. Examples include Triple Seven and Goex Clear Shot. (Note in most competitions black powder substitute/replacement powders are not permitted, only factory made black powder being allowed.)

Black powder is available in various granule sizes, with the finer powder burning at faster rates than the coarser grades. The finest grades rapidly generate high pressures and are generally only suitable for use as priming powder in flintlocks.

The widely available Swiss black powder is graded from 1 to 5, with number 1 being the finest and number 5 being the coarsest grade. An alternative system typically used with US manufactured powders has an ‘F’ grading: Fg (coarse grain), FFg (medium grain), FFFg (fine grain), FFFFg (extra fine grain). It should also be noted that similarly graded powder from different manufacturers can exhibit different characteristics.

Choice of powder will depend on the firearm to be used. For the novice, guidance should be provided during the probationary period of club membership and further advice may be sought from

a) BP Musket (historic) b) BP Rifle (modern)

Figure 8.1: Black Powder Muzzleloader Firearms

experienced shooters.

Black powder requires careful handling and has specific storage requirements. Requirements for storage are published by the Health and Safety Executive (HSE) in their Approved Code of Practice (ACOP), “Manufacture and Storage of Explosives Regulations 2005.” During the probationary period of a shooting club membership, such matters as the safe handling and storage of shooters powders are explained.

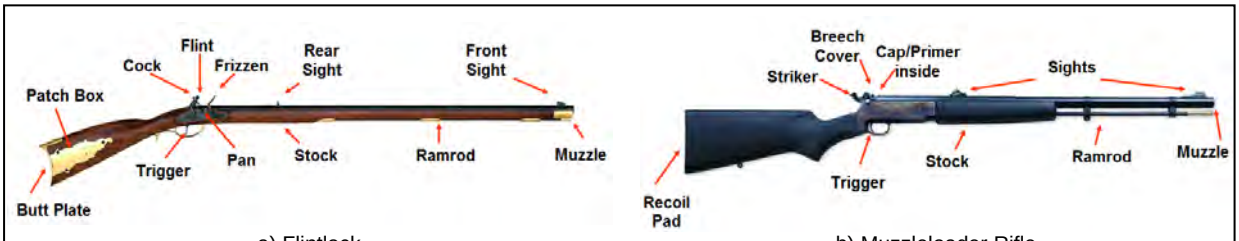
8.2 Black Powder Firearms

At a basic level, black powder firearms can be differentiated by the type of:

- **Firearms** – muskets, rifles, pistols and shotguns. Pistols are a generic term and cover all types of hand gun from matchlocks to revolvers.
- **Barrels** - *smoothbore* muskets, pistols and shotguns, and *rifled* rifles and pistols.
- **Loading** – *muzzleloaders* with separate powder and bullet or shot inserted in the barrel through the muzzle, and *breechloaders* that use black powder filled cartridges.

8.3 Muzzle Loaders

Shooting with muzzle loaders is conducted with a) original period firearms, b) reproductions of original firearms and c) modern purpose-designed muzzleloaders. The modern design muzzle loaders are seldom seen in the UK, largely being developed for the US hunting market where there are special hunting seasons for muzzle loading firearms. There are very few target shooting competitions held in the UK in which such firearms are eligible for use.



a) Flintlock b) Muzzleloader Rifle

Figure 8.2: Muzzleloader Firearms

Firearms

The use of muzzle loading muskets, rifles, pistols and shotguns spanned several centuries and included both military and sporting use. As such there is great choice available to suit today’s shooter’s interest and budget.

- **Muskets and Rifles** – Smooth-bore military muskets, such as the flintlock 'Brown Bess', and more exotic items such as the Japanese matchlock are generally fired at 50 metres; sporting British and European rifles and the American long rifle firing a patched round ball are used at 50 and 100 metres; while military rifles are used at distances out to 600 yards and specially developed percussion target rifles of the 1860 -1880 period are shot out to 1,200 yards.
- **Pistols** – muzzle-loading pistols are popular due to a prolific selection of well-made reproduction firearms including matchlock, flintlock and percussion target pistols and percussion revolvers. These are fired at 25 metres and, on occasion, at longer distances.
- **Shotguns** – muzzle-loading shotguns comprise both flintlock and percussion single and double barrel, as well as wildfowling pieces. These guns are used in competition in down-the-line and sporting clay pigeon events; the sporting events also often cater for breech loading black powder shotguns.

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feedback to p.treleaven@cs.ucl.ac.uk

Loading Equipment

A variety of accessories are necessary for the loading and servicing of the muzzle loading firearm. These include:

- **Powder Flask or Horn** – container with integral measure for dispensing a powder charge for a musket, rifle, pistol or shotgun. As a safety precaution and for consistent results many shooters prefer to load their powder from containers or measures holding only a single charge.
- **Flintlock Priming Tool** – a low volume flask for dispensing a small quantity of priming powder e.g. FFFFg) into the pan of the flintlock.
- **Ramrod** – the rod used to drive home the bullet (or shot) onto the powder charge. Ramrods may also be used for cleaning the bore after shooting and some have a threaded end for attaching cleaning accessories. More typically separate cleaning rods are used.
- **Cleaning accessories** – muzzleloaders require a range of jags and bore brushes for cleaning, although the task is not onerous. In addition specialist screws and worms are necessary in the eventuality that stuck balls or patches may need extracting.
- **Supplies** – the black powder, the round or conical bullets or shot, patches, match cord, flints and percussion caps.

Loading Steps

Muzzle loading, in general, follows the sequence of:

- *Step 1* Safety – check that the barrel is unloaded using a ramrod with an 'empty' mark; especially important for double barrel shotguns.
- *Step 2* Powder – a measured amount of black powder or BP substitute is inserted in the muzzle as loose powder.
- *Step 3* Wadding – wadding is made from felt, cloth or card. In rifles and single shot pistols firing round ball, a lubricated patch of fabric is wrapped around the base of the ball to grip the rifling and to make a seal between the ball and the barrel. When shooting flat based cylindrical bullets a card wad is loaded between powder and bullet. Hollow based conical bullets do not require any form of wadding. In shotguns, wadding is placed in before and after the shot or ball.
- *Step 4* Projectile – the projectile is next placed in the muzzle end of the barrel. Traditional projectiles are made from lead and typically comprise a solid ball, a flat based cylindrical bullet or a hollow based conical bullet (a Minie bullet), or loose shot. The modern design muzzle loader may also fire a jacketed bullet in a plastic sabot.
- *Step 5* Ramrod - a ramrod is next used to push the wadding and projectile down to ensure they are firmly seated onto the propellant charge leaving no air gap between powder and projectile. Patched round balls are typically tight fitting and the ram rod should be suitably robust.
- *Step 6* Vent Hole – clear vent hole with pick, if necessary.
- *Step 7* Prime – for a percussion lock muzzleloader, place a cap on the nipple; for flintlocks, pour powder into pan and close frizzen.

To improve accuracy muzzleloaders' bores are often cleaned (called 'swabbing' or 'wiping out') before reloading so there is no residue left in the barrel. Note that some competition rules do not permit cleaning between shots. If in doubt consult the event organiser.

8.4 Percussion Black Powder (or Cap 'n' Ball) Revolver

By far the most widely used percussion black powder revolvers are those of mid 19th century American pattern. Although there are a wide variety of British revolvers of the period, modern reproductions are almost exclusively of American arms.

Firearms

Shown on the right is a typical replica black powder revolver.

Figure 8.3: Black Powder Revolver.

Loading Equipment

- **Powder Flask or Horn** – a container with integral measure for dispensing the required powder charge for each chamber of the revolver. As a safety precaution and for consistent accuracy today many shooters prefer to load their powder from containers or measures holding only a single charge.
- **Supplies** – the black powder, the round or conical bullets, filler or wads and percussion caps.

Loading Steps

Basic loading steps are:

- *Step 1* Initial Cleaning – before firing the revolver it is important to remove all oil from the vent of the nipple by inserting a percussion cap on each nipple and firing it to ensure a free passage. The chambers can also be wiped out to remove any oil.
- *Step 2* Powder Charge – place a correctly measured powder charge in each chamber.
- *Step 3* Filler/Wadding – To ensure that there is no air gap between powder and ball, insert an inert filler such as Semolina or ground corn or a lubricated wad between the powder and ball.
- *Step 4* Bullet – insert a round or conical bullet in the mouth of one chamber at a time, and push home using the revolver's built-in loading rod.
- *Step 5* Lubricant – placing a dab of lubricant over the bullet after it is seated in the chamber will help continuous shooting by softening the fouling and also reduces the chance of 'chain fire'.
- *Step 6* Capping – place a percussion cap over each nipple. A capping tool can make this task easier than pushing the cap on to the nipple using your fingers.

8.5 Black Powder Cartridge Firearms

Black powder cartridge firearms are becoming increasingly popular due to Silhouette target shooting and Cowboy Action shooting.
Although many participants handload their own black powder cartridges, there are a significant number of commercial cartridges available. Popular calibres are .32 calibre, .38 calibre, .44 calibre, .45 calibre.

Firearms

Black powder cartridges cover all types of firearms: rifles, pistols and shotguns.

- **Rifles** – in general there are two types of black powder cartridge rifle commonly available, the single-shot breechloader and the lever-action repeater. Reproductions of British black powder breech loading rifles are not commonly available, although original arms such as the Snider and Martini-Henry can still be fairly readily found. By far the most shooting is undertaken with reproductions of American breechloaders such as the Remington rolling block and the Sharps and Ballard falling block rifles.
- **Pistols** – many 'old-time' black powder revolvers are offered as replicas. Examples include the Colt Peace Maker and the 45 Colt.
- **Shotguns** – there are still a large number of original black powder shotguns around. Subject to suitable safety checks these original guns can give great pleasure in the field or on the clay pigeon ground. They are also used in Cowboy Action Shooting.

Loading Equipment

Here we briefly list the materials used to hand load black powder cartridges.

- **The Case** – plenty of new black powder cases are available which should be used in preference to attempting to re-use original cases,
- **Load Density** – it is important not to have any air space in a black powder cartridge and any gap between powder and bullet must be occupied with an inert filler.
- **Primers** – use an appropriate black powder primer.
- **Bullets** – pure lead or lead/tin alloy bullets are usually used for black powder cartridge firearms.
- **Lubricating Discs** – a lubricating disc may be inserted between the powder and bullet both to provide lubrication for the bore and eliminate air space.

Loading Steps

An introduction to Handloading modern nitro powder cartridge is given in Chapter 55. Here we briefly explain black powder handloading:

- *Step 1* Deprime – knock out the spent primer from the case.
- *Step 2* Resizing – next resize the case in a correct size die.
- *Step 3* Trim Case – trim the case to the required length if necessary.
- *Step 4* Chamfer Case – the mouth of the case is 'bedevilled', using a de burring tool to cut away a little metal.
- *Step 5* Belling – next a die is used to slightly open the case mouth to accept the bullet.
- *Step 6* Re prime – a new primer is then installed.
- *Step 7* Powder Charge – next the correct volumetric powder load is inserted in the primed case.
- *Step 8* Lubricating Disc – a single lubricating disc may be inserted on top of the powder.
- *Step 9* Seat Bullet – a bullet is inserted in the case mouth, and the case is run up into the pre-set bullet seating die.

Further details of Black Powder hand loading can be found in the references.

8.6 Further Information

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[3]. Russ Castain, "How to Load a Cap & Ball Black Powder Revolver", About.com, http://hunting.about.com/od/blackpowder/l/aa_loadcbrev_a.htm

[4]. Derek Fuller, "The Definitive Guide to Shooting Muzzle Pistols", The Crowood Press (2002), ISBN 1861264828.

[5]. Long Range Muzzle Loader, www.lrml.org, *UK based forum and resource for this challenging discipline*.

[6]. Muzzle Loaders Association of Great Britain (MLAGB), www.mlagb.com, *The Governing Body for muzzle loading within the UK.*

[7]. The Muzzle-Loading Associations International Committee (MLAIC), www.mlaic.org, *World Governing Body for muzzle loading shooting.*

[8]. Historical Breechloading Smallarms Association (HBSA), www.hbsa-uk.org.

8.7 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation Muzzle Loaders Association of GB (MLAGB) Telephone 01926 458198 Address 7 Olympus Court, Tachbrook Park, Warwick CV34 6RZ Email membership@mlagb.com Web site www.mlagb.com	**Organisation** Historical Breechloading Smallarms Association (HBSA) Address BCM HBSA, LONDON WC1N 3XX Email secretary@hbsa-uk.org Web site www.hbsa-uk.org

Chapter 9

Airguns - pellets, BBs and Airsoft

An airgun is a pneumatic gun which fires projectiles using compressed air, CO2, spring-loaded piston or other high pressure gas as a propellant.

9.1 Airgun Basics

Airgun power sources or propulsion broadly divides into three groups: Pneumatic, CO2 and Spring-piston.

a) Pre-Charged Pneumatic b) Single-Stroke Pneumatic c) CO2 d) Spring-piston

Figure 9.1: Airgun (target air pistol) Propulsion

- **Pneumatic (compressed air)** – these are powered by compressed air from a cylinder attached to the airgun. The type of pneumatic is determined by the way you get the compressed air into the airgun:
  - Pre-charged Pneumatic – with PCP, the airgun's cylinder (or reservoir) is charged with compressed air from an external compressed air source (e.g. a Scuba tank), or by an electric compressor or by using a hand-pump. This is the most common form of airgun population.
  - Single-stroke Pneumatic – as the name implies, a single-stroke of the cocking level charges a built-in compressed air cylinder. This type of population was popular with high-end target airguns; the low power gives reduced recoil and hence improved accuracy.
  - Multi-stroke Pneumatic – the multi-stroke requires between 2-10 strokes of the cocking level to obtain the required pressure.

- **CO2** – as the name implies, Carbon Dioxide airguns are powered either by charging the airgun's built-in reservoir from an external tank, or using a disposable cartridge inserted into the airgun. CO2 propulsion is used both to power mass-produced 'cheap' airguns as well as precision target airguns.
  - External CO2 Tank – as described above, the airgun's reservoir is filled or charged by decanted CO2 from a 'bulk' tank.
  - 12 gram Cartridge – disposable CO2 cartridges (sparklets) are a popular form of propulsion for air pistols with the cylinder being inserted into the pistol grip.

  CO2 powered airguns, although generally easy to cock and with low recoil, are highly accurate at room temperature. However they are susceptible to temperature variations that can affect the point of impact, and may need to stabilise before using in a competition.

- **Spring-piston** – these airguns operate by means of a spring-loaded piston. Charging or 'breaking' the airgun involves moving the piston backwards within the receiver at the same time it compresses a powerful spring behind the piston. The trigger mechanism clicks into a notch in the piston, holding it under tension until released. (Dry-firing a spring-piston airgun without a pellet in the breech should be avoided as the piston head smashes into the receiver.)

  Spring-piston airguns subdivide into:
  - Barrel-Break – here the barrel is swung down to cock the piston, a pellet is placed into the breech and the barrel is swung back into position. When the trigger mechanism releases the piston, a column of air is forced into the base of the pellet driving it down the barrel.

- Lever Cocking – alternative methods of charging the spring-piston, include cocking an under-lever, side-lever or top-lever. However, inside the airguns operate in basically the same as the barrel-break mechanism.

Firing Mechanism

Figure 9.2 illustrates the basic firing mechanism for a pneumatic (pre-charged) airgun.

When the gun is cocked the hammer is pulled back and the trigger sear engages. When the trigger is pulled the hammer is released and travels forward striking the Firing valve and allowing air to flow past through the Transfer port and into the barrel. The air then drives the pellet forward, after which a spring closes the valve.

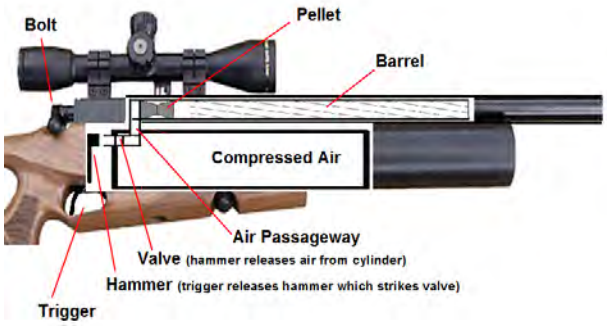

Figure 9.2: Airgun Firing Mechanism (pneumatic)

Spring-piston airguns operate by means of a coiled spring-loaded piston contained in a pressure chamber. Cocking the airgun causes the piston to be compressed until it engages a sear. When the trigger is pulled the sear is released, causing the piston to be driven forward by the spring, and the expanding column of air propels the pellet down the barrel.

9.2 Air Rifles and Pistols

Broadly airguns used in competitions divide into: a) target air rifles and air pistols shot at static 'bullseye' targets over fixed distances, b) so-called Practical air pistols (often accurate replicas of centrefire pistols) used on simulated police or military courses of fire, and c) Field Target Air Rifles used on outdoor simulated 'field sports' courses of fire.

a)Target Air Rifles (match) b) Target Air Pistols c) Field Target Air Rifle

Figure 9.3: Air Rifles and Pistols

Target Air Rifles

Target air rifles are .177" (4.5mm) calibre, usually pre-charged pneumatics, with aperture sights, and are fired at static targets designated by the ISSF. In particular, target air rifles are used in so-called three position competitions, requiring the stock to be adjustable for prone, kneeling and standing stances.

Target Air Pistols

Target air pistols are .177" (4.5mm) calibre and typically pre-charged pneumatics with iron sights, shot standing at 10m static targets.

Field Target (FT) Air Rifles

Field target air rifles of .177" (4.5mm) and .22 (5.5mm and 5.6mm) calibres are equipped with precision telescopic sights and competitions involve courses of fire that simulate field-hunting conditions. Although there is no restriction to .22 (5.5mm and 5.6mm) calibres, the more accurate and efficient .177" calibre is almost solely used.

Practical Air Pistols

Practical pistols are replicas of centrefire pistols that fire pellets and are usually powered by small 12-gram CO2 disposable cartridges. Competitions typically simulate a military or law enforcement scenario with competitors following a course of fire.

Airsoft Rifles and Pistols

Airsoft rifles and pistols are also highly realistic replicas of military and law enforcement firearms (e.g. M16, Glock), but fire plastic balls.

9.3 Airgun Ammunition

There are three types of airgun ammunition: lead pellets, BBs and Airsoft plastic balls

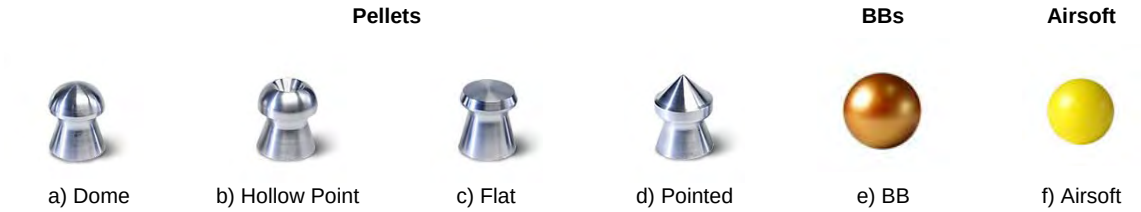

Figure 9.4: Airgun Ammunition

Pellets

There are four basic types of lead 'diabolo' pellet used in rifled airguns. They are: dome, hollow point, flat and pointed. The traditional dome is popular in field target, and the flat is used extensively in static target shooting, as it punches nice clean holes in targets.

BBs

BB guns are a type of airgun designed to fire spherical projectiles, called BBs, after the Birdshot pellet of approximately the same size. BB guns usually have a smoothbore barrel, with a bore diameter and calibre of 0.177" (4.5 mm). BBs are usually steel, plated either with zinc or copper to resist corrosion, and measure 0.171 to 0.173 inches (4.34 mm to 4.39 mm) in diameter.

Airsoft

Airsoft guns - often referred to as BB guns or pellet guns - shoot spherical projectiles with a smoothbore barrel. However, Airsoft BBs are 5.98mm to 6 mm in diameter (0.24"), are made of plastic or other non-metallic materials, and are designed specifically to be non-lethal.

9.4 Pellet Calibre and Selection

Pellet airguns are most commonly found in two calibres [1]:

- **.177" (4.5mm)** – the most common calibre for target shooting with a flat trajectory.
- **.22" (5.5mm or 5.6mm)** – a popular calibre for hunting small game.

In the UK, conventional airguns do not require a firearm certificate if their muzzle energy is at or below a designated limit. For an air pistol this is 6 ft/lbs, and for an air rifle it is 12 ft/lbs.

9.5 Airgun Accuracy

Finally, a few words on airgun ballistics and accuracy. Pellet airguns have rifling just like rifles and Pistols, and like them each airgun will exhibit differences for a range of pellets. This can depend on the twist rate, the choke of the barrel, the crown, the pellet to barrel fit, pellet stability, etc. Each airgun varies in the way it handles different pellet types. So get advice from the experts and then off to the range with a selection of pellets and see which ones your airgun likes.

9.6 Further Information

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[2]. Wikipedia, the free encyclopedia, http://en.wikipedia.org/wiki/Airsoft_Pellets, *overview of Airsoft pellets*.

[3]. American Airguns – airgun, calibre and selection, www.airguns.net/general_regulators.php, *good description of the operation of an airgun.*

[4]. Q. Cobham, “Air Rifle and Air Pistol Maintenance and Repair”, Mini-Maxi publications (2006) ISBN: 9780955313103.

9.7 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation National Smallbore Rifle Association Telephone 01483 485505 Address Bisley Camp, Brookwood, Surrey GU24 0NP Email info@nsra.co.uk Web site www.nsra.co.uk	**Organisation** The British Field Target Association Address BFTA, P.O Box 2242, Reading, Berks RG7 5YY Email Secretary@BFTA.net Web site www.bfta.net
Organisation United Kingdom Association for Hunter Field Target Email info@ukahft.co.uk Web site www.ukahft.co.uk	

Chapter 10

Iron and Optical Sights

The term ‘sight’ refers to any system used to assist the aiming of a firearm. Although we talk about iron and telescopic sights, there are a number of different categories: a) open iron sights as on pistols and shotguns, b) aperture iron sights found on target rifles, c) shotgun beads, d) telescopic rifle sights, e) red dot on pistols and gallery rifles, and f) laser sights on military and law enforcement firearms.

Broadly aiming systems subdivide into iron sights and optical sights, and these in turn divide into:

- **Iron sights** - any open, unmagnified aiming system, consisting of some form of notch or aperture in the rear sights and a post, bead or ring in the front sight [1].
  - Open sights – comprising a post or bead on a post for a front sight and a notch or U for the rear sight.
  - Aperture sights – a rear sight of a firearm consisting of an adjustable eyepiece with a small opening through which the front sight and the target are aligned.
  - Beads – a ‘bead’ is a metal or fibre optic stud on the muzzle-end of a shotgun or pistol.
- **Optical Sights** – comprises lens and a reticle that appears to place a sight image on the target.
  - Telescopic sights – commonly referred to as a ‘scope’, is an optical magnification sighting system that gives an accurate point of aim using the cross-hairs, called the reticle.
  - Dot sights – non-magnifying (1-power) optical sights that uses refractive or reflective optics to generate an image such as a red dot or cross that appears to be projected onto the target.
  - Laser sights – project a light point onto the target; common red-lasers are primarily for short-range, low-light-level (i.e. nearly dark) situations.

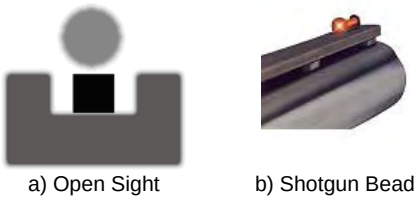
10.1 Iron Sights

As introduced, the term iron sights refer to an open, unmagnified aiming system, consisting of some form of notch or aperture as the rear sights and a post, bead or ring as the front sight (see Figure 10.1). Iron sights provide a horizontal and vertical reference point for the shooter to align with the target. Once the sights are correctly aligned with each other, and the elevation adjusted for the distance to the target, they should place the firearm at a precise angle to the line of sight of the target.

Iron sights used for target shooting are designed to be adjustable to match the ballistics of the cartridge, the distance to the target (elevation) and the strength and direction of the wind (windage).

Open Sights

Open sights [1] generally comprise a square post or bead-on-a-post for a front sight and a notch or U for the rear sight. When aiming, the post and bead is positioned in the rear sight notch, with the target centred above the bead.



a) Open Sight b) Shotgun Bead

Figure 10.1: Open Sights

Aperture Sights

Modern Smallbore and Fullbore target rifles use precision target aperture sights, as shown in Figure 10.2. The Rearsight is attached to the action and has vernier scale adjustments for elevation and windage. The Foresight in Figure 10.2b fits on the muzzle. The example shown is adjustable so the Sight can be moved up and down in the mounting bracket. Using an adjustable Foresight helps maintain the head-eye position.

a) Rearsight b) Front/Foresight

Figure 10.2: Aperture Sights *(RPA)*

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Aperture sights range from target aperture sights that use a disk with an adjustable pinhole-size aperture, to so-called *ghost ring* sights, whose thin ring blurs to near invisible [1]. Many rifles from the late 1800s use historic aperture sights, called a tang sight or also referred to as a 'ladder' sight.

Shotgun Beads

Beads, such as shotgun beads, are used for peripheral vision for open moving targets, with the front sight formed by the bead and the rear sight by the shooter's eye. Fibre optic sights are becoming increasingly popular for shotguns and also certain pistols, because they greatly increase the brightness of the bead by collecting more light.

10.2 Optical Sights

As illustrated in Figure 10.3, besides telescopic sights there is a range of high-tech optical sighting devices, including red-dot, Bushnell's holosight, and laser sights that can be fitted to rifles and pistols.

a) Telescopic Sight b) Dot Sight b) Laser sight

Figure 10.3: Optical Sights

Telescopic Sights or Scopes

Telescopic sights magnify the target image and are classified in terms of the magnification, tube size and the size of the objective lens. In general the larger the objective lens, the more light is captured and the larger the field of view.

Figure 10.4: Telescopic Sight

As shown in Figure 10.4, the principal parts are: the eye or ocular lens, the elevation and windage turret adjustments, and the objective lens and bell.

Scopes either have a fixed magnification or a variable magnification. Fixed power scopes are expressed in terms of magnification x objective lens (e.g. 9x40mm) and variable power scopes in terms of minimum magnification – maximum magnification x objective lens (e.g. 3-9x40mm). Besides the elevation and windage adjustments, scopes may also have an adjustable objective (AO) or a side focus adjustment on the saddle. Further details on scopes are given below.

Dot Sights and Holosights

Red-dot sights and holosights are 1-power optical sights (offering no magnification) that appear to project a red dot or cross onto the target. The red-dot sight system is quite simple, comprising a concave lens with a thin metallic coating that reflects red light but transmits other colours, and a diode that projects light on to the lens. The red dot appears to be projected out to a point at infinity, which makes the image of the reticle appear to the user to be projected onto the target [3, 5].

Figure 10.5: Red-dot Sight Principles

Laser Sights

A laser sight is a small, usually visible-light, laser placed on a rifle or pistol, aligned to emit a beam parallel to the barrel and appears as a small spot on the target. The actual usable distance of a civilian laser sight is typically 100-150 yards (and then often in semi-dark conditions) because beyond this distance the dot size becomes so large that the error variance is no longer practical.

The two basic types are: a) **Red lasers** that can only be used at short distances in diminished lighting, and b) **Green lasers** that use green diode pumped solid state lasers that can be seen in daylight. Most laser sights use a red laser diode, with the military and law enforcement using green lasers. Others use an infrared diode to produce a dot invisible to the naked human eye but detectable with night vision devices.

10.3 Sight Adjustment

Moving the sights, obviously, changes the point of impact of the bullet. However, the ammunition (bullet weight and powder) you use in your rifle or pistol can also have a dramatic affect on the point of impact. So when you get a new firearm take it to the range, set the firearm up on a rest or sand bag (to minimise movement) then 'zero' the sights to a fixed target at the required distance; for example, 25 yards (pistols), 50 yards (.22lr rifles) and 100 yards (centrefire rifles). It's a good idea to fire 5-10 shots at a time to get an average point of impact, then adjust the elevation or windage, and fire another 5-10 shots.

Once your have zeroed the sights it is then interesting (and fun) to fire batches of ammunition from different manufacturers to see the affect on the diameter of your groups. With one particular .223 centrefire rifle with a 1:8 twist, I was able to go from 6-inch (15cm) diameter groups at 100 yards (91m) with 55-grain bullets to ½-inch (13mm) groups with 77grain bullets.

Minutes of Angles (MOA)

Perhaps the most important concept in sight adjustment is the 'minute of angle' (MOA). Each 'click' of the adjustment moves the sights through a fixed angular displacement. However for the novice it is probably easier to think in distance rather angle, with 1MOA moving the point of impact of the bullet approximately one inch at 100 yards. Thus a novice shooter can re-adjust his or her firearm sights by estimating the distance in inches the bullet hole is from the desired impact point and adjusting the sights that many MOA in the same direction. Most target sights designed for long distances are adjustable in quarter (¼) or eighth (⅛) MOA "clicks". Thus one eighth MOA is equal to approximately an eighth of an inch at 100 yards or one inch at 800 yards.

Related to MOA in shooting is the concept of a 'Group'; the pattern/area on a target caused by a series of shots at a given distance. A group is the measure of the intrinsic accuracy of the rifle, ammunition and shooter in combination. For example, the group accuracy may be expressed as 1 MOA; one inch at 100 yards.

Adjustable sights

Rifles and pistols for target shooting have adjustable sights providing separate turrets or screws to adjust the horizontal or *windage*, and the vertical or *elevation*. These adjustments are independent, so the elevation can be adjusted without affecting the windage, and vice versa.

a) Non-adjustable b) Screws (iron) c) Knob (aperture) b) Dials (scope) e) Target Turrets (scope)

Figure 10.6: Sight Adjustments

- **Screws** – tightening or loosening the elevation and windage screws adjusts iron sights.
- **Dials** – sights with screw dials are similar to target turrets, but provide a slot adjusted for a screwdriver or small coin. This form of sight adjustment is often found on hunting scopes and red dot sights.
- **Turrets/Knobs** – sights for target rifles are usually fitted with finger-adjustable turrets with dials marked 'up' for elevation and 'right' for windage. Each audible 'click' of the turret moves the corresponding elevation or windage ¼ (or ⅛) minute of angle (i.e. ¼ inch at 100 yards).
- **Non-adjustable sights** - even non-adjustable sights can often be 'adjusted'. For example, dovetailed sights can be adjusted for windage by tapping the sight to the left or right in the dovetail using a brass or plastic headed hammer; likewise bead sights can be adjusted for elevation by replacing the bead with an equivalent higher or lower bead.

10.4 Target Aperture Sights

Most Smallbore and Fullbore target rifles use aperture (iron) sights.

Figure 10.6: Rear Aperture Sight

Basic Terms

The rear aperture target sight consists of a large disk with a small, adjustable hole in the centre and the front sight typically being a ring. The rear sight comprises an adjustable eyepiece, an elevation knob and corresponding vernier scale, and a windage knob and vernier scale. The elevation and windage knobs are capable of finely graduated adjustments, moving the sights vertically and horizontally in quarter (¼) or eighth (⅛) MOA with each click of the knob.

As mentioned, the foresight is usually a ring (or tube) on an adjustable post.

Aperture Sight Types

The aperture sight picture comprises the large outer ring formed by the rear sight, the inner ring of the foresight, and the target at the centre [1].

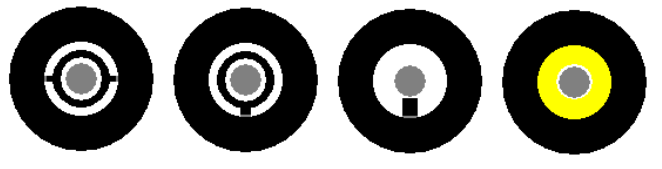


Figure 10.7: Aperture Sight Picture

The most common foresight is the ring (shown in Figure 10.7a), with the choice of size of the foresight ring being determined by the shooter's eyes. To assist sight alignment, some shooters believe that the amount of light around the (inner) foresight ring should be reasonably narrow, while others believe it should be wide.

Sight Adjustments

Aperture target sights work with vernier scales for elevation and windage on the rear sight. Each vernier scale consists of a moving and fixed scale (see Figure 10.8), each click of the knob will move the scale one quarter (¼) or eighth (⅛) MOA, depending on the design.

Each scale comprises two parts:

- **Main scale** (fixed) – this scale has a 0 (zero) line and <u>four</u> divisions each corresponding to 5 minutes of angle (5, 10, 15, 20, 25, 30 …).
- **Vernier scale** (moving) – the corresponding vernier scale has a 0 (zero) and five divisions (1, 2, 3, 4, 5).

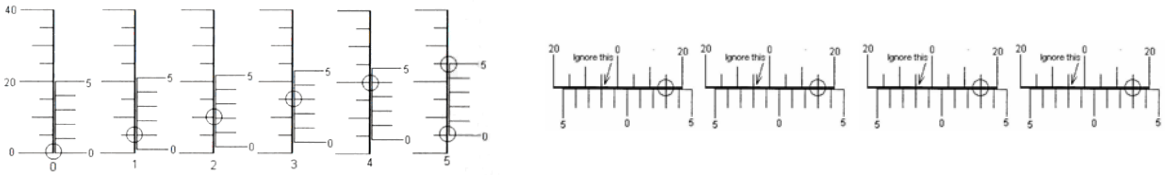


Figure 10.8: Elevation and Windage Vernier Scales *(NRA UK)*

If each click of the aperture sight knob moves the vernier scale ¼ (one-quarter) MOA, then four 'clicks' clearly are needed to move from (0) zero to 1 (one).

Elevation

Reading the Elevation scale is relatively straightforward. To learn simply click the elevation up and note the correspondence of the Vernier and Main scales. As illustrated by Figure 10.8a, when the 1 on the Vernier is level with the 5 on the Main scale, the elevation has been raised 1 MOA. To read the MOA: look at the position of the 0 on the Vernier and note the corresponding value on the Main scale. Then look for correspondence between the Vernier and Main scale (see Figure 10.8a).

Windage

The Windage scale is slightly harder to read, because it can move right or left of the zero. The golden rule is to only read the side of the scale from which the wind is blowing. Figure 10.8b illustrates a wind blowing from the right.

10.5 Telescopic Sights

Telescopic sights or scopes come in a variety of configurations, and with a variety of crosshairs (or reticles). In this section we discuss the basic scope terms and then look at some of the available scopes [3]. Two pieces of advice: firstly expect to pay almost as much for your scope as your firearm (it's a false economy to put a £100 scope on a £1,000 rifle), and secondly seek the views of experienced club members on the best scope and reticle for your chosen shooting discipline.

Basic Terms

When you look at scopes you will be amazed at the number of models available and the vast range of prices. Some of the key variables affecting your choice are:

- **Power** – power expresses magnification as a factor compared to the human eye. As we have seen scopes can be fixed power, such as 32x50 with the object in view being magnified 32 times, or variable power, such as 8-32x50 where the shooter can vary the magnification from 8 times to 32 times.

- **Objective Lens** – the second number listed for scopes (e.g. x50) is the diameter of the objective lens in millimetres. A 50 designation means the lens is 50 millimetres in diameter.

- **Reticle** – commonly known as the 'crosshairs' - because of the standard two thin wires that cross – the reticle is the aiming point within the scope. Typical scope reticles are shown in Figure 10.9, and range from traditional duplex 'crosshairs', to illuminated (ill) duplex, to military-style reticles such as Mil-Dot.

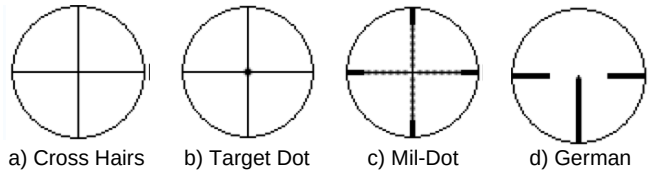


Figure 10.9: Scope Sight Picture

- **Field of View** (FOV) – FOV defines how wide an area (say in feet) can be seen through the scope at 100 yards. The greater the magnification the smaller the FOV. For example a variable power scope (expressed as 6.5-20x50) might have a FOV at 100 yards of 14.3 feet (at 6.5x magnification) and 5.5 feet (at 20x magnification).

- **Exit Pupil** - the exit pupil is the size of the beam of light that leaves the scope. The larger the exit pupil, the brighter the image that will be entering your eye. The exit pupil diameter can be calculated (in millimetres) by dividing the diameter of the objective lens by the power (ex. a 5x50 has an exit pupil of 10mm).

- **Eye Relief** – eye relief is the optimum distance between your shooting eye and the eyepiece of the scope that allows you to clearly see the target image. Outside of this distance the image will blur and disappear. Eye relief will usually be stated as a range, since on a variable power scope the eye relief will vary with the range setting.

Scope Types

A scope's intended usage and the distance to the target determine types. Scopes are typically sold as one of four types: a) target or varmint rifle scopes, b) hunting rifle scopes, c) pistol scopes or d) shotgun scopes.

It goes without saying that the choice of shooting discipline(s) you pursue will clearly determine the choice of scope. If shooting a single discipline at a fixed distance, than a fixed power scope may be ideal. In contrast, if shooting multiple disciplines, at multiple distances and especially if the shots are affected by wind, then you will undoubtedly need a variable power scope with target turrets.

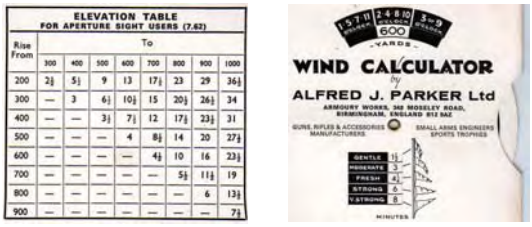
Sight Adjustment

Scopes are also adjustable in Minutes of Angle (MOA), and are calibrated in one quarter (¼) or eighth (⅛) MOA per click.

10.6 Zeroing the Sights

Before using your rifle, for safety, it is essential that you correctly zero the firearm for the new distance and wind conditions. (This is covered in detail in Chapter 53.)

For the popular 7.62x51mm target rifle calibre there are Elevation and Windage tables, as illustrated in Figure 10.10, which give estimates for Elevation and Windage, to at least get you –as they say – on the paper.



a) Elevation table b) Windage table

Figure 10.10: Elevation and Windage Tables

10.7 Further Information

[1]. Wikipedia the Free Encyclopaedia, www.wikipedia.org/wiki/iron_sights, *contains reviews of iron, and aperture sights.*

[2]. Wikipedia the Free Encyclopaedia, www.wikipedia.org/wiki/Telescopic_sight, *contains reviews of telescopic and red dot sights.*

[3]. UK National Rifle Association, "Target Rifle Coaching Course Notes", NRA (1997).

[4]. Clair Rees, "Optics Digest", Safari Press (2005), ISBN-13: 9781571573179.

[5]. 6mmbr, www.6mmbr.com/optics.html, *good review of long-range scopes.*

[6]. John Dreyer, "Facts and Figures about Dot Sights", www.bullseyepistol.com.dotsight.htm

10.8 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation National Smallbore Rifle Association Shop Telephone 01483 485509 Address Lord Roberts Centre, Bisley Camp, Brookwood, Surrey GU24 0NP Email sales@nsra.co.uk Web site www.nsra.co.uk/Shop2/contact.htm	**Organisation** HPS TR Ltd. Telephone +44 (0)1452 729888 Address PO Box 308, Gloucester South, England, GL2 2YF Email info@hps-tr.com Web site www.hps-tr.com

Chapter 11

Clothing, Equipment and Accessories

In your rush of enthusiasm to 'get started' you can easily spend a small fortune on your firearm and shooting equipment, only to find it is totally inappropriate or that in fact you really prefer another shooting discipline that requires different equipment.

And certainly don't turn up at your shooting Club dressed like Rambo or a member of the Special Forces. At the very least you will be the subject of much caustic humour, or more than likely considered a potential danger, and asked to leave. Every club has a dress, equipment and behaviour code, especially when you are shooting in competitions.

11.1 Appropriate Firearm and Sights

The best advice you will be given when taking up a new shooting discipline is to use the Club's equipment for the first 6-9 months, see what firearms and equipment other members are using, take lots of advice, and probably start with inexpensive second hand equipment if you can. For example, a second hand rifle with a good barrel might cost a few hundred pounds, while a new rifle might cost a few thousand and be an expensive mistake.

11.2 Clothing

Many shooting discipline specify the types of clothing that may be used in competitions; from the tight fitting jacket and trousers of the Smallbore target rifle shooter, to the loose shooting vest of the clay pigeon shooter.

a) Target Rifle b) High Power b) Shooting Vest

Figure 11.1: Jackets & Vests

The target rifle jacket used in Smallbore and Fullbore TR locks your torso. To test 'fit', raise and bend your arms, then try and bring your elbows together. The jacket should be tight enough to keep your elbows 10 inches (35cm) apart. The idea is that when you move your arms, the whole upper torso should rotate.

As an illustration of 'acceptable' clothing:

- **Hat** – a hat should afford adequate shade and shelter to eyes and Rearsight.
- **Jacket** – a purpose made jacket made of Cordura/leather that gives support across the back, with padding for the butt, upper arm under the sling, and elbows. Specialist jackets are made for: prone, standing and 3-position target shooting (e.g. AHG Anschutz, Kurt Thune, Sauer), High Power (e.g. Creedmoor Sports) and for Clay Pigeon shooting.
- **Glove** – when using a sling a purpose made Cordura/leather glove may be worn to protect the forward hand from the sling and forward slide swivel or handstop.
- **Wet Weather Clothing** – for wet weather on outdoor ranges a waterproof cape or mackintosh, trousers and boots are required.

11.3 Ear Defenders and Shooting Glasses

All shooting disciplines require you to wear ear defenders or adequate earplugs. Competition shooters also invest in specialist shooting glasses.

Ear Defenders

Hearing protectors come in all shapes and prices, subdividing into Ear Defenders and earplugs. Ear defenders range from cheap models that suppress all sound, to increasingly expensive electronic models, that filter out high-pitch discharges but allow you to hear people speaking.

a) Ear Defenders b) Earplugs

Figure 11.2: Hearing Protectors

Likewise, earplugs range from cheap disposable or soft rubber inserts, to expensive custom-made devices that distinguish between firearm discharges and low-level background noise.

Shooting Glasses

Eyeglasses for shooting either improve optics or provide eye protection. Target rifle shooters, especially Smallbore, often use specially made eyeglasses, with adjustable lens, nosepiece and an opaque shield for the non-dominant eye.

a) Target Rifle b) Clay Pigeon

Figure 11.3: Eyeglasses

In contrast, Black powder and Clay pigeon shooters wear eyeglasses that provide better visibility (cf. sunglasses) and also protection from dust and discharge.

11.4 Slings, Rests and Bipods

Depending on your shooting discipline, there are a massive range of slings, rests, sand bags, mono-pods and bi-pods.

a) Rifle Sling b) Front Rest c) 'Harris' Bipod d) Shooting Sticks

Figure 11.4: Slings and Rests

As a taster, Figure 11.4 shows a typical target rifle sling, an adjustable front rest used by F-Class and Benchrest shooters, a so-called Harris-type bipod mounted on the fore-end of the rifle, and shooting sticks used in field sports.

Slings

The sling is an essential piece of equipment in most rifle shooting disciplines: Fullbore, Smallbore, High Power, Practical and Service rifle. Its purpose is to support the rifle with minimal muscular effort, giving the shooter a solid shooting platform. Slings come in a variety of styles and materials; such as Cordura, leather or cotton webbing. Slings loop around the upper arm and attach to the forend with a hook or bolt. Target slings need to be tight and so usually have a wide cuff where the loop goes around the upper arm, to reduce pinching and circulation loss [1].

Rests and Sandbags

Rests and sandbags are popular for long-distance prone shooting, Benchrest shooting, and also for zeroing a rifle. The front rest (illustrated in Figure 11.4b) is engineered to allow the height to be precisely adjusted, and a variety of rest 'tops' are available for the different shooting disciplines.

In contrast, the 'sandbag' or rear rest is a leather, suede or Cordura bag filled with sand. During shooting the height of the rear rest is varied by squeezing the bag with the non-trigger hand.

Bipods and Shooting Sticks

Bipods are two-legged devices that attach to the rifle forend and function as a portable rest. There are two basic types (see Figure 11.4): the Harris-type bipods that are attached to the front stud, and Shooting sticks for sporting rifle that can be monopods, bipods, or tripods.

Good bipods are adjustable for height and canting. Bipods must always be attached to the rifle stock, never the actual barrel, since it would affect the barrel's vibration and cause a shift in the point of impact of the bullets. With shooting sticks, it is good practice to rest the rifle forend in the palm of the hand, and the hand on the top of the shooting stick.

11.5 Mats, Spotting Scopes & Scorebook

Other pieces of equipment you will need for many target rifle disciplines are: a) a waterproof shooting mat, with a non-slip surface at the front for your elbows, b) a high-powered spotting scope, with a 60-80mm lens if you shoot out to 1,000 yards, and lastly c) a scorebook. Because the scorebook is so important for target shooting, Chapter 17 is devoted to its use.

a) Shooting Mat b) Spotting Scope

Figure 11.5: Mats and Spotting Scopes

11.6 Gun cases, Sleeves & Range Bags

To protect your firearms and other shooting equipment in transit you will need hard or soft gun cases, and also a range bag to carry your ammunition, scorebook and any tools.

a) Gun case b) Gun Sleeves c) Range Bag

Figure 11.6: Cases and Bags

As a word of warning, airlines are notorious in the shooting community for damaging rifles and shotguns in transit. So if you are planning to shoot abroad in competitions, you will need super-strong aluminium cases. For taking weapons to the range a hard plastic or soft gun case is suitable.

Lastly, you should get a range bag to carry all your accessories. The two basic types are: firstly the so-called Bisley design (see Figure 11.6c) that doubles as a shelter for your scorebook during shooting, and secondly a standard hold-all (ideally with internal dividers).

11.7 Cleaning Equipment

Finally, you will need a set of rods, brushes and jags, plus solvents, oils and greases for cleaning your firearm. Every shooter has their favourite set of cleaning procedures and equipment. So Chapter 54 covers cleaning of rifles, pistols and shotguns in detail.

11.8 Further Information

[1]. Glen D. Zediker, "Slings and Things", Zediker Publishing (2007).

[2]. National Rifle Association (UK), "The NRA Rules of Shooting and Programme of the Imperial Meeting Bisley", (2007).

[3]. National Rifle Association (USA), "Competition Rules", www.nrahq.org/compete/

[4]. International Shooting Sports Federation (ISSF), "Rules", www.issf-shooting.org/rules/english/rules.asp

[5]. Sinclair International, www.sinclairintl.com, *US catalogue specialising in rifle target shooting supplies and equipment.*

[6]. MidwayUSA/UK, www.midwayuk.com, *comprehensive US and UK catalogue of shooting supplies and equipment.*

[7]. Edinkillie Sporting Services, Online Catalogue, www.edinkillie.co.uk, *UK catalogue specialising in target shooting equipment.*

[8]. Neal Johnson Gunsmithing Inc., Online Catalog, www.nealjguns.com, *US catalogue specialising in target shooting equipment.*

11.9 Contacts

Clothing, equipment and accessories are highly specialised. Therefore it is recommended to ask fellow club members for advice on where they purchase their equipment.

Organisation National Smallbore Rifle Association Shop Telephone 01483 485509 Address Lord Roberts Centre, Bisley Camp, Brookwood, Surrey GU24 0NP Email sales@nsra.co.uk Web site www.nsra.co.uk/Shop2/contact.htm	**Organisation** Sinclair International Telephone +1 260-493-1858 Address 2330 Wayne Haven St., Fort Wayne, IN 46803 Email support@sinclairintl.com Web site www.sinclairintl.com
Organisation Midway UK Telephone 0845 22 66 055 Address P.O.Box 4300, Warwick CV34 9BR Email sales@midwayuk.com Web site www.midwayuk.com	**Organisation** HPS TR Ltd. Telephone +44 (0)1452 729888 Address PO Box 308, Gloucester South, England, GL2 2YF Email info@hps-tr.com Web site www.hps-tr.com
Organisation Edinkillie Sport Services Ltd. Telephone 01324 711747 Address PO Box 21615, FALKIRK FK1 2YW, Scotland, UK Email info@edinkillie.co.uk Web site www.edinkillie.co.uk	**Organisation** Intershoot Ltd. Address PO Box 86, Omagh, BT78 9AQ Email http://www.intershoot.co.uk/cgi-bin/mf000003.pl?ACTION=SHOWFORM Web site www.intershoot.co.uk

Part C – Target Rifle Disciplines

Summary

Target rifle disciplines are typically shot with precision bolt-action target rifles at bullseye targets, using either single-shot rifles with aperture sights and supported by a sling; or magazine rifles with telescopic sights and supported by rests. Ranges can be outdoors from 100 yards to1000 yards, or indoors for Smallbore and Air Rifle.

Chapter 12 - Fullbore Target Rifle

Fullbore Target Rifle (TR) involves prone single shot precision shooting using aperture iron sights at 'round bull' targets at distances from 300 to 1200 yards, with each shot carefully scored and analysed. The standard calibre is 7.62mm x 51, with a 155-grain bullet.

Chapter 13 – High Power Rifle

High Power shooting comprises: a) **Match rifles** - custom-made bolt action, magazine rifles; and b) **Service rifles** - generally unmodified M1, M14, M16 or AR15. All shooting is done with metallic aperture, or peep, iron sights. A typical competition comprises 3-4 courses each of twenty shots at distances of 200, 300, and 600 yards, shot standing, seated and prone, respectively.

Chapter 14 - Smallbore Target Rifle – Standard (prone), 3 Position (Match)

Smallbore Rifle shooting is carried out using .22LR single shot rifles specially designed for target shooting with aperture 'iron' sights. Smallbore is practiced indoors at 25 yards and occasionally at 15, or 20 yards, and outdoors at 50 yards, 50 metres or 100 yards. The International Shooting Sports Federation (ISSF) recognises two international competitions: a) Prone – competitions comprise 60 shots prone at 50m; and b) 3 Position – competitions comprise 3 x 40 shots (Men), and 3 x 20 shots (Women) shot, respectively, prone, standing, kneeling at 50m.

Chapter 15 - International 300m Rifle

The International 300m Rifle discipline is fired at only one distance (i.e. 300 metres), but the rifle may be 'Standard' or 'Free' and in any calibre up to 8mm. Matches may be prone only, or prone, standing and kneeling (PSK), and are shot from a covered firing point.

Chapter 16 - F-Class Rifle

F ('Farquarson') Class, or F-Class is shot prone with any Fullbore target rifle, but shooters can use a variety of aids, such as telescopic sights, bipods, front-rests and sandbags, and any calibre of ammunition up to 8mm.

Chapter 17 - Benchrest Rifle

Benchrest shooting is a sport in which very accurate rifles are shot at targets from a bench with rests, and from a sitting position. Shooters typically use single shot custom rifles with heavy stainless steel barrels, and handmade stocks of graphite, fibreglass, or carbon fibre. Popular ammunition is the 6mm PPC and the Remington BR line of cartridges.

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Chapter 18 – Rimfire and Air Rifle Benchrest

Rimfire and air rifle Benchrest as the name suggests is shooting from a bench using both front and rear rests using highly accurate .22LR Rimfire rifles or Air rifles of .177, .20 or .22 calibre. Rimfire Benchrest is shot at 50 meters (or 50 yards in the US) and 25 yards in the UK, with as many sighting shots taken as required during the 30 minute match. Air rifle Benchrest is shot at 25 yards.

Chapter 19 - Match Rifle

Match Rifle is usually fired with the 7.62mm cartridge, at long distances from 1000 to 1200 yards, and is popular with UK and Commonwealth shooters. Telescopic sights and hand loaded ammunition are used, and the specification for rifles and the firing positions allowed are more open. Whilst the majority of shooters shoot prone, a few still adopt the 'supine' position, reclining on their backs feet pointing towards the target.

Chapter 20 – Target Air Rifle – 10m and 3-Position

Target Air Rifle is highly popular worldwide, and comprises the ISSF 10m Air Rifle and the US 3 Position Air Rifle. 10m Air Rifle is governed by the ISSF and included in the Olympics, and is shot over a distance of 10 metres from a standing position, unsupported. 3-Position Air Rifle is very popular in the US, South Africa and Germany. The current events available in the UK are Sporter (Standing and 3P) and Precision (3P) Air Rifle disciplines.

Other Disciplines

In the target rifle category, an entry-level discipline, popular in the United States, is the Light Rifle competition.

- **Light Rifle** – the US NRA Light Rifle competition rules allow any ‘light’ .22LR hunting rifle weighing less than 8½ lbs (3.9kg) using iron or telescopic sights and with any action type (e.g. bolt-action, slide-action, lever-action or self-loading). Light rifle matches may be fired indoors or outdoors, at any distance, and any stance (i.e. standing, prone or 3 position).

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Chapter 12

Fullbore Target Rifle

Fullbore Target Rifle (TR) evolved as a British and Commonwealth shooting discipline from Service rifle (SR) shooting in the 1960s, and is governed in the UK by the rules of the National Rifle Association of Great Britain. A few non-Commonwealth countries, most notably Germany and USA, also participate. Most countries have their own governing bodies that set national rules. The International Confederation of Fullbore Rifle Associations (ICFRA) produces a standardised rule set that has been adopted by some countries.

TR involves prone shooting using a sling for support, at 'round bull' targets at distances from 300 to 1000 yards and very occasionally longer distances, with each shot being carefully scored and analysed. The rifles used are single shot, typically 7.62x51mm NATO calibre, with aperture 'iron' sights fully adjustable for elevation and windage.

Fullbore TR events are staged at the Commonwealth Games, but not at the Olympics..

Figure 12.1: Fullbore Target Rifle *(Alan Keating)*

12.1 Rifles and Ammunition

The NRA-UK [1] states that any conventional bolt-action rifle conforming to the following can be used for TR:

- **Rifle** - the rifle and its components must be commercially available.
- **Weight** - it must have a maximum weight of 6.5kg (14.32 lbs).
- **Calibre** – it must fire either standard 7.62x51mm NATO, .308 Winchester commercial cartridges, .303 MK 7 military cartridges, 5.56x45mm military cartridges, or .223 Winchester commercial cartridges.
- **Ammunition** - during the UK Imperial Meeting at Bisley in July, only 7.62 x 51mm or .308" Winchester ammunition may be used, with ammunition being supplied by the NRA. In most other competitions, competitors supply their own ammunition.
- **Trigger Pull** – a rifle must have a minimum trigger pressure of 1.5kg (3.307 lbs).
- **Stock and Butt** – most configurations of butt stocks are allowed, with a restriction on the depth of curvature of the butt plate.
- **Sights** – most makes of aperture rear sight, adjustable for windage and elevation, and foresight are permitted. There are strict rules limiting the use of magnifying lenses, and many competitors use no magnification at all.

Figure 12.2: Fullbore Rifle *(RPA)*

Rifles are usually custom-made using actions such as the Barnard, Musgrave, Swing, RPA and Shilen – all specialist designs specifically for target shooting.

12.2 Ranges and Targets

As stated above, TR is shot prone at static bull's eye targets on outdoor ranges at distances of 300 to 1000 yards. Some ranges are measured in metres. The targets at distances up to 600 metres are sized roughly in proportion to the distance – the 600 yard target is about 2¼ times the size of the 300 yard target. At 800 yards and greater the same target is used at all distances; a board 10 ft x 6 ft, with the 'bull' being 2 ft across and the black aiming mark 4 ft across.

On all targets there are six scoring areas, from the 'bull' scoring 5 to the 'hit' scoring 1. Inside the 'bull' is a smaller ring (the V-bull) that acts as a tie-break when scores are level for all positions. The strength and direction of the wind plays a big part in TR. Even a gentle breeze will blow the shot out of the 'bull'. Wind flags are positioned at regular intervals down the range to assist the shooter in gauging the wind, and hence the correct setting of the windage on the rear sight.

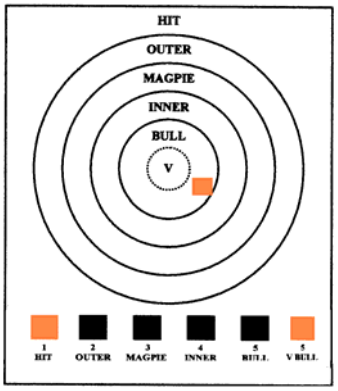

Figure 12.3: Fullbore Target Marking

After each shot competitors use a telescope to check the position and value of their shot. The target is pulled down into a pit, where the operator places a score 'panel' along the bottom of the target to show the value. The position of the shot on the target is shown by inserting an orange 'spotting disk' into the shot hole using a pin. The target is pushed up into view for the shooters to note the score and fire the next shot.

In the UK, two or three shooters use a single target in turn, and keep each others' score. In some countries, notably Australia, competitors fire singly and the shooter who has just finished keeps score for the next to fire.

12.3 Equipment

Fullbore rifles are precision single shot, bolt-action rifles with aperture 'iron' sights, with suppliers being small companies or one-man businesses who will effectively hand-build your rifle.

The next essential piece of equipment is a sling to steady the rifle. The sling is a leather, cloth or plastic strap placed around one upper arm and attached near the front of the rifle stock. The sling must not exceed 50mm (2") in width or 6mm (¼") in thickness. Other equipment includes a good spotting scope with stand, a shooting glove, specialist shooting jacket, plus a hat to shield the eyes, a mat and ear defenders. The shooting jacket is equipped with elbow, shoulder and sling pads that contribute to the shooter's comfort. Since there are several styles of shooting jackets of varying cost, the shooter is advised to try out several before making an investment. In addition, you will need a scorebook and a pencil/pen to record and analyse your scores.

12.4 Competitions

There are a wide range of TR competitions, from Club level, through County and Home Country, to International and World Championships.

Individual Competitions

A typical TR competition comprises multiple distances, with two sighting shots and ten or fifteen shots to count at each distance. There will be prizes for each separate shoot, but the main prizes will be for the Grand Aggregate (the total score in all the shoots that everyone entering completes).

The most prestigious individual competition is undoubtedly Her Majesty the Queen's Prize, shot in three stages at Bisley during the annual Imperial Meeting of the NRA. The winner is carried shoulder high from the range to the prize-giving, and then carried around the entire Camp, a distance of over a mile, involving visits to fourteen clubhouses, on a celebratory tour.

Team Competitions

Team competitions vary from club and county matches to International matches. Team sizes vary from 4 to 30, and wind coaches are normally allowed in addition to the shooters.

Touring teams typically have up to 20 members, to support teams of 12 firers, and will include dedicated coaches to direct the shooters on sight settings for wind during the matches.

Commonwealth Games

The firing distances for Commonwealth Games events are 300, 500, 600, 900 and 1,000 yards. On the first day, seven shots are fired at each of 300, 500 and 600 yards. On the second day, the same distances are used but with 10 shots at each. The final day's competition is 15 shots at each of 900 and 1000 yards. At the Commonwealth Games, shooters compete in both singles and pairs competitions. In the Pairs Match the other member of the pair acts as coach providing information on wind direction and speed, then roles are reversed to complete the shoot.

World Championships

Every 4 years (in the year after the Commonwealth Games), the World Long-Range Target Rifle Championships are held. Although there is an individual event for the title of World Long-Range Champion, the primary event is the World Long-Range Team Championship for the Palma Trophy. The modern competition is for a team of 16 firers, 2 reserves, 4 target coaches, a central coach, a Captain, Adjutant and Armourer – a total of 26. The competition lasts two days, with each competitor firing fifteen shots to count at 800, 900 and 1000 yards on each day. The target has a 20" diameter bull, scoring 10, and the larger rings are closely spaced, making this a most difficult event.

USA Palma Match

In the USA, TR is most commonly shot at 800-1000 yards. These competitions are also known as Palma competitions [2] but are not connected with the TR World Championship match for the Palma Trophy. The Palma Match course of fire is 15 shots at 800 yards, 15 shots at 900 yards, and 15 shots at 1000 yards. Unlimited sighters precede the 800-yard stage, and two sighters preceding each of the 900 and 1000-yard stages, with each stage shot in 20 minutes.

12.5 Help & Advice

[1]. National Rifle Association of the UK, "Bisley Bible - Rules of Shooting and Programme for the Imperial Meeting Bisley" (published each year).

[2]. Palma Promotions, www.palma.org, *the Official US Palma organisation*.

[3]. P F Hicks, "UK NRA Target Rifle Coaching Course Notes", National Rifle Association of the UK (2003).

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[5]. Clive R E Halnan, "Shooting Sport Technique and Practice", Canberra Publishing & Printing, *wonderful book but difficult to find*.

[6]. Harry Thompson, "A Guide to Target Rifle Shooting", (available from Fultons and Norman Clarke etc.), *good introduction to Fullbore.*

[7]. Desmond Burke, "Canadian Bisley Shooting: An Art and Science", Oakville (1970).

12.6 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation National Rifle Association of the UK Telephone 01483 797777 Address Bisley Camp, Brookwood, Woking, Surrey GU24 0PB Email info@nra.org.uk Web site www.nra.org.uk	**Organisation** National Rifle Association of Ireland Address NRA of Ireland, Leabeg, Blueball, Tullamore, Co Offaly, Ireland Email info@nrai.ie Web site www.nrai.ie

Chapter 13

High Power Rifle

High Power (or Highpower) is the major Fullbore shooting discipline in the United States, and is increasing in popularity in the United Kingdom and Europe. High Power shooting mainly comprises Match Rifle and Service Rifle.

Figure 13.1: High Power

- **Match rifles** - are fully customisable bolt action, magazine or stripper clip fed rifles often built on a Winchester or Remington bolt-action repeater. Also available are more specialist rifles such as the Tubb 2000 designed from the outset for High Power rifle competition. Calibres are restricted to .30 or less with many shooters using .308 Winchester or a variety of 6mm calibres.

- **Service rifles** - are generally limited to standard issue military rifles, either the unmodified M1, M14, M16, or their commercial equivalents such as an AR15 or M1A. In order to comply with current legislation in the United Kingdom AR15 or M1A style rifles are restricted to manually operated or "Straight Pull" configuration with no gas operated parts and are thus not semi-automatic. Calibres in common use are .223 Remington or .308 Winchester with some competitors choosing to shoot classic bolt action European Service Rifles in .303 British or 7.92 Mauser.

The majority of shooting is done with metallic aperture, or peep, iron sights although a class does exist for rifles fitted with telescopic sights.

There are 4 strings of fire that are the basic building blocks of any NRA-USA high power rifle across the course (XTC) competitions. These are: a) **Slow Fire** (standing) - 10 rounds standing at 200 yards in 10 minutes; b) **Rapid Fire** (sitting) - 10 rounds sitting or kneeling at 200 yards in 60 seconds; c) **Rapid Fire** (prone) - 10 rounds prone at 300 yards in 70 seconds; and d) **Slow Fire** (prone) - 10 rounds prone at 500 or 600 yards in 10 minutes.

13.1 Rifles and Ammunition

As discussed, the NRA-USA recognises two categories: fully customisable Match Rife and standard issue Service Rifle. In the UK the High Power Rifle Association in order to encourage more participation in the sport recognises five categories: Classic Rifle, Veteran Rifle, Service Rifle, Match Rifle and Scoped Rifle. The most commonly competed classes in the United Kingdom are Service Rifle and Match Rifle.

a) Match Rifle - Tubb b) Service Rifle – M16

Figure 13.2: High Power Rifle

Service Rifle

Service rifles such as M1, M16 and their derivatives, fire 7.62x51mm (cf. .308) and 5.56 (i.e. .223) ammunition, typically hand loaded for competition. United Kingdom legislation requires that M1 and M16 style rifles are built from new not to be semi automatic; basically this means that the gas operating parts are either not fitted or permanently blanked and the rifle is manually reloaded between shots. The most commonly used rifle in the United Kingdom is a "Straight Pull" AR15 with a manual cocking handle fitted to the right hand side of the bolt carrier, as shown above.

Match Rifle

Match rifles are so-to-speak designed from the ground up, such as the Tubb 2000 [1] shown in Figure 13.2a, considered the Rolls Royce of High Power rifles but can also be derivatives of the AR15 as shown below. A variety of high-spec ammunition is used in High Power Match rifle such as .308

Winchester, .260 Remington, .243 Winchester, .223 Remington and also the 6mmXC; and typically hand loaded.

In addition, some High Power competitions allow Match Rifle (Open) - any commercial, custom or service rifle of any calibre, fitted with any optical sights, including scopes.

13.2 Ranges and Targets

High Power rifle (similar to Fullbore Target Rifle) is shot on 200, 300 and 600 outdoor ranges, with targets elevated from the Butts or Pits. In:

- Slow-Fire Events – one round is loaded into the rifle at a time, and after firing, the target is pulled down, scored and run back up.
- Rapid-fire Events – the target is run up halfway, and at the command of the Range Conducting Officer, the target is fully elevated for a fixed time. The shooter starting standing adopts the firing position either sitting or prone makes ready and fires, and after the time expires the target is pulled down, scored and run back up.

A large variety of NRA-USA designated targets are used for High Power allowing matches to be at shorter distances if required.

13.3 Equipment

For High Power competitions you ideally need a shooting jacket, sling, glove, hat to shade the eyes, eye and ear protection, a mat and spotting scope. Service rifle shooters are required to use the appropriate 'military' pattern sights and slings but like Match rifle shooters are allowed to use specially designed shooting jackets.

13.4 Competitions

High Power competitions subdivide into: a) **Across the Course (XTC)** – slow and rapid fire shot at 200, 300 and 600 yards; and b) **Mid Range** – slow fire at 300, 500 and 600 yards from the prone position; c) **Long Range** – slow fire mainly at 1000 yards from the prone position

Across the Course (XTC)

XTC comprises four stages:

- First Stage – 2 sighters in 2 minutes, then 20 rounds slow-fire in 20 minutes from the standing position at 200 yards.
- Second Stage – 20 rounds rapid-fire from the sitting position at 200 yards. The shooter begins standing, and when the target appears has 60 seconds to get in the sitting position, fire 5 rounds, reload with either a magazine or from a stripper clip and fire another 5 rounds. AR15 Service rifle shooters are required to fire 2 rounds then reload with 8 rounds.
- Third Stage – 20 rounds rapid-fire at 300 yards. Again, the shooter begins standing, and when the target appears has 70 seconds to get in the sitting position, fire 5 rounds, reload and fire another 5 rounds. AR15 Service rifle shooters are required to fire 2 rounds the reload with 8 rounds.
- Fourth Stage – 2 sighters in 2 minutes, then 20 rounds slow-fire in 20 minutes from the prone position at 600 yards.

Mid Range

A Mid Range Match can consist of shots fired at 3 distances typically 300, 500 and 600 yards or 3 strings of shots fired at a fixed distance again either 300, 500 or 600 yards. The targets used for Mid Range matches are scaled to simulate shooting at 600 yards from whatever distance the firing line is set, all matches are slow fire prone are usually limited to 60 rounds to count with 2 sighting shots at each distance or before each string.

Long Range

A Long Range match is fired at 1,000 yards and fired from the prone position. They usually comprise 80 shot matches consisting of 4 strings of 20 shots for record in 30 minutes. These matches generally allow unlimited sighters.

13.5 Classification System

In High Power Rifle, shooters receive a classification based on their average score: a) Marksman – up to 84%, b) Sharpshooter – up to 89%, c) Expert - up to 94%, d) Master – up to 97%, and d) High Master – 97% and above. This is to encourage participation and allow competitors to set personal goals, therefore Marksmen are competing against fellow Marksmen and not against more experienced and proficient shots holding a Master classification.

13.6 Further Information

[1]. David Tubb, “the Rifle Shooter”, Zediker (2003) ISBN-13: 9780962692529.

[2]. Clint Greenwood, “Getting Started in High Power”, www.shootersjournal.com/Features/ClintHP.htm

[3]. Randolph Constantine, “Modern Highpower Competition”, Precision Shooting Inc. (1998) ISBN-10: 1931220050.

[4]. US NRA, “Getting Started in High Power Rifle Competitions,” www.nrahq.org/compete/HighPower.asp

13.7 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation High Power Rifle Association of the UK Address PO Box 5977, Elsenham, Hertfordshire CM22 6GH Web site www.highpowerrifle.co.uk	

Chapter 14

Smallbore Target Rifle – Prone and 3 Position Shooting

Smallbore Rifle shooting is carried out using .22LR single shot rifles specially designed for target shooting with aperture 'iron' sights. Smallbore is practiced indoors at 25 yards and occasionally at 15, or 20 yards, and outdoors at 50 yards, 50 metres or 100 yards.

The International Shooting Sports Federation (ISSF) recognises two international competitions: a) **Prone** – competitions comprise 60 shots prone at 50m; and b) **3 Position** – competitions comprise 3 x 40 shots (Men), and 3 x 20 shots (Women) shot, respectively, prone, standing, kneeling at 50m.

Prone shooting has the largest following in the UK and is usually the position in which the beginner starts the discipline, unless they have started with 10m Air Rifle, which is shot standing.

Figure 14.1: Smallbore Target Rifle

14.1 Rifles and Ammunition

Smallbore rifles are specially designed bolt-action, single-shot .22LR rifles with aperture sights adjustable for elevation and windage. Smallbore rifles typically have a stock with an adjustable butt plate and cheek piece, and a fore-end with an adjustable handstop to which is attached the sling. Smallbore rifles can have either a single-stage or two-stage trigger.

For 3 Position shooting, the target rifles have fully adjustable stocks, allowing the shooter to reposition the drop of the butt plate, height of the comb, and even angle of the cheekpiece.

The Smallbore rifles have a maximum overall weight of 8kg for men and 6.5kg for women.

14.2 Ranges and Targets

As discussed, Smallbore is shoot indoors at 15, 20 and 25 yards, and outdoors at 50 yards, 50 metres and 100 yards.

In the rifle events competitors shot at 10-ring targets. Scores range from one point for hitting the outside zone, to 10 for a hit in the 10 ring. If a shot hits the line between two zones, the higher score is awarded. In the international events at 50m there is a qualifying round and then, in the final, the 10 rings on the target are sub-divided into 10 score zones, with the highest score for a shot 10.9. The final round and qualifying scores are added together to determine the winner.

14.3 Equipment

Besides the Smallbore rifle, you will need a ‘single-point’ target sling that goes around your upper arm and attaches to the fore-end of the rifle.

You will need a simple spotting scope with stand, glove and shooting coat, a mat and most important, eye and ear protection. In addition, you will need a timer, scorecards and a pencil/pen to record your scores. However, most clubs have club equipment which you can borrow to get started.

14.4 Competitions

At the club level, competitions vary from country-to-country and club-to-club, and whether shooting on an indoor or outdoor range.

International (ISSF) competitions

ISSF competitions are shot at 50m and comprise:

- **50m Rifle Prone** (men only) - Sixty shots (.22LR) are fired in the prone position at a target 50 meters away, all fired within a time limit of 1 hour 15 minutes including unlimited sighting shots.
- **50m Rifle 3-Position** (Men "3 x 40") - The shooter fires three rounds of 40 shots (.22LR) each in the prone, standing and kneeling positions at a target 50 meters away. Unlimited sighting shots may be taken before starting in each position. Each of the three stages is timed and must be completed within its own time frame including the sighting shots – prone within 1 hour, standing in 1 hour 30 minutes and finally kneeling in 1 hour 15 minutes.
- **50m Rifle 3-Position** (Women "3 x 20") - The shooter fires three rounds of 20 shots (.22LR) each in the prone, standing and kneeling positions at a target 50 meters away. The three stages must be completed with 2 hours 15 minutes overall including unlimited sighting shots.

UK Outdoor Matches

Example outdoor competitions in the UK comprise:

- **English Match** – a match comprises a total of 60 shots at 50 metres.
- **Scottish Match** – a match comprises a total of 60 shots at 100 yards.
- **Dewar Match** – a match comprises a total of 40 counting shots; 20 shot at 50 metres and 20 shot at 100 yards.

14.5 Further Information

[1]. Bill Pullum and Frank Hanankrat, "New Position Rifle Shooting", Target Sports Education Center (1997), ISBN 10: 0965578003.

[2]. Chris Fordham, "Prone to Win: The Art and Science of Smallbore Target Rifle Shooting", Brookwood Publishing Ltd. (2000) ISBN-10: 0953909107.

[3]. Gaby Buhlmann, Heinz Reinkemeier, Maik Eckhardt, "Ways of the Rifle", MEC, ISBN 3-00-009478-4

14.6 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation National Smallbore Rifle Association Telephone 01483 485505 Address Bisley Camp, Brookwood, Woking, Surrey GU24 0NP Email info@nsra.co.uk Web site www.nsra.co.uk	**Organisation** National Target Shooting Association of Ireland Telephone 00 866 504 9073 Address PO Box 9, Blackrock, Co. Dublin, Ireland Web site www.targetshootingireland.org
Organisation English Smallbore Shooting Union Address The ESSU, 125 Turnpike Link, Croydon, Surrey CRO 5NU Email secretary@essu.org.uk Web site www.essu.org.uk	**Organisation** Scottish Smallbore Rifle Association Email executive@ssra.co.uk Web site www.ssra.co.uk
Organisation Welsh Smallbore Rifle Association Web site http://www.wtsf.org.uk/	**Organisation** Northern Ireland Smallbore Shooting Union Telephone 028 9446 4514 Email des.clyde@ukonline.co.uk

Chapter 15

International 300m Rifle

The International Sport Shooting Federation (ISSF) governs the International 300m Rifle discipline. It is fired at only one distance (i.e. 300 metres), but the rifle may be 'Standard' or 'Free' and in any calibre up to 8mm.

Figure 15.1: 300m Rifle Shooting

Matches may be prone only, or prone, standing and kneeling (PSK). Firing is from a covered firing point, and a metric target with smaller scoring rings than Target Rifle (TR) discipline is used. Many more shots are fired than in most other disciplines, usually 60 shots prone or 3 x 40 PSK (40 shots from each position). Unlike TR and MR, ladies fire fewer shots, only firing 3 x 20 in the PSK event.

15.1 Rifles and Ammunition

There are three classes of 300m rifles, Standard and Free for men and the new Ladies Sport Rifle:

- **Standard rifle** – with a maximum weight of 5.5kg and a trigger weight of 1500 grms.
- **Free rifle** – with a maximum weight of 8kg and no trigger weight limitations.
- **Ladies Sport Rifle** - with a maximum weight of 6.5kg and no trigger weight limitations.

Although you can use any calibre of rifle up to 8mm with iron aperture sights, to progress in competitions you really need a dedicated 300m rifle chambered for the popular 6mm calibre,of which there several different versions, **BR** being the most popular. However 6.5 x 55 is still used by Nordic countries as well as .308". Most popular rifles in use are Grunig, Keppeler, and Blieker shown in Figure 15.2.

On some of the 300m systems the stock is designed to interchange with rimfire actions, so it is possible to have one stock and two actions. This permits 300m competitors to train effectively year-round on 50m indoor rimfire ranges. The only difference is felt recoil and the size of the groups [1].

Figure 15.2: International 300m Rifle

The dominant calibre in international 300m rifle competition is the 6mm BR [1]. It offers low recoil, exceptional accuracy, and the availability of very high-quality commercially-loaded ammo from Lapua and Norma. Norma are also doing a lot of testing with national teams with their new **6mm XC** round.

15.2 Ranges and Targets

As described, firing is from a covered firing point with most 300m ranges using electronic scoring. The bullet's impact on the target is displayed on a screen positioned next to the shooter, and also on a screen in the match control centre where computers plot and calculate scores instantaneously.

15.3 Equipment

300m rifle shooters use the standard equipment of target rifle shooters: shooting jacket, sling, glove, and ear protectors. Due to the electronic scoring a scorebook is unnecessary, spotting scopes are an option mainly to look at mirage.

15.4 Competitions

There are three classifications of rifle - Free and Standard for men and the new Ladies Sport Rifle:

- **3 Position Free Rifle** – rifles have a maximum weight of 8kgrm and no trigger weight limitation other than being safe. 3 position (free rifle) competitions comprises 3 x 40 shots (Men), and 3 x 20 shots (Women), shot respectively prone, standing and kneeling.

- **Prone Rifle** – rifles have a maximum weight of 8kg as in the free rifle, no trigger weight limitations. Competitions for men and women comprise 60 shots prone.

- **Standard Rifle** - rifles have a maximum weight of 5.5kg and a trigger weight of 1500 grms. Competitions for men comprise 3 x 20 shots in prone, standing and kneeling.

- **Ladies Sport Rifle –** Rifles maximum weight 6.5 kg and are used in both prone and 3 x 20 competitions

15.5 Further Information

[1]. 6mmbr.com, "300m Competition", www.6mmbr.com/300m.html, *interesting article on 300m shooting.*

[2]. USA Shooting, the governing body for 300m in the United States, www.usashooting.com/usaShooting.cfm

15.6 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation Great Britain 300m Club Telephone 01483 485505 Address Bisley Camp, Brookwood, Surrey GU24 0NP Email info@GB300m.com Web site www.gb300m.com	**Organisation** National Target Shooting Association of Ireland Telephone 00 866 504 9073 Address PO Box 9, Blackrock, Co. Dublin, Ireland Web site www.targetshootingireland.org

Chapter 16

F-Class Rifle

F-Class ('Farquarson') Class was introduced in Canada in 1997 and was originally intended to allow TR shooters with eyesight or other physical problems to carry on in the sport by allowing greater freedom in optical sights, rifle rests etc. This class has now, however, developed into a highly popular new discipline in its own right, and is one of the fastest growing forms of rifle competition.

Figure 16.1: F-Class Shooting

In addition to a class which retains the spirit of the original concept (with calibre restrictions and bipod only as a front rest) known as F/TR or similar, 'Open F-Class' competition rules allow rifles up to 10 Kg, any calibre of cartridge up 8mm which is within range safety limits, commercial or hand loaded ammunition, plus any magnifying or telescopic sight. In addition, the rules allow front rests or bipods with a rear sandbag for the rifle butt.

16.1 Rifles and Ammunition

The beauty about F-Class is that it scales to suit your pocket. Most F-Class shooters start with a standard bolt-action 7.62mm target rifle on a bi-pod shooting factory made ammunition with a telescope sight with turret adjustments. Competition in this category is rapidly improving, but the 'accuracy bug' may prompt a move to more sophisticated equipment in Open F-class competitions which allow custom rifles and front rests with scopes in excess of 40x magnification.

Open F-class rifles are similar in many respects to 1000-yard Benchrest guns. Popular with competition shooters is hand loaded ammunition shot in a 6.5-284 calibre rifle, although recent trends show a move towards the 7mm calibres, with a high-powered telescope sight up to 50x magnification, from manufacturers such as Leupold or Nightforce.

- **Open F-Class Rifle (F-O)** - a rifle restricted to a bore diameter no larger than 8mm calibre (excluding Benchrest "Rail guns"). Any sighting system is permitted, but it must be including in the rifle's overall weight, which must not exceed 10 kilograms (approximately 22 pounds). The width of the rifle's forend must not exceed 76mm (approximately 3 inches). Front rests or bipods are allowed along with a rear sandbag.

- **F-Class Target (F-T/R or similar category)** - a rifle with the calibre restricted to unmodified .308 Winchester/7.62mm or unmodified .223 Remington/5/56mm chambering. The rifle is fired off a bipod, attached to the rifle's forend, and/or a sling. Any sighting system is permitted, but it must be included in the rifle's overall weight, which must not exceed 8.25 kilograms (approximately 18.15 pounds). Individual countries have subtle modifications of these basic rules.

16.2 Ranges and Targets

Like Fullbore Target Rifle, F-Class is shot on outdoor ranges from 300 yards to over 1,000 yards, in the prone position.

16.3 Equipment

The standard equipment for Open F-Class is a target rifle with high-powered scope, an adjustable front-rest (often of Bench-Rest derivation or bipod, a rear sandbag, an optional spotting scope (e.g. 20-60x80mm) and score book. The front rest must not grip or be attached in any way to the rifle fore-end. No specialist clothing such as a shooting coat or jacket is required.

A bipod and/or sling are the only allowed front supports for the F-T/R rifle. The rear bag, as for all F class classes must be solely a rear support which provides no positive mechanical method for returning it to its precise point of aim for the prior shot.

In all F class shooting, no portion of the rifle's butt or forend is allowed to rest directly on the ground or any hard surface. A rear rabbit-eared bag, small sandbag or a gloved hand may be used to support the rifle's butt. Any rear support employed cannot be attached, clamped or held to the rifle in any manner. The rear support may not be fixed to or protrude into the firing point. Mechanically adjustable rear supports are not allowed.

16.4 Competitions

Being so new, F-class rules are still evolving.

Style of shooting will vary depending on the country. In GB, F-class shooters usually compete in squads of two or three. After each shot, you must wait for the target to be pulled and marked. In other countries 'string' shooting is preferred where each shooter fires all his shots individually. With increasing accuracy rifles, new F-Class targets are being introduced with ½ MOA V-bulls (X-rings).

The international target for F class competition is now the US Palma target with a 5 inch X-ring (V-bull). At shorter ranges an number of targets are used, which may be derived from TR targets but all with smaller V-bull (X-rings).

16.5 Further Information

[1]. 6mmbr.com, www.6mmbr.com/fclass.html, *the F-Class page on the excellent 6mmbr.com site*.

[2]. F-Class shooting, http://f-classinfo.com/index.html, *An American site covering F-Class shooting*

[3]. Website for F-Class shooting in Great Britain, http://www.f-class.org.uk.

[4]. Website for F-Class shooting in the United States, www.usfclass.com.

16.6 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation GB F Class Association Email mrmister@tinyonline.co.uk Web site www.f-class.org.uk	**Organisation** National Rifle Association of Ireland Address NRA of Ireland, Leabeg, Blueball, Tullamore, Co Offaly, Ireland Email info@nrai.ie Web site www.nrai.ie

Chapter 17

Benchrest Rifle

Benchrest shooting is all about accuracy rather than marksmanship and competitors shoot for 'group' rather than attempting to hit the bullseye. As the name suggests, targets are shot with the competitor seated at a bench, with the rifle supported on a front 'machine' rest and rear sand-bag. The standard of accuracy is high, so most benchrest rifles are custom-made and serious shooters will hand-load their ammunition and tune it to their rifle.

17.1 Rifles and Ammunition

Rifles subdivide into two categories - for custom rifles and out-of-the-box factory rifles.

Figure 17.1: Benchrest Shooting

- **Custom Rifles** – These will be single-shot bolt-action rifles with very heavy barrels. Stocks are of graphite, fibreglass, carbon-fibre or wood. Triggers are usually set to a pull of 2 oz or less. The popular cartridge for 100/200 yards is the 6mm PPC but for 600 yards, the 6BR or 6.5x47 cartridges are popular. At 1000 yards, the bigger cartridges like the 7mmWSM, 6.5-284 rule the roost.

- **Factory Sporter** - These rifles must be un-modified out-of-the-box factory-produced rifles and the class is intended to provide an entry-level route into the sport without spending several thousand pounds. At shorter ranges, the .223 cartridge is popular with the 308 and the big magnums the preferred choice for longer ranges.

Rifles

A competitive benchrest rifle is not a mass-produced product. Rifles are custom-built with extreme accuracy in mind. The starting-point will be a custom-action like the American Stolle or BAT and heavy 'match' barrels must be chambered to the highest possible standards. Strict rules govern the design of the stock and the finished rifle must comply with the weight-limit for the class. Scopes will have a magnification of at least 36 power and triggers are usually set to a pull of only a few ounces. Classes include:

Figure 17.2: Benchrest rifle

- **Light Varmint** – An LV rifle has a weight limit of 10.5 lbs. including scope. The barrel must be cut from a 28 inch blank that tapers from 1.25 inches at the breech to 0.9 in. at the muzzle. Restrictions are also placed on the shape of the stock. Muzzle-brakes are not permitted.

- **Heavy Varmint** – As above but with a weight limit of 13½ pounds overall – which usually means a heavier barrel can be used.

- **Light Gun** – At 600 to 1000 yards, the rifles may be heavier – up to 17lbs. - so stocks can be wood-laminate and barrels even longer. Muzzle-brakes are allowed. Any rifle weighing over 17lbs will be classed as Heavy Gun – there is no upper weight limit for this class.

- **Factory Sporter** – As the name implies, these rifles must be shot 'out-of-the-box' and modifications such as re-barrelling or re-stocking are not allowed. Non-standard parts are not allowed but there is no restriction on scope-power.

In the United States there are also so-called Rail Guns:

- **Unlimited (including Rail Gun)** – rail guns are 'unlimited' in that they can have barrels greater than 18", electronic triggers and unrestricted rests. Unrestricted rests may be of one-piece construction for front and rear, and may incorporate guiding means (see Figure 17.2).

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Ammunition

Only the most consistent and efficient cartridges can provide the necessary accuracy for benchrest shooting. Popular cartridges are:

- **6PPC** – most short-range benchrest shooters use the 6PPC cartridge. It completely dominates 100 and 200 yard group shooting. The 22PPC is a variant used by a small number of competitors.
- **6BR** – the 6BR Remington (or 6mm BR Norma) is superbly accurate, very efficient and very versatile, especially in the 300 to 600 yard range. The 6BR cartridge has set world records at 600 yards and even 1000 yards. The recently introduced 6.5x47 Lapua is also an effective 600 yard cartridge.
- **6.5-284** – This is an effective round at 600 to 1000 yards and it is also popular in 6mm and 7mm forms. In addition, there are a host of 'wildcat' cartridges such as the 7mmBooBoo and 7mmWSM.

The UK Benchrest website www.ukbra.co.uk lists the popular benchrest cartridges currently in use.

17.2 Ranges and Targets

Benchrest is typically shot from a covered firing-point on an outdoor range. Benches should ideally be built from concrete to eliminate vibration. Range distances are from 100 yards out to 1,000 yards. In the UK, there are 100 yard ranges at Bisley, Minsterley and Diggle. The only 600 – 1000 yard ranges currently in operation are at Diggle Ranges in the North West.

17.3 Equipment

Benchrest is all about precision and demands the highest specification equipment. The initial dilemma of most people who become interested in benchrest is what equipment to purchase. Whether it's 100 or 1000 yards, the ancillary equipment is the same.

a) Front Rest b) Rear Sandbag

Figure 17.3: Rests and Sandbags

- **Front rest** – This will normally consist of a heavy tripod with adjustable feet and an adjustable central column. Rules state that the rifle must rest on a sand-bag so this will be affixed to the rest-top. Sand-bags can be made of leather or synthetic material. The rest-top will also incorporate windage adjustment.
- **Rear bag** - Again rules state that this must be filled with sand and most bags are of leather or a synthetic material like Cordura. The rear-bag cannot incorporate any metal or adjustment.
- **Wind-flags** – Although wind-flags will be the last thing a new benchrest shooter purchases, they are as important as any other piece of equipment. Without wind-flags, you cannot shoot small groups. Ideally, each competitor should have a set of five wind-flags.

Examples of adjustable front-rests and rear sand-bags are shown in Figure 17.3.

17.4 Competitions

In Benchrest shooting there are two major types of competition:

- **Group shooting** – where the object is to place five shots on a target as close as possible to each other – in other words, a group. A very good group shot at 100 yard will have 5 bullets hitting within .100" of each other, centre to centre; such a group is known as a 'screamer'. At 1000 yards, any group below four inches is classed as a screamer.
- **Score shooting** – Although this has a following in America, we do not shoot for score in the UK. The World Benchrest Championships, which are held every two years, are group shooting competitions.

17.5 Further Information

[1]. Wikipedia, the free encyclopedia, http://en.wikipedia.org/wiki/Benchrest_shooting, *contains an introduction to Benchrest shooting.*

[2]. 6mmbr.com, www.6mmbr.com, *web community dedicated to precision shooting and accurate rifles, with excellent articles*.

[3]. Benchrest Central, www.benchrest.com, *site covering all American Benchrest information.*

[4]. Dave Brennan, "Benchrest Shooting Primer", Precision Shooting Inc. (2000) ISBN 1931220034.

[5]. Mike Ratigan, "Extreme Rifle Accuracy", Zediker Publishing, ISBN 0-9792528-0-8.

[6]. Precision Shooting Magazine, www.precisionshooting.com, *US magazine for Benchrest shooters*.

[7]. UK Benchrest Association, www.ukbra.co.uk *contains information on rifles, ammunition and competitions.*

[8]. International Benchrest Shooters, www.international-benchrest.com, *the United States Benchrest Shooters association.*

[9]. World Benchrest Shooters Federation (WBSF), www.world-benchrest.com, *includes a list of member federations.*

17.6 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation UK Benchrest Association Email jeanette.whitney@oldham.gov.uk Web site www.ukbra.co.uk	**Organisation** National Rifle Association of Ireland Address NRA of Ireland, Leabeg, Blueball, Tullamore, Co Offaly, Ireland Email info@nrai.ie Web site www.nrai.ie

Chapter 18

Rimfire and Air Rifle Benchrest

Rimfire and air rifle Benchrest as the name suggests is shooting from a bench using both front and rear rests using highly accurate .22 Rimfire rifles or Air rifles of .177, .20 or .22 calibre.

Figure 18.1: Rimfire & Air Rifle Benchrest

Rimfire Benchrest is shot at 50 meters (or 50 yards in the US) and 25 yards in the UK, with as many sighting shots taken as required during the 30 minute match. Air rifle Benchrest is shot at 25 yards.

It is not a new sport as it originated in the Europe and the United States some years ago. The sport is also popular in some African states and Australia. The nice thing about this sport is people can start off with what they have in their rifle cabinet.

18.1 Rifles and Ammunition

The rifles used range from factory Anschutz and CZ's, to an increasing number of custom rifles now being seen on the Rimfire and Air rifle Benchrest circuit. Scopes vary from 6.5X or 12X magnification in the Sporter Classes to 36X or 40X high-powered scopes in the Unlimited Classes. Rimfire ammunition must be commercially available but can be in .22 Rimfire short, long, or long rifle calibres.

Rimfire

Rimfire Benchrest rifles are grouped by class.

- **Sporter .22 Rimfire Rifle -** is any Sporter model weighing not more than 7.5 pounds (3.402 Kg) inclusive of sight. The action must be a repeater action and hold minimum of two rounds. Any scope may be used with max magnification of 12X scopes.
- **International Sporter -** is any Sporter having a maximum weight not more than 8.5 pounds (3.855 Kg) inclusive of scope. The action must be a repeater action and hold minimum of two rounds. Any scope may be used with max magnification of 6.5X.
- **10½ lb Light Varmint .22 Rimfire Rifle -** is any rifle weighing not more than 10.5 pounds (4.762 kg) inclusive of sight. Any modification may be made to the rifle and any scope may be used.
- **Unlimited Weight .22 Rimfire Rifle -** is any rifle without weight limit. Any modification may be made to the rifle and any scope magnification may be used.

Figure 18.2: Benchrest rifle

Air Rifle

Benchrest Air rifles are similarly grouped by class.

- **Sporter Air Rifle Class** - is any unmodified factory model weighing not more than 10.5 pounds (4.762 kg) inclusive of sight, and at least 1,000 of these rifles must already have been produced. Power to be restricted to 16.27 Joules or 12 ft lbs maximum. Any scope may be used with maximum magnification of 12X.
- **International Sporter Air Rifle Class -** is any unmodified factory model weighing not more than 10.5 pounds (4.762 kg) inclusive of sight, and (again) at least 1,000 of these rifles must already have been produced. Power to be restricted to 8.13 Joules or 6 ft lbs maximum. Any scope may be used with max magnification of 6.5X.

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- **Hunter Air Rifle Class -** is any unmodified factory model, weighing not more than 10.5 pounds (4.762 kg) inclusive of sight, and at least 1,000 of these rifles must already have been produced. Power to be restricted to 16.27 Joules or 12 ft lbs maximum. Any magnification scope may be used.

- **Unlimited Air Rifle Class A -** is any rifle without weight limit. Barrel Tuners are permitted. There is no restriction on cylinder size or capacity as long as 8.13 Joules or 6 ft lbs maximum power is retained.

- **Unlimited Air Rifle Class B -** is any rifle without weight limit. Any modification may be made to the rifle and any magnification scope may be used. 'There is no restriction on cylinder size or capacity as long as 16.27 Joules or 12 ft lbs maximum power is retained.

18.2 Ranges and Targets

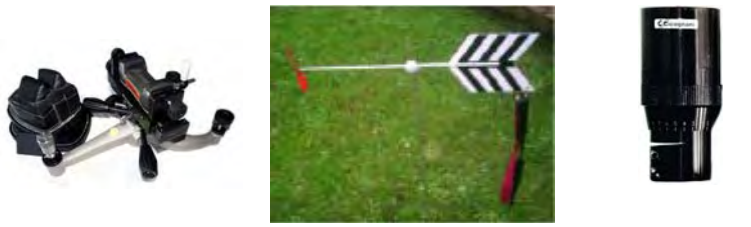
Rimfire Benchrest is shot over two distances, 50 meters and 25 yards, and is mostly shot on outdoor ranges. Air rifle Benchrest is shot at 25 yards. There are 25 scoring targets per target for both 25 yard and 50 meter. Each of the 25 scoring target has a scoring zone from 10 to 5, the overall size being 39mm. The maximum score possible is 250 with 25 10X's.

18.3 Equipment

The main equipment for both Rimfire and Air Rifle Benchrest is obviously the best rifle that can be afforded, with correctly powered scope for its class. Other equipment is outlined below:

- **Front rest -** this is normally an adjustable precision 'benchrest' front rest incorporating windage adjustment. A spirit level is a must on the front rest, and possibly the scope, to ensure the rifle is level in the rests.

- **Rear bag -** these must be filled with sand and most bags are of leather or a synthetic material like Cordura.



a) Rests b) Wind Flag c) Barrel Tuner

Figure 18.3: Rimfire and Air Rifle Benchrest Equipment

- **Wind-flags** – an important addition are wind-flags; without them you cannot shoot accurately as you will not be able to judge how the wind will affect the bullet. Each competitor should have a set of three to five wind-flags.

- **Barrel Tuners** – these are devices fitted to the muzzle of the barrel or on the length of the barrel. They are in fact sophisticated weights that alter the harmonics of the barrel, and give more accuracy to the rifle once the barrel has been 'tuned' to the specific ammunition and the way the action has been set in the rifle stock.

18.4 Competitions

Even though Rimfire and Air Rifle Benchrest have been going on for some time, the rules are still evolving in line with other countries. Head-to-head matches take place for major championships, but most of the matches are 'postal', allowing shooters to compete with shooters from all over the world. The sport has really developed in the United Kingdom and Europe over the last four years following the first head-to-head UK national championship in 2006, the first European Championship in 2007 and the first World Championship in 2008.

18.5 Further Information

[1]. 6mmbr.com, www.6mmbr.com/fclass.html, *information on shooting 'accuracy'*

[2]. Target Sports Magazine, *UK magazine for shooting with Benchrest Columns, reviews, etc.*

[3]. Precision Shooting Magazine, www.precisionshooting.com, *US magazine for Benchrest shooters*.

[4]. Benchrest Central, www.benchrest.com, *site covering all American Benchrest information.*

[5]. Rimfire Benchrest, http://rimfirebenchrest.com/, *site covering Rimfire Benchrest*.

[6]. Website for Rimfire and Air Rifle Benchrest shooting in Great Britain, http://www.benchrest22.org/

[7]. Website for Rimfire and Air Rifle Benchrest shooting in the Europe, http://www.erabsf.org/

[8]. World Rimfire Benchrest Federation, http://worldrimfire.com/.

18.6 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation United Kingdom Association of Rimfire Benchrest Shooting Email ukbr22web@fsmail.net or br22scores@btinternet.com Web site http://www.benchrest22.org/	

Chapter 19

Match Rifle

The term Match Rifle in the UK and Commonwealth refers to long-range (1000-1200 yards) prone shooting; whereas in the United States in Highpower it refers to custom-made magazine rifles. This chapter discusses the former. Match Rifle has long been regarded as a premier shooting discipline, and the Elcho (the annual match between the home nations), first shot in 1862, is one of the oldest international team matches in any sport. Like Target Rifle it is usually fired with the 7.62mm cartridge, but at longer distances from 1000 to 1200 yards [1]. Experimentation and innovation have always played an important part in the discipline. Telescopic sights and hand loaded ammunition are used, and the specification for rifles and the firing positions allowed are more open. Whilst the majority of shooters shoot prone, a proportion still adopt the more traditional 'supine' or back position, reclining, with their feet pointing towards the target! For those with disabilities that would otherwise prevent them from shooting match rifle, a sitting position has recently been introduced.

a) Prone

b) Supine

Figure 19.1: Match Rifle Shooting *(David Pollard)*

Within Match Rifle, the term *Any Rifle* refers to a variation on Match Rifle in which greater freedom over rifle specifications is allowed (calibre, barrel weight, etc), allowing even more opportunity for experimentation. In terms of rifles permitted, it has similarities with F-Class, but otherwise Match Rifle rules apply. In practice there are few serious events in which Any Rifles are allowed, so Any Rifle is very much a minority discipline.

19.1 Rifles and Ammunition

The NRA-UK rules [2] state that for Match Rifle, any rifle suitable for firing 7.62 x 51 mm (NATO) or .308 Winchester cartridges of standard dimensions may be used; there is no limit to the overall weight of the rifle, but the *barrel* weight must not exceed 2.5 kg (5.5 lbs). The trigger pull must be a minimum of 1.5 kg (3.307 lbs), and most shooters use telescopic sights, though iron (aperture) or magnifying (Galilean) sights are also permitted. Muzzle brakes are prohibited. Ammunition may be commercial or hand loaded, and almost all shooters either handload their own ammunition or purchase ammunition from specialist manufacturers. To maximise long range performance, heavier bullets are favoured (typically 190 or 200 grain) than those typically used for Target Rifle (TR). The NRA Rules give clear guidance on the safety of ammunition, and the NRA also offers training courses in basic handloading.

Whilst many people who start shooting Match Rifle simply mount a telescopic sight on a Target Rifle, most competitive Match Rifle shooters choose to use longer barrels than are conventionally used for Target Rifle. Faster rifling twists (typically one rotation in 10”) are better suited to stabilising the heavier bullets used in Match Rifle.

Lastly, Match Rifles and Ammunition in 5.56 x 45 mm (NATO) or .223 Remington calibres are permitted on an identical basis to that specified for the 7.62 x 51 mm (NATO), though in practice this option is rarely if ever exercised.

19.2 Ranges and Targets

For Match Rifle, outdoor ranges at 1,000 and 1,200 yards are the same as those used for the Fullbore and F-Class shooting disciplines. The targets used are the NRA’s *Bisley Long Range Target Rifle Targets*, designed for TR shooting up to 1000 yards. Note that for Match Rifle there is no increase in the size of the aiming mark or the scoring rings, despite shooting taking place at longer distances. Few ranges in the UK are long enough to accommodate Match Rifle. Most Match Rifle shooting in the UK takes place on Bisley’s Stickledown range. A small MOD range at Barton Road, Cambridge offers

very limited civilian access. Blair Atholl (near Pitlochry, in Scotland), is particularly picturesque, but equally renowned for its challenging wind, being located on undulating terrain on a hill-side.

19.3 Equipment

As shown in Figure 19.1, Match Rifle may be shot prone or supine. Unlike Target Rifle where artificial support is limited to the use of a sling, Match Rifle rules are less restrictive: The rifle must only be directly supported by parts of the firer's body, though they in turn may be supported artificially. For example, a (right handed) prone shooter may use a rest to support the (left) hand with which he/she supports the fore-end of the rifle; this contrasts with F-Class, where the rifle may be directly supported using rest(s). The other 'standard' Fullbore equipment comprises shooting jacket to increase the steadiness of the firer's position, hearing protectors, mat, scorebook and spotting scope.

19.4 Competitions

Whilst most shooting is conducted on an individual basis, there are a few team events, most notably the Elcho, and the Woomera Trophy Match (held between GB and Australian Teams every 2 – 3 years during a GB Match Rifle Team [3] tour to Australia [4] or vice-versa).

A Match Rifle competition typically involves shooting 2 (usually convertible) sighters followed by 15 or 20 shots at each of three distances: 1000 yards, 1100 yards and 1200 yards over the course of a day. The focus of the UK match rifle calendar is the Hopton Aggregate, four days of individual entry competitions held at the start of the NRA Meeting in July. Other principal events include the English Eight Club Spring and autumn meetings (held at Bisley) and the National Rifle Club of Scotland's Open Meeting at Blair Atholl.

19.5 Further Information

[1]. The NRA-UK, "Bisley Bible," The NRA Rules of Shooting and the Programme of the Imperial Meeting Bisley (available from the NRA).

[2]. The NRA-UK Match Rifle web site, www.nra.org.uk/common/asp/disciplines/mr.asp

[3]. Great Britain Match Rifle Team (GBMRT), www.gbmrt.org.uk

[4]. National Rifle Association of Australia (NRAA), www.nraa.com.au, *web site of the Australian NRA*

19.6 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation Great Britain Match Rifle Team (GBMRT) Telephone Jim McAllister (01 483 200 900) Email jmcallister@rutland.co.uk Web site www.gbmrt.org.uk	

Chapter 20

Target Air Rifle – 10m and 3-Position

Target Air Rifle is highly popular worldwide, and comprises the ISSF 10m Air Rifle and the US 3 Position Air Rifle:

- **10m Air Rifle** - governed by the International Shooting Sports Federation and included in the Olympics, 10m Air Rifle is shot over a distance of 10 metres from a standing position, unsupported, with a 4.5 mm (.177 in) calibre air rifle with a maximum weight of 5.5 kg. Competitions consist of 60 shots in 105 mins for men, possible score - 600, and 40 shots in 75 min for women, possible score - 400.

Figure 20.1: Air Rifle - Match

- 3-Position Air Rifle – this is the most recent addition to the air rifle shooting scene in the UK originally being very popular in the US, South Africa and Germany. The current events available in the UK are Sporter (Standing and 3P) and Precision (3P) Air Rifle disciplines. Precision (3P) is very similar to the ISSF disciplines, in that jackets, trousers and boots can be used, with fully-adjustable high-tech air rifles. Sporter Air Rifle has limits on the weight and range of adjustments on rifles.

Target Air Rifle has the advantage of being conducted in indoor facilities often with electric target changing equipment. This allows people to shoot the match, within the specified time limits, at their own pace. In addition, once the initial equipment purchases are made, the cost of engaging in this particular sport is minimal.

20.1 Rifles and Ammunition

The International Shooting Sports Federation (ISSF) specify that that only air rifles and carbon dioxide rifles with a calibre of 4.5 mm (.177 cal.) and a maximum weight of 5.5 kilograms are permitted. In practice, almost all competitors use specialist compressed air rifles loaded from cylinders, and built by manufacturers such as Anschutz, Feinwerkbau, Hämmerli, Steyr and Walther. The Precision 3-P discipline uses similar rifles but for Sporter, dimensions and permitted adjustments are close to the old “ISU Standard Rifle” specification.

20.2 Ranges and Targets

As discussed, Air Rifle ranges are indoors, and comprise of 10m electronic targets. Air Rifle target dimensions range from the: 10 Ring 0.5 mm (±0.1 mm), to the 1 Ring 45.5 mm (±0.1 mm).

20.3 Equipment

For ISSF events, besides the Air rifle, you will need a shooting jacket, flat shoes and a shooting glove. More specialist shooting boots, trousers, hats and shooting spectacles are often used. Eye protection is recommended. For 3-P Precision an additional sling, kneeling roll and mat will be required. For Sporter events a much simpler rifle is required and other equipment is restricted to glove, sling, kneeling roll and mat. However most clubs offer basic equipment that can be borrowed to get you started.

20.4 Competitions

As discussed there are broadly two types of Target Air Rifle shooting: ISSF 10m and 3-Position Sporter and Precision.

ISSF 10m

In the main competition, only the entire rings are counted. The men complete 60 shots in 105 minutes with any number of sighting shots before the first competition shot is fired. The women complete 40 shots within a maximum of 75 minutes, including the sighting shots. The shots are fired in the standing position at a very small centre of exactly 0.5 mm at a distance of 10 meters.

In the following final, each of the eight finalists only has 75 seconds to fire each of his 10 final shots. The points achieved are subdivided into decimal tenths. A shot that hits directly in the centre of the ten counts as a 10.9, whereas a shot just barely touching the centre counts as 10.0. The results from the normal programme and the final are added together.

3-Position

Two different 3-Position Air Rifle events are available:

- **Precision Air Rifle** - is modelled on ISSF 10m shooting and allows the use of specialized target rifles and equipment.
- **Sporter Air Rifle** - is designed for new competitors or those who desire to compete with a minimum of equipment and expense using more standard air rifles. There are limits on the weight and range of adjustments on rifles. Dimensions and permitted adjustments are close to the old "ISU Standard Rifle" specification. Ancillary equipment is restricted to glove, sling, kneeling roll and mat.

In both types of 3-P shooting, competitors fire at targets at a distance of 10 meters in three different positions, prone, standing and kneeling.
The sporter events offer to under-21 juniors both standing-only and 3x20 shooting in a very simple and accessible format, and using the minimum of ancillary equipment.

20.5 Further Information

[1]. Wikipedia, the free encyclopedia, http://en.wikipedia.org/wiki/10_m_Air__Rifle, *introduction to ISSF 10m Air Rifle shooting*.

[2]. UK Sporter web site, *dedicated to the promotion of Sporter Air Rifle,* www.sporter.org.uk

[3]. Civilian Marksmanship Program 3 P Air Rifle, www.odcmp.com/3P.htm, *The CMP actively promotes Three-Position Air Rifle shooting as a premier youth marksmanship competition.*

[4]. Gaby Bulmann, Heinz Reinkemeier and Maik Eckhardt, "Ways of the Rifle – .22, Three-Position Air Rifle", MEC, 2002.

20.6 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation National Smallbore Rifle Association Telephone 01483 485505 Address Bisley Camp, Brookwood, Surrey GU24 0NP Email info@nsra.co.uk Web site www.nsra.co.uk	**Organisation** National Target Shooting Association of Ireland Telephone 00 866 504 9073 Address PO Box 9, Blackrock, Co. Dublin, Ireland Web site www.targetshootingireland.org
Organisation Welsh Airgun Association Email iharris@btinternet.com Web site http://www.welsh-airgun.org.uk	

Part D – Target Pistol & Gallery Disciplines

Summary

Gallery shooting disciplines are shot on covered or indoor ranges using pistols and rifles firing ‘pistol’ cartridges (e.g. .22LR or .357 calibres). The targets are usually static bullseye targets at 10m, 25m and 50m. Gallery rifle became especially popular in the UK following the handgun ban in 1997.

Chapter 21 - Pistols – Free, Rapidfire, Standard, Centrefire

The International Shooting Sport Federation (ISSF) recognises four pistol disciplines, referred to as: a) **Free** – competitions comprise 60 shots fired with .22LR single shot pistols in the standing position at a target 50 meters away; b) **Rapidfire** - competitions are fired with .32 five shot pistols, and consist of a series of five shots is fired at five targets.; c) **Standard** – competitions comprise three rounds of 20 shots at 25 metres; and d) **Centrefire** – completions comprise two rounds each of 30 shots.

Chapter 22 - Bullseye or Conventional (3-gun) Pistol

So-called Bullseye, three-gun or conventional pistol shooting is hugely popular in the United States. It comprises a “3-gun aggregate”, fired with a .22 rimfire, a centerfire, and a .45 calibre at paper targets at fixed distances and within time limits. However, most competitors use their .45 pistol, both for the ‘open’ centerfire and .45 stages.

Chapter 23 - Air Pistols – Single, Multi-shot

For Air Pistols, the ISSF recognises four competitions: a) 10m Air Pistol Men - 60 shots in a total time of 1 hour 45 minutes, including sighting shots, b) 10m Air Pistol Women - 40 shots in a total time of 1 hour 15 minutes, including sighting shots, c) 10m Standard Air Pistol – 40 shots for men and 30 shots for women, divided into events of 5 shots taken in 10 seconds, and d) 10m Rapid Fire Air Pistol – 60 shots fired in two so-called half courses.

Chapter 24 - Gallery Rifle and Pistol

Gallery rifles are usually lever action or bolt-action carbines firing pistol ammunition, such as .22LR, .38, 9mm, and .45 calibres. Lever action rifles typically incorporate a 10-shot tubular magazine underneath the barrel. Rimfire carbines are often autoloaders with a circular 10-shot magazine.

Chapter 25 – Long Range Pistol

Long-Range Pistol events are shot at distances of 100, 200 and up to 1200 yards. The various classes cater for pistols of differing types and calibres, ranging from black powder muzzle loaders through modern service and other pistols, to specially built rifle-calibre firearms firing (for example) 7.62x51. NRA-USA Long Range Pistol silhouette has two basic pistol definitions and forms of competition: a) **Conventional**, which permits minor modifications, and b) **Unlimited**, which allows almost anything that can be done to a pistol within the limits of a 15 inch barrel and 4 1/2 pound weight limit.

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Chapter 21

Target Pistols – free, rapidfire, standard, centrefire

Figure 21.1: Target Pistol

There are a vast number of international and national pistol shooting disciplines spanning centrefire pistols, .22LR Rimfire and air pistols [1]. They include the International Shooting Sports Federation (ISSF) six pistol events shot at distances of 10, 25, and 50 metres; the International Military Sports Council's rapid fire match shot at 25m; the International Practical Shooting Confederation (IPSC) disciplines where the shooter often moves during shooting, and hit scores and shooting time are equally important; the Muzzle loading, Cowboy Action Shooting and Metallic silhouette shooting; plus a number of nationally recognized sports, including the US NRA Conventional Pistol or Bullseye shooting, shot with up to three different pistols, popular in the United States and Canada and other countries.

In this chapter we focus on the four ISSF pistol disciplines: 50m free pistol, 25m rapidfire, 25m standard pistol, and 25m centrefire.

21.1 Pistols and Ammunition

Competitions are shot with .22LR pistols and centrefire pistols; single shot and semi-automatic.

a) Free (.22LR x 1 shot) b) Rapidfire (.22LR x 5) c) Standard (.22LR x 5 shot) d) Centrefire (.32 SWL x 5)

Figure 21.2: Target Pistol

50m (Free) Pistol

50m Pistol (also called Free Pistol) is arguably the purest precision shooting discipline among the pistol events, dating back to the 19th century. The pistol, loaded with one round at a time, is .22 calibre and shot single-handed. These are precision pistols with long barrels, grips fitted to the shooter's hand, very light trigger pull, etc. The course of fire is 60 shots within a maximum time of two hours.

Most shooters excelling in 50m Pistol also compete at the same level in 10m Air Pistol, a similar precision event.

Rapidfire Pistol

The Rapidfire Pistol (RFP) match is shot with a semi-automatic pistol in .22LR calibre at 25 metres. This is a self-loading pistol with maximum dimensions for barrel length, weight and sight radius specifications. Since 2005, Rapidfire pistols conform to 25m standard pistol specifications, with the new rules precluded use of the .22 Short cartridge as well as wrap-around grips and light trigger pulls.

Standard Pistol

The Standard Pistol match is shot with a semi-automatic pistol in .22LR calibre. This is self-loading pistol with 5.56mm calibre with maximum dimensions for barrel length, weight and sight radius specifications. 60-shot match is divided into 5-shot strings with different timings: 4 strings within 150 seconds each; 4 strings within 20 seconds each; and 4 strings within 10 seconds each.

Centrefire Pistol

The rules for centrefire pistols specify that matches are to be shot with a pistol of any calibre between 7.62 mm (.30) and 9.65 mm (.38), but the most popular cartridge is the .32 S&W Long, because it has good performance characteristics. However, many countries such as the UK have laws restricting civilian ownership of centrefire pistols.

It subdivides into: a) **25m Centrefire Pistol** - normally a men-only event, and b) **25m Pistol** (formerly called Sport Pistol) - essentially the women's equivalent of this event. The only difference being the smaller rimfire calibre pistols used (often the same models only chambered for the smaller calibre).

Regarding ammunition - not much can be said about ammunition - match grade ammunition is available commercially and is manufactured to higher standards than 'regular' ammunition, while the cheapest ammunition is probably is best avoided as the 'wax' build will quickly clog the firing mechanism. For centrefire you also have the option of handloading.

21.2 Ranges and Targets

Ranges and targets for the four ISSF pistol disciplines are presented below. Targets are divided into concentric score zones with 10 being the most central part, giving a total maximum score of 600.

50m (Free) Pistol

50m (Free) pistol is shot – as the name implies - at 50m with the targets being either paper or electronic.

Rapidfire Pistol

RFP competitions shot at 25m use either paper targets that are able to turn 90 degrees to appear to the shooter and then turn back to disappear when the shooting time is up or electronic targets which use red and green lights to indicate the beginning and the end of the shooting time, and which automatically handle late shots.

Standard Pistol

Standard pistol is shot at 25m with the targets being either paper or electronically scored.

Centrefire Pistol

Centrefire pistol consists of: a 5-shot precision stage where the target is the same as the 50m Free pistol with a 10-zone of 5 cm diameter; and a rapid-fire stage where, for each shot, the shooter has to raise his arm from a 45 degree angle and fire at a target the same as in 25 m Rapid Fire Pistol, with a 10-zone of 10 cm diameter.

21.3 Equipment

The rules of the pistol shooting discipline you choose will determine the specification of the pistol chosen: .22LR single shot, .22LR semi-automatic or .32 centrefire. In general, a target pistol is held in one hand at arm's length and shot without any supporting aids.

All target pistols come with an adjustable rear sight, and most international competitions restrict pistols to only open iron sights. (However, as discussed elsewhere, NRA-US Bullseye or Practical shooting allows optical and electronic sights, but not laser sights that project a beam onto the target.)

For competition shooting, pistols are fitted with anatomical grips that can be adjusted to fit the hand of the shooter (see Figure 21.1), rather than the 'standard' straight factory grips. Eye and ear protectors are also mandatory. Finally a spotting scope is usually allowed and necessary to spot the fall of shot on the target.

21.4 Competitions

All ISSF pistol competitions are shot standing and this section summarises the ISSF pistol competition rules [1].

50m (Free) Pistol

The course of fire is 60 shots within a maximum time of two hours. In 50m pistol, competitors have 120 minutes to shoot 60 times at a target 50 metres away. The centre of the target is 50mm, and the gun must be fired, single-handed, in the standing position.

Rapidfire Pistol

A Rapidfire pistol competition involving the shooter raising his arm from a 45 degree angle and firing fire shots, one at each of five targets next to each other at 25m, within a time limit.

- **Series** – a series (or string) comprises five shots, one at each of five adjacent targets (i.e. 5 shots).
- **Stage** - a stage consists of two series each of 8 seconds, 6 seconds, and 4 seconds (i.e. 2x3x5 or 30 shots).
- **Course of Fire** – a competition comprises two stages (i.e. 2x30 or 60 shots).

Standard Pistol

A Standard Pistol competition comprises a 60-shot match divided into 5-shot *strings* with different timings: a) 4 strings within 150 seconds each, b) 4 strings within 20 seconds each, and c) 4 strings within 10 seconds each. The event is shot at 25 metres in three timed sequences of four series.

Centrefire Pistol

Centrefire pistol competitions comprise 25m Centrefire (men) and 25m Pistol (women) formally called Sport pistol.

- **25m Centrefire** - a Centrefire match consists of two parts of 30 shots each: a) a *precision* stage where 6 series of 5 shots are to be fired, each series during a 5 minute period; and b) a *rapid-fire* stage where, for each shot, the shooter has 3 seconds to raise his arm from a 45 degree angle and fire.
- **25m Pistol** - a 25m pistol match consists also of two parts of 30 shots each: a) a *precision* stage where 6 series of 5 shots are to be fired, each series during a 5 minute period; and b) a *rapid-fire* stage where, for each shot, the shooter has 3 seconds to raise his arm from a 45 degree angle and fire. (In the women's competition the six series of five shots each must be completed, with three seconds allowed for each shot with a break of seven seconds in between.)

21.5 Further Information

[1]. Wikipedia, the free encyclopedia, http://en.wikipedia.org/wiki/Shooting_sports#Handgun_shooting_sports, *good introduction to pistol shooting sports*.

[2]. Target Shooting Canada, www.targetshooting.ca, *A Training Resource for Novice to Intermediate Pistol Target Shooters.*

[3]. NSRA Basic Shooting Techniques Course, Pistol, www.nsra.co.uk, *available from the UK National Smallbore Rifle Association*.

[4]. New Zealand Pistol Association, "Introduction to Pistol Shooting," www.targetshooting.ca/docs/Intro2PS.pdf.

[5]. US Army Marksmanship Unit's Pistol Training Guide, www.bullseye.com.

21.6 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation National Smallbore Rifle Association Telephone 01483 485505 Address Bisley Camp, Brookwood, Surrey GU24 0NP Email info@nsra.co.uk Web site www.nsra.co.uk	**Organisation** British Pistol Club Telephone 01483 486293 Address B.C.M 5114 London WC1N 3XX Email britishpistolclub@ntlworld.com Web site www.britishpistolclub.org
Organisation National Target Shooting Association of Ireland Telephone 00 866 504 9073 Address PO Box 9, Blackrock, Co. Dublin, Ireland Web site www.targetshootingireland.org	**Organisation** English Pistol Association Email englishpistolassociation@blueyonder.co.uk
Organisation Scottish Pistol Association Email scottishpistolhq@aol.com Web site www.scottishpistolassociation.co.uk	**Organisation** Welsh Airgun Association Email iharris@btinternet.com Web site http://www.welsh-airgun.org.uk

Chapter 22

Bullseye or Conventional (3-gun) Pistol Shooting

In the United States, so-called Bullseye, three-gun or conventional pistol [1], is the most popular pistol shooting discipline. Participants shoot pistols (semi-automatics and revolvers) at paper targets at fixed distances and within time limits.

Figure 22.1: Bullseye Pistol *(CMP)*

22.1 Pistols and Ammunition

Although the NRA-USA Bullseye rules allow autoloaders and revolvers (from .22 to .45 calibre), automatics are used almost exclusively.

The standard course of fire, called a "3-gun aggregate", is fired with a .22 rimfire, a centerfire, and a .45 calibre. However, most competitors use their .45 pistol both for the 'open' centerfire and .45 stages.

While there are dozens of different choices of commercial .22 calibre pistols used for Bullseye, the .45 calibre requires an accurized or a custom-built model. A popular choice is a stock Model 1911A1 pistol, especially accurized by a pistolsmith.

22.2 Ranges and Targets

Both outdoor and indoor ranges are used for Bullseye, with NRA-USA rules covering firing slow, timed and rapid stages. All courses of fire at an indoor competition are typically fired at 50 feet and outdoor competitions are typically fired at both 50 yards (slow fire) and 25 yards (timed and rapid fire). The 50 yard slow and the 25 yard timed/rapid targets have the same ring size.

Figure 22.2: Bullseye Pistol

The sustained fire stages are timed, with the targets turning to face the shooters at the start, and then turning back to their starting positions when the time finishes.

22.3 Equipment

Given the accuracy requirement of Bullseye shooting, special autoloader pistols are used with either adjustable rear-sights or optical or electronic sights. (Laser sights that project an image on the target are not allowed.) Custom anatomical pistol grips are also recommended. Finally a quality spotting scope with a high resolution that will allow you to see your shots on the target is also necessary.

22.4 Competitions

As discussed, Bullseye pistol competitions typically involve 3-4 courses of fire:

- **Slow Fire** - in which ten rounds are fired in ten minutes.
- **Timed Fire** - consisting of two five-round strings with twenty seconds for each string.
- **Rapid Fire** - has a ten second limit for each of the two five-round strings.

Outdoor Competitions		Indoor Competitions	
50 yd/ 25 yd	Slow Fire	20 yd	Slow Fire
	Timed & Rapid		Timed & Rapid
25 yd	Slow (short course)	50 ft	Slow Fire
	Timed & Rapid		Timed & Rapid
		25 ft	Slow Fire
			Timed & Rapid

Figure 22.3: NRA (USA) Bullseye Completions

- **National Match Course** - comprising 10 shots Slow Fire at 50 yards, 10 at Timed and 10 at Rapid at 25 yards.

In a '2700' match - the classic outdoor match - shooters fire 270 shots with a maximum value of 10 points each (hence the name), divided into three 90-shot events, fired with a .22, centerfire and .45 calibre pistol.

In a shorter '900' match - depending on the match format – shooters fire 90 shots in four stages: Slow, Timed and Rapid (20-shots each), and the National Match Course (30 shots), shot with a single pistol. Hence, a one-gun competition is often referred to as a "900" whereas a three-gun competition is a "2700".

The NRA-USA competitions groups shooters by ability (e.g. Marksman to top-level Master), and category (e.g. juniors, women, police, service).

22.5 Further Information

[1]. Bullseye Pistol, "The Encyclopedia of Bullseye Pistol," www.bullseyepistol.com, *provides extensive information on the shooting discipline.*

22.6 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation National Rifle Association Telephone 1-800-672-3888 Address NRA, 11250 Waples Mill Road, Fairfax, VA 22030 Web site www.nra.org	

Chapter 23

Target Air Pistols – single and multi-shot

There are a vast number of international and national pistol shooting disciplines spanning centrefire pistols, .22LR rimfire, and air pistols [1].

In this chapter we will focus on the ISSF 10m Air Pistol discipline. The ISSF Air Pistol competitions comprise:

- **10m Air Pistol Men** - 60 shots in a total time of 1 hour 45 minutes, including sighting shots.
- **10m Air Pistol Women** - 40 shots in a total time of 1 hour 15 minutes, including sighting shots.
- **10m Standard Air Pistol** – 40 shots for men and 30 shots for women, divided into events of 5 shots taken in 10 seconds
- **10m Rapid Fire Air Pistol** – 60 shots fired in two so-called half courses.

Figure 23.1: Target Air Pistol *(John Bloomfield)*

23.1 Pistols and Ammunition

For 10m Air Pistol, competitors may use any calibre 4.5mm (.177) compressed air or CO2 pistol that complies with the ISSF general rules. The following standards applies: a) the pistol must be loaded with one pellet only (apart from rapid fire), b) sights must be 'open' metallic only, c) the weight of the trigger pull must be at least 500 grams, d) the weight of the pistol with all accessories must not exceed 1500 grams, e) the grip may not support the hand beyond the wrist and may not encircle the hand, and f) it must fit into a box measuring 420 x 150 x 50 mm.

The ammunition must be 4.5mm lead projectiles (pellets).

a) Single b) Multi-shot

Figure 23.2: Target Air Pistols

23.2 Ranges and Targets

Air pistols are shot on indoor ranges at 10m using either paper targets or electronic targets.

23.3 Equipment

For competition shooting, pistols are fitted with anatomical grips that can be adjusted to fit the hand of the shooter (see Figure 23.1). Eye protectors are also mandatory.

23.4 Competitions

Competitions are shot in the standing position at a target centre of 11.5mm at a distance of 10 metres. The final of the best eight consists of 10 shots within 75 seconds per shot, and the score is evaluated in tenths with a central 10 being scored 10.9.

As discussed, there are three ISSF competitions:

- **10m Air '5 Target' Pistol (Falling Targets)** – men fire 60 shots in a total time of 105 minutes and women fire 40 shots in a total time of 75 minutes, including sighting shots. Events are divided into series of 5 shots each taken in 10 seconds. In each series, five shots are fired, one on each of 5 falling targets in a set.
- **10m Standard Air Pistol (Single Target)** – men fire 40 shots and women 30 shots, divided into events of 5 shots taken in 10 seconds. In each series, five shots are fired at one target.

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- **10m Rapid Fire Air Pistol** – 60 shots fired in two so-called half courses as follows: 1 sighting series in 8 seconds, 2 series in 8 seconds, 2 series in 6 seconds, and 2 series in 4 seconds.

23.5 Further Information

[1]. Shooting Wiki, http://www.shootingwiki.org/index.php?title=Air_Pistol_Shooting, *introduction to ISSF 10m Air Pistol*.

[2]. Target Shooting Canada, www.targetshooting.ca, *A Training Resource for Novice to Intermediate Pistol Target Shooters.*

23.6 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation National Smallbore Rifle Association Telephone 01483 485505 Address Bisley Camp, Brookwood, Surrey GU24 0NP Email info@nsra.co.uk Web site www.nsra.co.uk	**Organisation** National Target Shooting Association of Ireland Telephone 00 866 504 9073 Address PO Box 9, Blackrock, Co. Dublin, Ireland Web site www.targetshootingireland.org
Organisation British Pistol Club Telephone 01483 486293 Address B.C.M 5114 London WC1N 3XX Email britishpistolclub@ntlworld.com Web site www.britishpistolclub.org	**Organisation** Welsh Airgun Association Email iharris@btinternet.com Web site www.welsh-airgun.org.uk

Chapter 24

Gallery Rifle and Pistol

The changes in the Firearms laws in 1996 stopped most competitive pistol shooting in England, Scotland and Wales (except for air and muzzle-loading pistols, both of which are covered elsewhere in this handbook). Many former pistol shooters turned instead to Gallery Rifle. Since then, gunsmiths have been working to develop pistols that comply with the Firearms Acts; a variety of long barrelled pistols and revolvers are now being used competitively.

Figure 24.1: GR&P Shooters Standing Ready
(Iain Robertson)

24.1 Firearms and Ammunition

Gallery Rifle and Pistol (GR&P) covers four types of firearm:

- **Gallery Rifle Centre Fire (GRCF)** – any centrefire pistol calibre rifle, typically lever-action.
- **Gallery Rifle Small Bore (GRSB)** – any .22 rimfire rifle, typically a self-loading rifle with a detachable magazine; air rifles are also allowed in some, though not all, GRSB events.
- **Long Barrelled Pistol (LBP)** – in the UK this covers all .22" rimfire 'Long Barrelled Pistols', including revolvers, self-loading pistols and single-shot-pistols.
- **Long Barrelled Revolver (LBR)** – in the UK this covers any 'Long Barrelled Revolver' in a centrefire pistol calibre.

a) GRCF - under-lever Rifle

b) LBR - long barrelled revolver

Figure 24.2: Gallery Firearms

The term 'pistol calibre' refers to cartridges which were originally designed for use in pistols and thus have relatively low muzzle energy compared to the "full-bore" rifles used in Target Rifle and similar shooting. Popular centrefire pistol calibres include .357, .38 and .44.

Although these four types of firearm can be shot using traditional "iron" sights, telescopic and red-dot sights are used in most competitions.

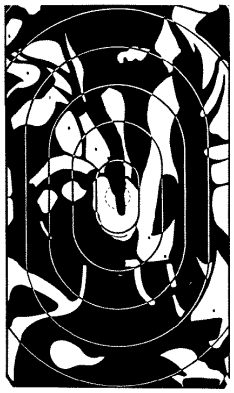

Figure 24.3: Disruptive-Pattern Target

24.2 Ranges and Targets

GR&P can be shot on suitable outdoor and indoor ranges. Targets are typically mounted on fixed frames, turning frames (programmed to provided timed "exposures" during which the target faces the shooter, then turns through 90 degrees) or advancing target trolleys (which move towards the firer at a fixed speed). The targets themselves vary between classic round-bulls for precision shooting to disruptive-pattern designs for speed events. Steel, rubber and paper plates are sometimes used and a few ranges have target frames which move rapidly from one side of the range to the other.

24.3 Equipment

In addition to a suitable rifle or pistol, a GR&P shooter needs hearing protection and, for some competitions, suitable belt pouches to carry spare ammunition. Spotting scopes are used in a few

events. Holsters are used for some of the LBP and LBR events. Eye protection is recommended and is likely to be compulsory in some competitions. Shooters wear normal clothing – anything which provides artificial support (e.g. stiff jackets, slings or shooting gloves) is not allowed.

24.4 Competitions

Much GR&P shooting is carried out in the standing position, but some events also require the shooter to kneel, sit and/or to use his/her weak shoulder/arm. Competition events include a wide range of targets, exposure timings, distances (usually anywhere from 10m to 50m, though some GR&P competitions involve shooting as far as 300yd) and/or the use of barricades for support in order to provide varied challenges to the skills of the shooters. Although GR was developed in the UK, it is now also popular in Ireland and Germany; international matches between the three nations take place every year. Shooters of LBPs and LBRs are also increasingly able to take part in international events, competing alongside shooters using more traditional pistol designs.

Further information on Gallery Rifle and Pistol shooting can be found on the NRA-UK web site [1].

24.5 Further Information

[1]. The Gallery Rifle and Pistol Handbook of the National Rifle Association of the United Kingdom: www.nra.org.uk/common/files/GR/GRPHandbook.pdf

[2]. National Rifle Association of the UK (NRA-UK), www.nra.org.uk. *The tab 'Clubs' gives an extensive list of UK shooting clubs.*

[3]. Galleryrifle.com, www.galleryrifle.com, *web site dedicated to Gallery Rifle shooting in the UK.*

24.6 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation	National Rifle Association of the UK
Telephone	01483 797777
Address	Charles Murton, Gallery Rifle & Pistol Discipline Rep, NRA, Bisley Camp, Brookwood, Surrey GU24 0PB
Email	gallery@nra.org.uk
Web site	www.nra.org.uk

Chapter 25

Long Range Pistol

The wonderful picture in Figure 25.1 shows long range pistol shooters shooting from their "flying machines".

Figure 25.1: Long Range Pistol Shooting

Long Range Pistol events are shot at distances of 100, 200 and up to 1200 yards. The various classes cater for pistols of differing types and calibres, ranging from black powder, through modern service and other pistols, to specially built rifle-calibre pistols. In the United States, NRA-USA Long Range Pistol silhouette has two basic pistol definitions and forms of competition: a) **Conventional**, which permits minor modifications, and b) **Unlimited**, which allows almost anything that can be done to a pistol within the limits of a 15 inch barrel and 4 1/2 pound weight limit.

In the UK Long Range Pistol Shooting was started over 40 years ago by Mr. G.R. (Gillie) Howe, an armourer with the Royal Marines, with the goal of improving the accuracy of long range pistol shooting. Officers came to Gillie complaining that they could not hit “a door” from 20 paces with their 9mm Browning Semi-Automatic Pistols (standard Army issue). Gillie hand tuned their guns with filed down foresights; produced hand made ammunition and showed them how to hit a dinner plate from 200 yards.

Prior to the banning of pistols in the UK, Long Range Pistol Shooting was divided into a number of classes:

- **Black Powder** – shot with BP pistols at 100 yards.
- **Pocket Pistol** – shot with pistols with 2” barrels at distances of 100 - 200 yards.
- **Browning Automatics** – shot with 9mm Browning semi-automatic pistols at 100 - 200 yards.
- **ACP Automatics** – shot with .45 ACP semi-automatic pistols at 100 - 200 yards.
- **Revolvers** – shot with revolvers with 9” barrels at 100 - 200 yards

Today, long range pistols are created from cut-down rifles; defined as a gun with a barrel of at least 30cm (12”) and an overall length of at least 60cm (24”). These “Long Range Pistols” are now shot at Bisley on a monthly basis from 100 yards to 1200 yards.

19.1 Pistols and Ammunition

Figure 25.2: Long Range Pistol

Long range pistols are typically defined as cartridge pistols chambered for rounds more usually associated with rifles (e.g. 7.62) and typically shot at ranges beyond 100 yards and up to 1200 yards.

Although a majority of shooters do re-load their own ammunition and use the latest wild-cat cartridges, there is no reason why you can not start off with a Production gun like the Competitor or Thompson Contender in .308 or 30-06 and use NRA ammunition. Most pistols are scoped. There are also classes for black powder, .22 rimfire and separate class for pistol calibres i.e. parallel sided cartridges like .357 Magnum or .44 Magnum.

19.2 Ranges and Targets

The pistols are used at ranges from 100 to 1200 yards. At 100/200 yards the Wessex target is used. At all other distances the standard NRA target is used. At short range 100/600 yards the course of fire

is 2 sighters and 10 to count where as at longer distances 800/1200 yards the course of fire is 2 sighters and 15 to count.

19.3 Equipment

Figure 25.1 shows Long Range Pistol Shooters shooting from their “flying machines”. Their shooting equipment is essentially a pistol gripped, short barrelled rifle, shot from a rested position. There is no need to have your own machine to start with as there is always someone to lend you one.

19.4 Competitions

Long Range Pistol Shooting competitions fall into several classes:-

- **Black Powder** - shot with BP pistols at 100 yards.
- **.22 Rimfire** - shot with .22 pistols at 100 yards and 200 yards.
- **Production Pistol** – specialist pistols, namely the Competitor or Thompson Contender.
- **Free Pistol** - custom made pistols, typically based on the Swing or RPA action; modified production pistols can also be used in this class.

The ILRPSA holds monthly competitions all the year round. Then in the Spring is the Phoenix Meeting at Bisley. The British Long Gun Assoc (BLGA), a Sister club to the ILRPSA, also meet monthly all year round and only shoot over 900/1200 yards.

19.5 Further Information

[1]. The NRA-UK, “Bisley Bible,” The NRA Rules of Shooting and the Programme of the Imperial Meeting Bisley. (available from the NRA).

19.6 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation International Long Range Pistol Shooters Association Telephone 01276 858 799 Address Mike Lunnon, 35A Delta Road, Chobham, Surrey GU24 8PZ	**Organisation** British Long Gun Association Telephone 01276 858 799 Address Mike Lunnon, 35A Delta Road, Chobham, Surrey GU24 8PZ

Part E – Historic Arms Disciplines

Summary

Historic arms disciplines – as the name suggests – shoot ‘old’ or replica firearms; especially muzzleloaders and black powder cartridge firearms. Rifles are shot on outdoor ranges, pistols on indoor ranges, and shotguns on outdoor ranges.

Chapter 26 - Classic and Historic Arms

The Classic and Historic Arms group is dedicated to those with an interest in historic rifles with particular reference to British, Commonwealth and other significant Military Miniature Calibre Training and Target Rifles, such as those manufactured by Lee-Enfield and BSA.

Chapter 27 - Muzzle Loading Rifles, Pistols and Shotguns

Muzzleloader, black powder firearms (muskets, rifles, pistols and shotguns) cover any firearm into which the bullet is loaded from the muzzle of the gun. Shooting competitions range from 25 yards for pistols to over 1000 yards for rifles.

Chapter 28 - Black Powder Cartridge Rifles and Pistols

Shooting is conducted with: a) original period rifles, b) replicas and c) modern purpose-designed rifles and pistols at distanced up to 600 yards, and with rifling, specialist rifles in .451" calibre shoot well out to 1000 yards.

Chapter 29 - Cowboy Action Shooting

Cowboy Action Shooting (CAS) typically uses four firearms: two revolvers, lever action rifle and double barrel shotgun. CAS requires competitors to use firearms typical of the mid- to late 19th century including single action revolvers, lever action rifles (chambered in pistol calibres) and side-by-side double barrel shotguns (e.g. with external hammers).

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Chapter 26

Classic and Historic Arms

Classic and Historic Arms groups are dedicated to those with an interest in historic rifles with particular reference to British, Commonwealth and other significant Military Miniature Calibre Training and Target Rifles, such as firearms manufactured by Lee-Enfield [4] and BSA.

Figure 26.1: Classic and Historic

Classic and Historic shooting has had an amazing growth in popularity in the last few years. The firearms used are 'datelined' to ensure that competitors are always competing against other competitors using a similar class of firearm. The dateline periods are: a) **Muzzle Loading** - before 1874, b) **Vintage** - before 1891, c) **Classic** - before 1919, d) **Veteran** - between 1919 and 1946 incl., e) **Open** - before 1946, and f) **Post Historic** - after 1946.

In the UK, two main Historic Arms Meetings are held at Bisley each year, at the beginning of the Imperial Meeting in July and the Trafalgar Meeting in October.

26.1 Rifles and Ammunition

The NRA-UK Historic Arms Resource Centre (http://rifleman.org.uk) provides a wealth of information on the classic and historic firearms, including an animation of available information.

Figure 26.2: Lee-Enfield Rifle

- **Muzzle loading** – this covers rifles before 1874.
- **Vintage** – this covers rifles before 1891.
- **Classic** - this covers rifles before 1919.
- **Veteran** - this covers rifles between 1919 and 1946.
- **Open** - this covers rifles before 1946.
- **Post Historic** - this covers rifles after 1946.

26.2 Ranges and Targets

Classic and Historic arms are shot at static targets on both covered and outdoor ranges at a variety of distances. For covered ranges this is 15, 20 and 25 yards; and for outdoor ranges 300 to 600 yards are popular.

26.3 Equipment

All that is required is a classic and historic firearm, falling within one of the six categories above: muzzle loading, vintage, classic, veteran, open or post historic.

Competitors also use historic slings and sandbags, and many use 50s-style cloth shooting jackets.

26.4 Competitions

The NRA-UK run a number of competitions for Classic and Historic arms. These include Miniature Rifle Winter Leagues at 15, 20 and 25 yard ranges for prone rifle in four classes: a) Service Rifle for pre-1946 military trainers; b) Classic Rifle for pre-1919 target rifles; c) Veteran Rifle for pre-1946 target rifle; d) Post-Veteran Rifle for later target rifles up to 1960; and e) Standing Leagues for rifles of pre- 1946 design at 20 & 25 yard ranges in three classes (i.e. 'Deliberate' using iron sights, 'Rapid Repeater' such as pump action, with any sights, and 'Semi-Auto' with any sights).

26.5 Further Information

[1]. Wikipedia, the free encyclopedia, http://en.wikipedia.org/wiki/Lee_enfield, *good review of the UK Lee-Enfield rifles popular with Classic and Historic Arms enthusiasts*.

[2]. The UK NRA, “Bisley Bible,” The NRA Rules of Shooting and the Programme of the Imperial Meeting Bisley. (available from the NRA).

[3]. UK Historic Arms Resource Centre, http://rifleman.org.uk, *an extensive UK web site covering Historical arms.*

26.6 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation Historical Breechloading Smallarms Association Address BCM HBSA, LONDON WC1N 3XX Email general.secretary@hbsa-uk.org Web site www.hbsa.fsnet.co.uk	**Organisation** UK Historic Arms Resource Centre Web site http://rifleman.org.uk

Chapter 27

Muzzle Loading Rifles, Pistols, Shotguns

Muzzle loading firearms (muskets, rifles, pistols and shotguns) are hugely popular worldwide. *Muzzleloaders* are any firearm loaded from the muzzle or in the case of revolvers from the front of the cylinder.

Figure 27.1: Muzzle Loading Firearms

One of the great attractions of muzzle loading is the diversity of firearms available for the enthusiastic target shooter to compete with. Shooting may be conducted with original period firearms or with modern made reproductions.

The Governing Body for muzzle loading within the UK is the Muzzle Loaders Association of Great Britain (MLAGB). The MLAGB has developed a comprehensive program of events that cater for a huge variety of firearms. In addition the National Rifle Association (NRA) caters for muzzle loaders in its historic arms matches. At a regional and local club level there are many that include muzzle loading shooting in their club activities.

The MLAGB also selects teams to represent Great Britain in international competition. At an international level the Muzzle Loaders Associations International Committee (MLAIC) is the World Governing Body. The MLAIC holds World and European Championships which are well attended and medals keenly contested.

27.1 Firearms

Nowadays with our developed appreciation of the past it is not difficult to understand the fascination that muzzle loading arms hold. Be it a sporting, military or specialised target arm that catches one's interest there are courses of fire open for most who wish to use them on the target range.

There are three basic ignition systems employed: matchlock, flintlock and percussion. When compared to later breech loading firearms the lock time (in simple terms, the time taken between pulling trigger and firing of the shot), while still measured in fractions of a second, is slow. This means that to get the best from the firearm draws on all one's basic shooting skills, especially sighting and follow-through. Sight systems will vary greatly depending on arm, from the flintlock musket with solely a foresight for reference to the sophisticated vernier adjustable sights of the long range match rifle.
At the basest level muzzle loaders are great fun to shoot and a most enjoyable time can be had in a morning spent in informal target practice. Learning to get the best accuracy from them though requires skill, practice and patience. Overlooked or perhaps misunderstood by many, muzzle loading offers a sport with all the challenges of modern target disciplines and capacity for accuracy to suit the most fastidious.

Classification and characteristics of muzzle loading firearms, basic equipment and loading techniques are covered in Chapter 8.

27.2 Ranges and Targets

Muzzleloaders are shot on standard rifle, pistol and clay pigeon ranges:

- **Muskets and Rifles** – muzzle loading muskets and rifles are shot on outdoor ranges alongside traditional (nitro) cartridge target and service rifles. They are shot prone, supine, kneeling and standing.

- **Pistols** – muzzle loading pistols are usually shot standing on a covered (open or enclosed) range, at distances of 25 metres, 25 yards, 50 metres and 50 yards.

- **Shotguns** – both flintlock and percussion shotguns will be seen on the ranges and are used in down-the-line, skeet and sporting clay pigeon events.

Targets used for the 25m pistol, and 50m and 100m rifle events are the standard ISSF 50m free pistol target, also known as PL7. This is designated MLAIC C50 within the MLAIC rules. The target has a 50mm diameter 10 ring, with remaining scoring rings (down to 1) at a 25mm spacing. The aiming mark is 200mm diameter and includes the 7-ring. Smooth bore musket events are usually fired at 50m on the French Military 200 metre target (MLAIC C200). The 10 ring measures 80 mm diameter, with the black aiming mark out to the 6 ring measuring 400 mm diameter. For mid (200-600 yard) and long range (distances out to 1200 yards) rifle competitions the standard NRA rifle targets are used.

Some events will use other targets for competition but the foregoing are those most commonly in use.

27.3 Equipment

Basic equipment needs for the loading and management of the muzzle loader are covered in Chapter 8. For the target shooter some consideration of additional items will be necessary. It should be noted that all are not necessary at the outset and equipment can be built up over a period of time.

- **Shooting Box or Case** – firearms should be transported in cases and a suitable box or case will also be required to transport the black powder, and shooting accessories.
- **Competition Equipment** – depending on the rules of the competition and the type of firearm to be used, this might include a shooting mat, shooting jacket, shooting glove, a suitable sling etc.
- **Spotting Scope and Stand** – a suitable spotting scope and stand for checking the target at a distance is also required.

27.4 Competitions

The standard course of fire for pistol, musket and rifle fired at short range (up to 100m) is thirteen shots in thirty minutes, with the best ten shots to count for score. No sighting shots are permitted, although a fouling shot can be fired into the backstop during the thirty minute detail if desired. The fouling shot should be announced to the range officer or scorer before firing so that it does not get mistaken for a match shot. All loading must take place during the allotted time period. Down-the-line shotgun competition is a total of 50 clay targets shot in two separate rounds of 25 clay targets.

Pistol shooting events are fired one handed, unsupported, at 25m. Musket and rifle events are for the most part fired either offhand or prone. Rifle slings, where permitted, must be original or a reproduction of a contemporary type. Modern adjustable target type slings, including single-point slings, are not permitted. In MLAGB and MLAIC events International Shooting Sports Federation (ISSF) style shooting jackets, gloves and boots are permitted, however the specialised shooting trousers are banned. Such specialised equipment may not be permitted in some NRA organised events.

Muskets and Rifles

Matchlock muskets are fired in competition at 50m from the standing and kneeling positions. The European style matchlock with its full length stock will not be unfamiliar, however the more exotic Japanese style matchlock with its short stock that is held against the cheek has its own unique characteristics. Flintlock military muskets are also fired offhand at 50m, and popular models include the British 'Brown Bess,' the French Charleville and the American Springfield muskets.

Flintlock and percussion sporting rifles firing a patched round ball are fired offhand at 50m and prone at 100m. British and European sporting rifles will be seen competing with the American long rifle; the latter it should be noted is more suited to 50m offhand shooting due to the shape of its stock.

The Enfield percussion rifle of The British Army is well known. It is prominent on the rifle scene at 100 metres and shot at longer ranges up to 600 yards. The specially developed percussion target rifles of the 1860 -1880 period extend competitive shooting out to 1,200 yards.

Pistols

Pistols are split into four categories: a) Matchlock, b) Flintlock, c) Single Shot percussion and d) Revolver. All competitions are shot in the standing position with a single handhold, except Historic revolver where a two hand hold is permitted. In some matches Original pistols are shot alongside reproduction models but in general they are shot in separate classes. For competitive shooting with

flintlock and single shot percussion pistols the duelling versions such a Le Page and Kuchenreuter are most popular due to their accuracy. For competitive shooting with revolvers the solid frame models such as Remington and Rogers and Spencer are preferred to the open frame Colt type. When shooting the Historic Revolver match the Old Army Rugers with adjustable sights are preferred.

Shotguns

A variety of muzzle loading clay pigeon shooting competitions are held at both club and national level in the disciplines of sporting, down-the-line and skeet. These competitions usually have classes for percussion single barrel, double barrel, small bore (18 bore and smaller), big bore (10 bore and larger) and flintlock guns. At international level the competitions are 50 birds down-the-line from a fixed, below ground, trap for both percussion and flintlock guns. Original and reproduction guns compete in separate classes so as not to disadvantage the older arms.

27.5 Further Information

[1]. Andrew Courtney, “The Modern Muzzle Loader”, The Muzzle Loaders Association of Great Britain (1997) ISBN 0 9530541 0 1.

[2]. Sam Fadala, “Lyman Black Powder Handbook & Loading Manual”, Lyman Publications (2001), UPC #011516971005

[3]. Muzzle Loaders Association of Great Britain (MLAGB), www.mlagb.com, *The Governing Body for muzzle loading within the UK.*

[4]. Charcoal Burner, “Muzzle Loading Pistol Shooting – an Introductory Guide”, www.charcoal-burner.com

[5]. Derek Fuller, “The Definitive Guide to Shooting Muzzle Pistols”, The Crowood Press (2002), ISBN 1861264828.

[6]. Muzzle Loaders Association International Committee, www.mlaic.org, *World Governing Body for muzzle loading shooting.*

[7]. Long Range Muzzle Loader, www.lrml.org, *UK based forum and resource for this challenging discipline*.

27.6 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation Muzzle Loaders Association of GB (MLAGB) Telephone 01926 458198 Address 7 Olympus Court, Tachbrook Park, Warwick CV34 6RZ Email membership@mlagb.com Web site www.mlagb.com	

Chapter 28

Black Powder Cartridge Rifles and Pistols

Black powder cartridge rifle and pistol shooting encompasses both hand loaded and commercial cartridges. In the UK, the Single Shot Black Powder Cartridge Rifle Club of Great Britain shoot prone on outdoor ranges at distances of 200 to 1000 yards. In the United States, black powder cartridges are governed by the NRA-USA and closely associated with Cowboy Action shooting and Silhouette shooting. In America this typically comprises 3-gun shooting competitions of BP C pistol, rifle and shotgun.

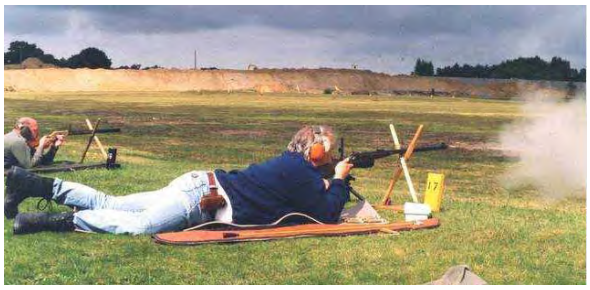

Figure 28.1: Black Powder Cartridge

In this chapter we focus on UK BPCR shooting, with Cowboy Action Shooting and Silhouette shooting covered by separate chapters.

28.1 Rifles and Ammunition

BPCR subdivide into *historic* firearms, *replicas* of historic firearms and *modern* designs. Typical calibres are .45 calibre, and also .35 calibre, .40 calibre, and .50 calibre.

a) BP Cartridge Rifle

b) BP Cartridge Pistol

Figure 28.2: Black Powder Cartridge Firearms

Examples of the rifles include the Pedersoli Quigley .45-3.25" (.45-120), Pedersoli Rolling Block (Custer Mod.) .45-2.1" (.45-70), Shiloh (Hartford) .45-2.1" (.45-70), Shiloh (Long Range Express) .45-2.1" (.45-70).

Sights must be period correct of original design, click adjustable sights are expressly excluded. Period correct telescopic sights are permitted but shoot within their own class.

An Introduction to Black Powder Cartridge Rifle Loading By Chuck Raithel can be found on the web or on the SSBPCRC site [3].

28.2 Ranges and Targets

Black powder cartridge rifles are shot prone on standard Target Rifle (TR) or specially designed targets on High Power outdoor ranges at distances of 200 to 1000 yards.

28.3 Equipment

The equipment required is an authentic black powder cartridge rife; and the only artificial supports allowed are Crossed-sticks and/or Wrist Supports that meet Club rules are allowed as rests for this match.

28.4 Competitions

The Single Shot Black Powder Cartridge Rifle Club of Great Britain (SSBPCRC) [3] has five major competitions:

- **Buffalo** – the course of fire comprises 20 consecutive rounds to score at both 200 yards and at 600 yards, each with 30 minutes. The target is an outline of a buffalo with anatomically correct scoring zones.

- **Creedsmoor** – the course of fire comprises 20 consecutive rounds to score at both 900 yards and at 1000 yards, each with 30 minutes. The target is a standard NRA target for 1000 yards.
- **Silhouette** – this involves shooting at animal 'silhouette' targets. The course of fire comprises 10 consecutive rounds each at chickens and at pigs at 300 yards. Then 10 rounds at turkeys and 10 rounds at rams at 500 yards. Each of the four courses of fire being completed in 15 minutes.
- **Quigley** – the course of fire comprises 20 consecutive rounds to score at both 300 yards and 600 yards, each with 30 minutes. The targets are so-called Bucket and Wagon Man Targets.
- **Precision** - the course of fire comprises 20 consecutive rounds to score at both 300 yards and at 600 yards, each with 30 minutes. The targets are the standard NRA targets for these distances.

28.5 Further Information

[1]. Sam Fadala, "Lyman Black Powder Handbook & Loading Manual", Lyman Publications (2001), UPC #011516971005

[2]. Chuck Raithel, "Introduction to Black Powder Cartridge Rifle Loading", www.wahsatchdesperadoes.com/Intro_to_BPCR_Loading.pdf

[3]. Single Shot Black Powder Cartridge Rifle Club of Great Britain, www.ssbpcrc.co.uk/index.htm.

[4]. Black Powder Cartridge Rifle Site, www.bpcr.net, *American BPCR site.*

28.6 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation Single Shot Black Powder Cartridge Rifle Club of Great Britain Email secretary@ssbpcrc.co.uk Web site www.ssbpcrc.co.uk/index.htm	**Organisation** Muzzle Loaders Association of GB (MLAGB) Telephone 01926 458198 Address MLAGB, 7 Olympus Court, Tachbrook Park, Warwick CV34 6RZ Email membership@mlagb.com Web site www.mlagb.com

Chapter 29

Cowboy Action Shooting

Cowboy Action Shooting (CAS) [1], also known as Western Action Shooting or Single Action Shooting, is a competitive shooting sport that originated in California, in the early 1980s. Matches are held throughout the United States, as well as Australia, England, Finland, Holland, New Zealand, and Spain. The informality of CAS means that courses of fire can include shooting from facsimile barber's chairs, wagon or train seats, and even huge rocking horses!

Figure 29.1: Cowboy Action Shooting *(courtesy SASS)*

29.1 Rifles and Ammunition

A CAS shooter typically uses four authentic firearms: two revolvers, lever action rifle and double barrel shotgun. CAS requires competitors to use firearms typical of the mid- to late 19th century including single action revolvers, lever action rifles (chambered in pistol calibres) and side-by-side double barrel shotguns (e.g. with external hammers). All CAS guns must be 'single action', the hammer must be manually cocked before each shot can be fired, but firearms can be either original or reproduction guns.

a) Revolver b) Rifle c) Shotgun

Figure 29.2: Cowboy Action Shooting

29.2 Ranges and Targets

In CAS, the 'ranges' or courses of fire are typically mock-ups of Old West towns and the targets are typically steel plates that ring/clang/ding when hit. Each competition follows a scenario or 'stage', like in a film. It might involve 'jumping out of bed, shooting through the window with their pistol, grab the money bag, go outside and get their shotgun and shoot 4 shells from behind a rock or building, then get their rifle from a saddle scabbard and so on.' The scenarios and stages are different for each competition, with the competitor being scored for time and accuracy.

29.3 Equipment

Competitors are required to wear an authentic Western costume of some sort. Depending on the rules of the sanctioning organization, clothing may be historically accurate for the late 1800s or may just be suggestive of the Old West.

29.4 Competitions

As introduced, CAS competitions involve a number of separate shooting scenarios known as 'stages' [1]. Stages are always different, each typically requiring ten pistol rounds (using two single action revolvers), nine or ten rifle rounds, and two to eight shotgun rounds.

Shooters compete one at a time, against the clock, with some matches being scored simply by 'total time' plus penalties and bonuses, and other matches being scored by Rank Points. Each shooter's 'raw' time for the stage is increased by 5 seconds for each missed target and 10 seconds for any procedural penalty incurred. After these adjustments are made; the fastest time wins. In 'Rank Point' scoring the winner of a match is determined by adding up each shooter's ranking for each stage, with the lowest score winning.

CAS competitions are often designated by different Classes depending on the firearms used:

- **Traditional** - Shooters use pistols with fixed sights.
- **Modern** - shooters use pistols with adjustable sights.

- **Frontier Cartridge** - shooters use black powder rather than smokeless powder in all their guns.
- **Frontiersman** - Shooter uses cap and ball revolvers and side by side double barrel or lever action shotguns.

and style of shooting [1]:

- **Duellist** - Shooter uses only one hand to fire pistols
- **Gunfighter** - Shooter uses two pistols at once when the stage allows otherwise shoots his right side pistol with his right hand only and his left side pistol with his left hand only.

29.5 Further Information

[1]. Wikipedia free encyclopedia, "Cowboy Action Shooting", http://en.wikipedia.org/wiki/Cowboy_action_shooting

[2]. Ronald Harris, "All About Cowboy Action Shooting," Stoeger (2001), ISBN-10: 0883172321.

[3]. Hunter Scott Anderson, "The Top Shooter's Guide to Cowboy Action Shooting," (2001), ISBN-13: 9780873418713.

[4]. Single Action Shooting Society (SASS), www.sassnet.com, *the official sanctioning body for cowboy action shooting competitions.*

29.6 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation Single Action Shooting Society Telephone +1 (714) 694-1800 Address SASS, 23255 La Palma Avenue, Yorba Linda, California 92887 Email www.sassnet.com/Contact-Us-001A.php Web site www.sassnet.com	**Organisation** British Western Shooting Society Telephone 016-422-53-3333 Address BWSS, 21 Shardeloes Road, SKEGNESS, Lincs PE25 3AA Email mail@bwss.org.uk Web site www.bwss.org.uk

Part F – Military and Practical Disciplines

Summary

The Military and Practical disciplines shoot civilian equivalents of modern service rifles such as the M16 (firing 5.56 calibre cartridge), semi-automatic pistols and pump-action shotguns. Competitions as you might expect are military or law enforcement inspired, and often the course of fire comprise a series of stages.

Chapter 30 - Practical 3-Gun Shooting – rifle, handgun, shotgun

Practical 3-gun shooting is popular in the United States, and involves shooting a rifle, pistol and shotgun on a simulated military or law enforcement course of fire (called stages).

Chapter 31 - Practical Rifle

Practical rifle shooters use a civilian version of a modern service rifle, such as a 5.56 calibre AR15, with competitions involving a series of stages. To compete competitively a telescopic sight and large capacity magazines are a requirement (20 rounds is the norm although 10 rounds will suffice at a pinch).

Chapter 32 – Civilian Service Rifle

Civilian Service Rifle is a shooting discipline that involves the use of rifles that are used by military forces and law-enforcement agencies, both past and present use. These include ex-military rifles, sniper rifles (both past and present) and civilian versions of current use service rifles.

Chapter 33 - Fifty-Caliber (Long Range) Rifle

The Fifty Caliber Shooting Association (FCSA) as the name suggests focus on firing .50 calibre (and .338 calibre) rifles at bullseye targets at ranges of 1,000 yards and greater. FCSA has over 4000 members and is growing steadily. FCSA has members in twenty-two countries including England, Switzerland, Finland, South Africa, Australia and Canada.

Chapter 34 - Practical Pistol and Air Pistol

Practical Pistol involves cartridge pistols, air pistols and Airsoft, with competitors shooting a simulated military or law-enforcement course of fire. Competitors use a magazine fed pistol or revolver capable of firing multiple shots before reloading. The majority of pistols used in the UK for PP are CO2 powered, or air cartridge revolvers. The standard calibre is .177 but .22 is allowed.

Chapter 35 - Service Pistol

A service pistol is any handgun (revolver, or semi-automatic) issued to military personnel, or in some contexts law enforcement officers. Service Pistol typically involves competitions between serving military personnel, recent personnel and (where the Law allows) civilian enthusiasts. Shooting is often done on Military ranges.

Chapter 36 – Iron Plate Action Shooting

Iron plate action shooting or I.P.A.S, is the action shooting discipline, designed specifically for the multi shot CO_2 and Air cartridge pistols and is a form of “speed shooting”.

Chapter 37 – Target and Practical Shotgun

Target and Practical Shotgun involves competitors shooting self-loading or pump action shotguns with magazines containing 7-14 rounds at steel plates, ‘shoot/no-shoot’ targets, ‘pepper poppers’ and paper targets.

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Chapter 38 - Airsoft Rifles and Pistols

Airsoft is a shooting discipline in which players participate in simulated military or law enforcement-style combat using replicas (in appearance only) of real firearms firing small round pellets. Airsoft guns (also known as Soft Air guns) are spring, electric, or gas powered air guns that fire small spherical plastic pellets of either 6 mm or 8 mm diameter (0.24 or 0.32 inches).

Other Disciplines

- **The 'McQueen' (Sniper Rifle)** - The so-called McQueen is a sniper competition rather than a shooting discipline such as Fullbore or Smallbore target shooting. Specifically it is a series of six Sniping competitions A to F [1], called: Sniper, Target, Classic Sniper Rifle, Sporting, Open Sniper Rifle, and Any Rifle – shot at 300 yards.

- **(Sub) Machine Gun** - Although submachine gun matches have been happening in the United States since the early 1980's, it is one of the least-known shooting disciplines, and banned in most other countries. Submachine gun and belt-fed Machine gun shooting competitions use Heckler & Koch MP5, Uzi and Mini Uzi, M16 in 9mm, Sterling, Sten, Thompson, Carl Gustav M/45 / Swedish K and the MP40 (competitions must cost a small fortune!).

Chapter 30

Practical 3-Gun Shooting

Practical 3 gun shooting is a sport that challenges an individual's ability to shoot rapidly and accurately with a full power rifle, pistol, and shotgun. In practical shooting competitors move around a course of fire or a series of 'stages' shooting at a variety of targets [1-3], as with military or law enforcement training. The goal for the competitor is to try and blend accuracy, power, and speed, into a winning combination. Targets are typically 75 centimetres by 45 centimetres with a 15-centimetre center representing the "A zone" or bullseye. Most shooting takes place at close range; below 45 metres.

Figure 30.1: Practical 3-Gun *(courtesy USPSA)*

Historically, practical shooting has been a pistol sport, and is primarily still so at an international level [3]. However, in recent years in the United States 3-gun (rifle, pistol, and shotgun) has been growing in popularity. The sport is governed by the International Practical Shooting Confederation (IPSC) [1]; incorporating the United States Practical Shooting Association (USPSA) [2] and UK Practical Shooting Association (UKPSA) [3]. In 1996, a breakaway group formed the International Defensive Pistol Association (IDPA) with the aim of returning to the defensive pistol roots of practical shooting.

This chapter covers IPSA and USA 3-gun shooting. The next chapter covers IDPA Defensive Pistol. In the following two chapters we look at Practical Rifle and Practical Pistol shooting, mainly from a UK perspective.

30.1 Firearms and Ammunition

The US Practical Shooting Association [1] subdivides firearms into the following classes:

- **Pistols** – semi-automatic pistols and revolvers divide by class into: *Limited*, *Limited 10*, *Open*, *Production*, and *Revolver*.
- **Rifles** – semi-automatic and manual rifles are dived into: *Open, Standard, Tactical*, and *Manually Operated*.
- **Shotguns** – shotguns of all types are subdivided into: *Open* and *Standard*.

a) Pistol b) Rifle c) Shotgun

Figure 30.2: Practical Shooting

For details of these classes refer to the USPSA web site [3].

30.2 Ranges and Targets

Ranges simulate military or law enforcement training with a course of fire (called stages). In general, the course designer can include multiple targets, moving targets, targets that react when hit, penalty carrying targets mixed-in, or even partially covering shoot targets, obstacles, movement, competitive tactics, and in any combination.

30.3 Equipment

To compete in 3-gun practical shooting competitions you need a suitable pistol, rifle and shotgun. Within the UK practical 3 gun competitions are held using other firearms to overcome the ban on

pistols and to cater for those ranges where full bore rifles cannot be used. Many competitions use a combination of Shotguns, Gallery Rifles, Lightweight sporting Rifles (LWSR) and Long Barrelled Revolvers (LBR) or Gas Powered Pistols (GPP) guns.

Dressing in combat fatigues is discouraged. With the exception of serving military or police personnel who may wear their normal service clothing, any clothing, or combination of clothing, which has a paramilitary style is considered inappropriate at practical 3-gun competitions. Camouflage clothing of any irregular pattern is specifically banned by the UKPSA and many other associations.

30.4 Competitions

The rules of the IPSC state that the course of fire (i.e. stages) should be practical and diverse, to keep the sport from becoming too formalized or standardized. Targets are 75 centimetres by 45 centimetres with a 15-centimetre center representing the "A zone" or Bullseye. Most pistol shooting takes place at close range, with rare shots out to 45 metres.

All shooting is against the clock, with an electronic ‘beep’ starting the stage and at the end of the stage the competitor shoots a metal ‘stop’ plate to stop the timer. Scoring is a combination of points (target hits) and time.

The USPSA has a classification scheme for practical shooters so they can compete against shooters of a similar score and skill level: Grand Master (95%-100%), Master (85%-94.9%), A (75%-84.9%), B (60%-74.9%), C (40%-59.9%), and D (2%-40%). UKPSA sanctioned matches are only open to those members who have successfully completed a two day basic safety course and obtained a competition licence. This is to ensure that competitors are of a sufficient standard to cope with the difficult demands of practical shooting under competition conditions.

30.5 Further Information

[1]. Wikipedia, the free encyclopedia, http://en.wikipedia.org/wiki/Practical_shooting, *introduction to practical shooting*

[2]. The UK Practical Shooting Association, www.ukpsa.co.uk, *the UK region of the International Practical Shooting Confederation*.

[3]. The United States Practical Shooting Association, www.uspsa.org, *as the name suggests, the governing body of practical shooting in America.*

[4]. International Practical Shooting Confederation, www.ipsc.org, *the International governing body of practical shooting*

30.6 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation The UK Practical Shooting Association Telephone 07010 703845 Address UKPSA, PO Box 7057, Preston, Weymouth, Dorset DT4 4EN Email alan@mediainc.co.uk Web site www.ukpsa.co.uk	**Organisation** Irish Practical Shooting Association Address PO Box 856, Naas, Co. Kildare Web site www.ipsc-ireland.org/
Organisation United States Practical Shooting Association Telephone +1 (360) 855-2245 Address P.O. Box 811, Sedro-Woolley, WA 98284 Email office@uspsa.org Web site www.uspsa.org	

Chapter 31

Practical Rifle

In general, 'Practical' shooting covers rifles, pistols and air pistols, and also shotguns. Competitors move around a course or a series of 'stages' shooting at a variety of targets [1-3], as with military or law enforcement training. The goal for the competitor is to try and blend accuracy, power, and speed, into a winning combination.

Figure 31.1: Practical Rifle *(Iain Robertson)*

Practical Rifle evolved as a discipline to replace the old Service Rifle when the Armed Forces adopted the self-loading rifle in the late '60s. Courses of fire are devised by the individual match organiser, and usually involve a physical element (e.g. a 500 to 100 yard run down the range firing two shots every 100 yards). Matches may involve deliberate, timed and snapshooting, and may involve rapid reloading or changing of magazines. Competitions are usually fired on disruptive pattern targets. A rifle with a telescopic sight and a magazine capacity of at least 10 shots is advisable.

In the USA targets are 75 centimetres by 45 centimetres with a 15 centimetre centre representing the "A zone" or bullseye.

31.1 Rifles and Ammunition

You don't need any special equipment to take part except of course a rifle; typically a civilian version of a modern service rifle, such as a 5.56 calibre AR15. Having said that, it will soon become apparent that to compete competitively a telescopic sight and large capacity magazines are a requirement (20 rounds is the norm although 10 rounds will suffice at a pinch).

Figure 31.2: Practical Rifle

31.2 Ranges and Targets

Practical rifle is shot on outdoor ranges at static targets, with targets usually adopted from the 'local' NRA.

31.3 Equipment

As discussed, the basic equipment is a civilian equivalent of a modern, self-loading service rifle with a 10 or 20 round magazine, a telescopic sight with a 10-20 magnification, plus hearing protectors and casual clothing.

31.4 Competitions

As discussed above, the individual match organisers largely specify competitions, but courses of fire usually include a 'physical' and 'disruptive' element, such as running down the range and rapid loading of ammunition. Practical shooters also take part in UK Service Rifle [2] and High Power competitions [3].

31.5 Further Information

[1]. Practical Rifle, www.practicalrifle.co.uk, *The web site for practical rifle shooters in the UK.*

[2]. The UK Practical Shooting Association, www.ukpsa.co.uk, *the UK region of the International Practical Shooting Confederation*.

[3]. The United States Practical Shooting Association, www.uspsa.org, *as the name suggests, the governing body of practical shooting in America.*

[4]. International Practical Shooting Confederation, www.ipsc.org, *the International governing body of practical shooting*

31.6 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation The UK Practical Shooting Association Telephone 07010 703845 Address UKPSA, PO Box 7057, Preston, Weymouth, Dorset DT4 4EN Email alan@mediainc.co.uk Web site www.ukpsa.co.uk	**Organisation** Irish Practical Shooting Association Address PO Box 856, Naas, Co. Kildare Web site www.ipsc-ireland.org/

Chapter 32

Civilian Service Rifle

Service Rifle is a shooting discipline that involves the use of rifles that are used or were used by military forces and law-enforcement agencies. These include current military rifles (e.g. M16, SA80), ex-military rifles, sniper rifles (both past and present) and civilian versions of current use service rifles (AR15).

In the United States the Civilian Marksmanship Program (CMP) governs civilian Service Rifle matches. Competitors must use an approved US military service rifle, or the civilian equivalent. This is generally either an M16 or AR15. In the UK, civilian Service Rifle courses of fire are based on those fired by the Armed Forces, and as with Practical Rifle usually involves a physical element (e.g. a 500 to 100 yard run down firing two shots every 100 yards). Matches may involve deliberate, rapid fire and snap shooting, and will usually involve firing from a variety of positions including prone, sitting, kneeling, and standing, and from a fire trench.

Figure 32.1: Service Rifle

For Military personnel the matches are fired with the current military issue rifle (the SA80 for British Forces) or, for overseas competitors (German H&K G36, USA M16), that of their own country.

32.1 Rifles and Ammunition

Service Rifle covers any rifle that has been in general issue with an armed force at some stage, or a civilian rifle based on a military rifle (H&K SL4/8, AR15 etc). However, many countries prohibit civilians from owning fully automatic rifles.

Sights are usually restricted to the type issued with the rifle; not aftermarket target sights, modified military sights or optical sights (except for sniper class).

Likewise, ammunition must be of a calibre that has been used with a military force at some stage and consistent with the rifle to which it is being used. However, the ammunition does not have to be military surplus (milsurp); any commercial or reloaded ammunition is acceptable if consistent with the original cartridge as to load and bullet weight.

Service Rifle also includes ‘Sniper Class’, which covers military issued sniper rifles or faithfully reproduced sniper rifles. They should have an original optical sight, or a broadly similar civilian pattern telescopic sight, not greater than 4x32 power.

32.2 Ranges and Targets

Service Rifle is shot on civilian and military ranges from 100 to 600, or even 1000 yards at silhouette (head-torso) figure targets. Some competitions are shot on electronic targets that ‘fall’ when hit.

32.3 Competitions

As discussed, competitions are based on courses of fire fired by the Armed Forces and usually involve a physical element such as running down the range; deliberate, rapid fire and snap shooting; and firing from a variety of positions including prone, sitting, kneeling and standing.

In the US, a CMP-designated Service Rifle match course of fire is: a) **Standing** - 10 shots standing, slow fire, 200 yards; b) **Sitting** - 10 shots sitting, rapid fire, 200 yards; c) **Prone (rapid)** - 10 shots prone, rapid fire, 300 yards; and d) **Prone (slow)** - 20 shots prone, slow fire, 600 yards.

In the UK, a NRA-designated Service Rifle match course of fire is: a) **Sitting** - 10 shots sitting, 25 seconds, 200 yards; a) **Standing** - 10 shots standing, 100 yards; followed by kneeling or squatting, and c) **Prone** - 10 shots prone, rapid fire, 300 yards.

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32.4 Further Information

[1]. Wikipedia, the free encyclopedia, http://en.wikipedia.org/wiki/Service_Rifle, *list of historical and modern service rifles*.

[2]. Shootingwiki, www.shootingwiki.org/index.php?title=Service_Rifle, *introduction to US Service Rifle.*

[3]. The Lee Enfield Rifle Association, www.leeenfieldrifleassociation.org.uk , Contact info@…

32.5 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation National Rifle Association of the UK Telephone 01483 797777 Address Bisley Camp, Brookwood, Woking, Surrey GU24 0PB Email info@nra.org.uk Web site www.nra.org.uk	

Chapter 33

Fifty-Caliber (Long Range) Rifle

The Fifty Calibre Shooting Association (FCSA) is a discipline shot in the USA, UK and a number of other countries, such as Switzerland, Finland, Italy, Malta, South Africa, Australia and Canada.. As the name implies it focuses on firing .50 calibre and other large calibres such as .338 calibre rifles at bullseye targets (and others) at ranges of 1,000 yards and greater.

Given the cost of shooting .50BMG, the FCSA allows members to use a variety of other calibre's such as .338 right down to .22LR.

Figure 33.1: Fifty Calibre Shooting

Figure 33.2: Accuracy International AW50 Rifle

33.1 Rifles and Ammunition

The FCSA specialise in the 50BMG 12.7x99mm Browning cartridge - '50cal' being the common name, rather than the Russian counterpart 12.7x108mm or the short .50cal 'Spotter' as used on recoilless artillery, as 50BMG reloading components are the most readily available in the UK, Europe and the US. Compared to other 12.7mm calibres the '50BMG' has the largest number of civilian users across the world. Details such as forthcoming 50BMG rifle competitions, 50BMG reloading data and retail information on rifles available to the UK shooter can be found on the FCSA (UK) website. Many members also compete at distances beyond 1000 yards with other large calibre rifles, such as .338 Lapua and now the .408 CheyTec.

Popular 50BMG rifles in the UK include RPA Rangemaster .50BMG, Accuracy International AW50, the Steyr HS50 50BMG and AMSD Nemesis 50 BMG from Switzerland.

All of the rifles (see Figure 33.1 and 33.2) are fitted with muzzle breaks or recoil compensators. These are fitted to the muzzle of a firearm and redirect propellant gases with the benefit of countering both recoil and rising of the barrel during firing.

All ammunition used in FCSA sanctioned 50cal shooting competitions is the "fixed" 50BMG design (12.7mm x 99mm).

33.2 Ranges and Targets

To those not familiar with the .50BMG calibre, the muzzle energy can be in excess of 10,000 ft/lbs depending on the loading, with a muzzle velocity usually just under 3000 ft/sec. As such the majority of UK ranges are not suitable.

That said, there are a growing number of UK ranges that the FCSA (UK) have managed to gain access to (Mainly MOD Multi Purpose / Field Firing Ranges) that have been approved for 50BMG and usually even larger calibres, allowing shooting to around 3000m (see www.fcsa.co.uk).

33.3 Equipment

FCSA approved equipment comprises:

- **Rifle Rests** - a rifle rest is allowed to support the forend of the rifle. A rifle rest is also allowed to support the rear of the rifle. Rifle rests are restricted to the sand bag type made from soft pliable leather or a soft pliable material, filled only with sand.
- **Bipods** - bipods are acceptable in any class of FCSA sanctioned shooting competition.
- **Targets** - only the NRA-UK MR-1 600 yard target is approved for FCSA sanctioned 1000 yard shooting competitions. (These can vary, depending on the competition.)
- **Wind Flags** - it is recommended that wind flags be used at all FCSA sanctioned shooting competitions. This does not preclude competitors from using and placing their own wind flags/wind measuring devices on the range during a shooting competition.
- **Benches** – benches are only allowed in 'unlimited' class fifty calibre; see below.

33.4 Competitions

The FCSA (UK) has 4 classes of competition:

- **Light Class Fifty Calibre** - restricted to a rifle that shoots a .50 cal. BMG cartridge and restricted to a total overall weight of thirty two pounds and eight ounces (32 lbs 8.00 oz.).
- **Heavy Class Fifty Calibre** - any rifle that shoots a bullet with a diameter of .510/.511 inches and has a maximum overall weight of fifty (50 lbs.) Pounds.
- **Unlimited Class Fifty Calibre** -: any rifle that fires a bullet with a diameter of .510/.511 inches.
- **Hunter Class Fifty Calibre** - Competitors will shoot and compete from a prone shooting position with rifle equipped with bipods or other authorised supports.

The competitions usually consist of the smallest size, 5 shot group.

33.5 Further Information

[1]. Wikipedia, the free encyclopedia, http://en.wikipedia.org/wiki/.50_BMG, *article on the .50 Browning Machine Gun cartridge.*

[2]. Fifty Caliber Institute, www.fiftycal.org, *US organisation dedicated to the legal aspects of 50cal ownership in the USA.*

33.6 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation Fifty Calibre Shooters Association UK Address Please make initial contact by email Email editor@fcsa.co.uk Web site www.fcsa.co.uk	**Organisation** Fifty Caliber Shooting Association Telephone 00 1 435 527 9245 Address P.O.BOX111, MONROE, UTAH 84754-0111 Email fcsa@scinternet.net Web site www.fcsa.org

Chapter 34

Practical Pistol and Air Pistol

In Practical Pistol (unlike traditional target pistol shot over a fixed distance at a bullseye target) every competition is different, with the competitor moving around and shooting at a variety of targets positioned at varying distances. The so-called stages (a dozen or so in a typical match) themselves are set up as shooting problems to be overcome by the competitor. In addition, competitors carry a number of magazines, which they will need to change during the different stages.

Figure 34.1: Practical Pistol

In most countries, Practical Pistol involves magazine fed semi-automatics or revolvers capable of firing multiple shots before reloading, equipped with open 'iron' sights or red-dot sights.

In mainland UK, following the Pistol ban, Practical Pistol now involves multi-shot Air pistols and Airsoft. The vast majority of pistols are CO2 or Gas powered. There are also a number of competitions using Long Barrelled Revolvers (LBR). However, Practical Pistol is still shot in Northern Ireland where a number of UKPSA Graded and Championship competitions take place. UK competitors still compete in overseas competitions using semi-automatics.

34.1 Pistols and Ammunition

Practical Pistols are divided into divisions:

IPSC Practical Pistols

a) Semi-Automatic b) CO2 Air Pistol c) Airsoft Pistol

Figure 34.2: Handguns used for Practical Pistol

The IPSC separate pistols by Divisions. In general, the minimum cartridge case dimension for pistols to be used in IPSC matches is 9 X 19 mm. The minimum bullet diameter is 9 mm (.354 inches). Types of sights allowed by IPSC are: a) "Open sights" are aiming devices fitted to a firearm which do not use electronic circuitry and/or lenses; and b) "Optical/electronic sights" are aiming devices (including flashlights) fitted to a firearm which use electronic circuitry and/or lenses.

Air and Airsoft Pistol

In the UK, Air Pistols and Airsoft Pistols classify by group:

- **Standard** - Magazine capacity 10 rounds or less. Open sights (No red dots etc.). (But NOT air cartridge revolvers [Brocock] - see revolver Division).
- **Modified** - Magazine capacity 10 rounds or less. Optical sights (red dots etc.). (INCLUDES air cartridge revolvers [Brocock] with red dots etc.).
- **Open** - Magazine capacity over 10 rounds. "Free" sights - red dots etc. allowed. (This Division is primarily for Anics users).
- **Revolver** - Air cartridge revolvers (e.g.: Brocock). Open sights (No red dots etc.).

34.2 Ranges and Targets

As discussed in previous chapters on Practical Shooting, ranges simulate military or law enforcement training with a course of fire (called stages). In general, the course designer can include multiple targets, moving targets, targets that react when hit, penalty carrying targets mixed-in, or even partially covering shoot targets, obstacles, movement, competitive tactics, and in any combination.

34.3 Equipment

The principal piece of equipment is a legal semi-automatic pistol or air pistol.

Practical Pistol (USA)

You can get started with very little equipment: a safe gun and holster, two ammo carriers, a belt, and several hundred rounds of ammunition. Examples of pistols used include: .45ACP semi-automatics, 9mm semi-automatic service pistols; and .38 calibre service revolvers.

Practical Air and Airsoft Pistol (UK)

In the UK equipment comprises: a) an Air Pistol, b) extra magazines, c) holster and belt, d) magazine pouch or clips, e) safety glasses, f) airgun pellets, and g) CO2 capsules [1]. For competitions at least 5 magazines, each holding 8 rounds or 40 shots is required.

Safety glasses are are mandatory.

34.4 Competitions

In practical shooting, the competitor must try to blend accuracy, power, and speed, into a winning combination. Targets are 75 centimetres by 45 centimetres with a 15 centimetre center representing the "A zone" or Bullseye. Most shooting takes place at close range, with rare shots out to 45 meters. Hitting a 15 centimetre A zone at 45 meters or less might seem easy to an experienced pistol shooter, but in IPSC only full power pistols are allowed (9mm or larger). This power minimum reflects the heritage of this modern sport, and mastering a full power pistol is considerably more difficult than shooting a light recoiling target pistol especially when the competitor is trying to go as fast as possible. Time also plays a major factor.

UKPSA sanctioned matches are only open to those members who have successfully completed a two day basic safety course and obtained a competition licence. This is to ensure that competitors are of a sufficient standard to cope with the difficult demands of practical shooting under competition conditions.

34.5 Further Information

[1]. UK Practical Pistol, www.btinternet.com/~triplep/public_html, *introduction to Practical Pistol shooting in the UK.*

[2]. The UK Practical Shooting Association, www.ukpsa.co.uk, *the UK region of the International Practical Shooting Confederation*.

[3]. The United States Practical Shooting Association, www.uspsa.org, *as the name suggests, the governing body of practical shooting in America.*

[4]. International Practical Shooting Confederation, www.ipsc.org, *the International governing body of practical shooting*

34.6 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation The UK Practical Shooting Association Telephone 07010 703845 Address UKPSA, PO Box 7057, Preston, Weymouth, Dorset DT4 4EN Email alan@mediainc.co.uk Web site www.ukpsa.co.uk	**Organisation** Irish Practical Shooting Association Address PO Box 856, Naas, Co. Kildare Web site www.ipsc-ireland.org/

Chapter 35

Service Pistol

A service pistol is defined as any pistol (revolver, or semi-automatic) issued to military personnel, or in some contexts, law enforcement officers, such as those shown in Figure 33.2. Service Pistol typically involves competitions between serving military personnel.

Figure 35.1: Service Pistol

In the United States, Service Pistol matches are governed by the Civilian Marksmanship Program (www.odcmp.com), with input from the US military services and the National Rifle Association of America (NRA-USA). The course of fire is identical to the National Match Course described in the Bullseye section, but the distances are fixed at 50 yards and 25 yards and are not authorized to be reduced. Further, the firearms are restricted to two military styles, with open sights required, modifications extremely limited and only specific ammunition is allowed. Turning targets for the 25 yard portion are a requirement, as well.

In the UK Service Pistol is governed by the Joint Services Shooting Committee, with input from the individual service shooting committees and the National Rifle Association of the UK and is restricted to military personal who shoot on military ranges. Courses of fire and targets are defined in the National Rifle Association Rules of Shooting, available to the general public. Service Pistol, as to be expected, is typically shot with current 9mm services pistols such as the HK P8 (Germany), Sig Sauer P226 (Japan), and Beretta M9 (USA) or Browning Hi-Power.

35.1 Ranges and Targets

Shooting is largely confined to military ranges. The targets used are the 50 and 25-yard full sized American Bullseye Pistol targets which include an X-ring that is counted for hits. The total possible score is 300-30x.

35.2 Competitions

Service Pistol completions (The National US Match Course of fire) are:

- 1 string of 10 shots fired in 10 minutes at 50 yards
- 2 strings of 5 shots fired in 20 seconds at 25 yards
- 2 strings of 5 shots fired in 10 seconds at 25 yards

International matches are held between the armed forces' teams of the USA, UK, Commonwealth, European and many other countries worldwide.

Further details on Service Pistol can be found on Wikipedia and Shooting Wiki.

35.3 Further Information

[1]. Shooting Wiki, http://www.shootingwiki.org/index.pp?title=Service_Pistol, *introduction to service pistol shooting*.

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35.4 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation National Rifle Association of the UK Telephone 01483 797777 Address Bisley Camp, Brookwood, Woking, Surrey GU24 0PB Email info@nra.org.uk Web site www.nra.org.uk	

Chapter 36

Iron Plate Action Shooting

Iron plate action shooting or I.P.A.S, is the action shooting discipline, designed specifically for the multi shot Co2 and Air cartridge pistols and is a different form of “speed shooting”.

Figure 36.1: Iron Plate Action Shooting

IPAS is good for clubs wanting to shoot rapid fire pistol within limited space and with range equipment that’s easy to construct, set up and clear away/store, it also is appealing to the phyiscaly disabled as there is no movement required other than to draw the pistol.

IPAS was started in 2000 to foster ‘Steel Challenge’ competitions. Competitions involve the shooting of several stages where five steel plates either 10”x10”, 12"x12” or 12”x18” and set out at varying ranges and different but challenging layouts need to be hit and each sequence is timed. Each stage is shot 5 times and the slowest of the times is discarded, the remaining four being your score. It's fast, it's furious and most of all, it's fun.

The discipline relies on two basic principles: accuracy and speed.

36.1 Pistols and Ammunition

For IPAS competitions the following pistols are allowed:

- **CO_2** – these are replicas of centrefire pistols that are powered by a CO2 cartridge. CO2 guns use a disposable cylinder, a ‘powerlet’, that is purchased pre-filled with 12 grams of liquefied carbon dioxide.
- **Tandem Air Cartridge (TAC)** - these are multi-shot air guns based on the Air Cartridge System, which uses a pre-charged, single shot air cartridge (similar in size to a .38 Special cartridge).

a) CO_2 TAC

Figure 36.2: IPAS Pistols

The following pistols are not allowed: Target pistols, Single shot air pistols, Airsoft pistols and BB firing pistols.

The ammunition allowed is standard lead-based air pellets; no steel based pellets or BB’s are permitted. This is to ensure that the pellet is destroyed on impact with the steel plate.

36.2 Ranges and Targets

Stages comprise various distances and layouts. There are currently 70+ official IPAS stages that can be used.

The targets comprise metal plates the following sizes are used for IPAS:

a) 10” x 10” Squares,
b) 12” x 12” Squares, and
c) 12” x 18” Rectangles.

Each plate is mounted on a 2-inch square long post, held upright in a suitable base, the posts being of various heights: from 18” to 66” in 6” increments allowing for a vast number of stages.

All plates are painted white apart from the ‘Stop’ plate which is blue or red and mounted on its respective post via a metal threaded stud affixed to the rear surface of the plate, alternately a bolt through the centre of the plate (offset on the rectangular plates)

36.3 Equipment

The main equipment is holsters. All holsters must be mounted in the vicinity of the strong side hip, at waist level. All holsters must retain the pistol. Triggers may not be fully exposed with any holster.

No camouflage or paramilitary style clothing or clothing with offensive slogans to be worn.

36.4 Competitions

Each course of fire will consist of between two and five plates (one of which will be a "stop plate").

Competitors are started by a shot timer’s “beep” and it will record the last shot fired by the competitor.

The plate distances will vary between a minimum of 5m and a maximum of 25m from the designated shooting box. Plate angles will also vary depending on the course of fire and range space limitations.

Unless specified in the course briefing all primary plates may be engaged in any order (the stop plate is always engaged last). The competitor may fire as many rounds as they deem necessary to complete the course of fire.

36.5 Further Information

[1]. Wikipedia, the free encyclopedia, http://en.wikipedia.org/wiki/Steel_Challenge *overview of the Steel Challenge Airsoft rifle and pistols*.

[2]. Iron Plate Action Shooting is organised by Sleeping Tigers, who maintain the IPAS web site, www.ipas.org.uk

[3]. Steel Challenge Shooting Association (SCSA), http://steelchallenge.com/, *the governing body of the Steel Challenge the world speed shooting championship with the annual match is held in Piru, California.*

36.6 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation Iron Plate Action Shooting Email admin@ipas.org.uk Web site www.ipas.org.uk	

Chapter 37

Target and Practical Shotgun

Target and Practical Shotgun involves competitors using self-loading or pump action shotguns with magazines containing 6-14 rounds. These are Section 1 shotguns which must be held on a Firearms certificate.

Figure 37.1: Target & Practical Shotgun

Practical *shotgunners* like to say 'In Clay pigeon shooting the shooter stays still and the targets move around; in Practical Shotgun the targets are stationary and the shooter moves around'.

We distinguish between:

- **Practical shotgun** – as covered by the International Practical Shooting Confederation (IPSC) is a dynamic form of shooting which can involve movement and shooting from different positions at multiple targets, including steel plates, IPSC classic paper targets and frangible targets such as clays. The course of fire is made up of a variety of stages, these will be different from one match to the next. In practical shotgun the shooter competes against the timer and must either knock down the steel targets or when shooting on paper have the scoring zones scored.

- **Target shotgun** – as covered by the UKPSA was introduced by the NRA at Bisley and involves competitors shooting set courses of fire (stages) from a static position at paper targets. Any shotgun may be used along with any sights. There are no gun divisions except for the Embassy Cup which is divided into semi-auto and pump action.

To compete in a UKPSA licensed practical (target) shotgun match, a competitor must have completed a two day basic course and gained a competition qualification as well as being a member of the UKPSA. Practical Shotgun has four classes or divisions of guns which may be used.

- **Standard Auto** - any semi auto shotgun with fixed sights and holding a maximum of 9 rounds. No optical or electronic sights.

- **Standard Manual** - any pump action shotgun with fixed sights and holding a maximum of 9 rounds. No optical or electronic sights.

- **Modified** – any shotgun with fixed sights and a maximum overall length of 1320 mm. No optical or electronic sights.

- **Open** - any shotgun. Optical or electronic sights are allowed along with detachable magazines, compensators and ported barrels.

37.1 Shotguns and Ammunition

Figure 37.2: Practical Shotgun

In Target shotgun, competitors use self-loading (with fixed and removable box-fed magazines), pump-action and occasionally lever-action shotguns. The shotguns are typically 12-bore/gauge, with magazines holding between six and fourteen rounds. (These are referred to as Section 1 shotguns in the UK.) Popular makes are the Remington 1100 and 11-87, the Browning Hunter Gold, Benelli and Baikal self-loading shotguns.

Practical shotgun uses a variety of ammunition. Rifled Slug is used on paper targets; 9 ball Buck shot also known as SG is used on metal and paper targets; and birdshot, No 5 or No 6 is used on metal targets and frangible clay targets. In Target shotgun the ammunition used is Rifled slug.

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37.2 Ranges and Targets

Practical shotgun is shot at variety of targets including steel plates, IPSC classic paper targets and frangible targets such as clays.

Target shotgun is shot at ranges of 15 to 30 metres for short competitions and at 100 and 200 yards for long range. Targets include: paper targets – DP1, DP2 and IPSC Classic targets.

37.3 Equipment

Apart from a self-loading or pump action shotgun and the appropriate ammunition, most types of casual clothing can be worn. However, as with other forms of target shooting, paramilitary style clothing is considered inappropriate. The UKPSA do not allow DPM clothing at any of their competitions.

Both shooting disciplines require a cartridge belt for the carrying of ammunition.

37.4 Competitions

Target shotgun competitions have their roots in the old pistol courses of fire:

- **Timed and Precision** (the 'Sydney Street') – this is shot in the standing stance, with the ready position comprising the shotgun being held waist height and parallel to the ground. The competition comprises three courses of fire: a) Practice 1 – 25 metres, 12 shots in 2 minutes at fixed paper targets; b) Practice 2 – 15 metres, 12 in two strings of 6 at shoot/no-shoot 'turning' targets; and c) Practice 3 – 10 metres, 6 shots on shoot/no-shoot targets.

- **Multi-Target** (the 'Trenchard') - this is shot in the standing stance, with the ready position comprising the shotgun being held waist height and parallel to the ground. The competition comprises four courses of fire: a) Practice 1 – 25 metres, 6 shots in 30 seconds on the left hand (of a pair) paper target; b) Practice 2 – 20 metres, 6 shots in 20 seconds, 3 shots on each of a pair of targets; c) Practice 3 – 15 metres, 6 shots in 3x4 seconds exposure, 2 shots per exposure on right hand shoot/no-shoot target, and d) Practice 4 – 10 metres, 6 shots in 15 seconds, 3 shots one each of a pair of fixed targets.

- **Embassy Cup** (Bund der Militär – und Polizeischűtzen) – this is shot in a variety of positions: standing, prone, sitting and kneeling with the standard ready position. Each course of fire comprises 8 shots in 20 seconds at a pair of fixed papers targets The competition comprises: a) Practice 1 – 25 metres, 2 shots on each target standing, reload with at least 4 rounds, then 2 shots on each target prone; b) Practice 2 – 20 metres, 2 shots on each target standing, reload with at least 4 rounds, 2 shots on each target sitting; and c) Practice 3 – 15 metres, with 2 shots on each target standing, reload with at least 4 rounds, and then 2 shots on each target kneeling.

- **NRA Shotgun Slug Match** – this is shot standing and sitting/kneeling at 100 and 200 yards using shotgun 'slug' ammunition. The competition comprises: a) Practice 1 – 100 yards, 2 sighters, followed by 2 strings of 5 shots each in 30 seconds, and b) 200 yards, 2 sighters, followed by 10 shots in 12 minutes sitting or kneeling.

- **TBT -** this is shot without movement and comprises a number of stages shooting slug, buckshot and birdshot. The stages are different for every competition and usually includes shotgun bowling pins. 'Shotgun bowling' is shot in the standing position with the target being 10 bowling pins. It comprises a single practice – 25 metres, in unlimited time, scored as per ten pin bowling.

37.5 Further Information

[1]. The UK Practical Shooting Association, www.ukpsa.co.uk, *the UK region of the International Practical Shooting Confederation*.

[2]. The United States Practical Shooting Association, www.uspsa.org, *as the name suggests, the governing body of practical shooting in America.*

[3]. International Practical Shooting Confederation, www.ipsc.org, *the International governing body of practical shooting*

37.6 Contacts

Organisation The UK Practical Shooting Association Telephone 07010 703845 Address UKPSA, PO Box 7057, Preston, Weymouth, Dorset DT4 4EN Email alan@mediainc.co.uk Web site www.ukpsa.co.uk	

Chapter 38

Airsoft Rifle and Pistol

Airsoft is a shooting discipline in which players participate in simulated military or law enforcement-style combat using replicas (in appearance only) of real firearms firing small pellets. Airsoft guns (also known as Soft Air and Strike Ball) are gas powered, electric, or spring guns that fire small spherical plastic pellets of either 6 mm or 8 mm diameter (0.24 or 0.32 inches).

Airsoft shooting as a sport originated in the late-1980s in Japan, China, Taiwan, South Korea and other East Asia countries, where conventional firearms were often banned, or difficult to obtain due to local laws [1].

Figure 38.1: Typical AEG Gear box cut away

Airsoft events subdivide into:

- **Practical Pistol** – that involves the competitor moving around a course of fire and shooting at targets.
- **Gaming** – which involves (like paintball but more realistic) simulated military style combat and typically involve hitting an adversary with one of more pellets, hits declared on an honour system.

38.1 Rifles and Ammunition

The guns used in Airsoft can be divided into three groups based on their power source: gas-powered, electric or spring. The choice of Airsoft guns is determined by either the performance (e.g. battery life, power, range, pellet magazine capacity). The better versions have a hop up unit at the start of the barrel (an adjustable piece of rubber) which imparts back spin on the bb leaving the chamber increasing its stability and allowing adjustment of its flight through the air.

- **Gas-powered** Airsoft guns - use pressurized gas to propel the pellets, and are capable of automatic or semi-automatic operation. 134A gas is the most common recommended propellant, consisting of a mixture of propane and polysiloxane lubricant. Gas power guns can be very powerful and are often used for top end sniper rifles, but gas power is greatly affected by ambient temperature and in cold condition may not work effectively.
- **Electric-powered** Airsoft guns - use a rechargeable battery to drive an electric motor that in turn drives an air piston assembly that fires the pellet. These guns operate in automatic or semi-automatic mode. There are two basic types of electric Airsoft guns: a) Automatic Electric Guns (known as AEGs) and the child's version Mini-Autos. With an AEG, a gearbox (see Figure 38.1) houses the motor, gears, spring, and piston which drives the pellet by air pressure through the chamber and out of the gun. Battery power is provided by a variety of sources, either by common AA batteries or 8.4 volt NiMh battery which are the most common for standard AEG's.
- **Spring** Airsoft guns - also known as ‘springs’ or ‘springers’, must be cocked each time they are fired. Springers are common in cheap Airsoft guns, but many of the expensive ‘sniper’ rifles also use this system.

In summary, the most popular Airsoft guns are AEGs because of their high rate of fire and the convenience of automatic fire without the cost or unreliability of gas.

As introduced, most Airsoft pellets are plastic and are 6mm or 8mm in diameter, and range in weight from 0.12-0.90 grams; with the most popular being 6mm between 0.12-0.33 grams in weight [3]. There are several types of pellets, ranging from Teflon coated special sniper rounds, standard white, cheap yellow plastic, and Biodegradable, which are more expensive. The light weight 0.12 gram pellets are used in the cheaper types of gun, normally, electric or springer. However, most better quality Airsoft guns require heavier pellets, most commonly used are 0.20 gram (5.95 mm) and up to approx 350 fps, and 0.25 gram that are over 350 fps. Higher weight improve accuracy with less wind drift but reduces range therefore higher power requirement to counteract this.

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38.2 Ranges and Targets

Ranges and targets broadly divide into:

- **Close Quarter Battle (CQB)** – intense close range battle often involving room clearance, hostage rescue, and often use made of pyrotechnics to simulate flash bangs, grenades, and smoke. In CQB maximum power restrictions may be imposed on guns used of 1 joule, or under and a 'verbal bang' rule may be operated. Pop up targets or real opposing players may be involved.
- **Outdoor ranges** – ordinary target shooting with all types of gun.
- **Airsoft Gaming** – gaming may include CQB but generally is conducted in more open terrain and woodland with ranges of approx 75-200 feet, simulating military engagements.

38.3 Equipment

Airsoft equipment comprises Airsoft gun, essential 'eye' (a legal requirement in some countries) and face protection, tactical clothing, equipment harness etc. It is fairly common for Airsoft players to wear battle dress uniform (BDU), tactical or military surplus clothing, consisting of separate trousers/pants, shirt and jacket. Use is also made of pyrotechnics in the form of grenades, flash bangs and smokes.

38.4 Competitions

Airsoft guns and gaming are legal in many countries but not all, with some countries placing restrictions on the visual appearance of the firearms and others restrictions on the maximum muzzle energy. Further details are given in the references [1, 2].

38.5 Further Information

[1]. Wikipedia, the free encyclopedia, http://en.wikipedia.org/wiki/Airsoft_guns *overview of Airsoft rifle and pistols*.

[2]. Wikipedia, the free encyclopedia, http://en.wikipedia.org/wiki/Airsoft_Pellets, *overview of Airsoft pellets*.

[3]. Official UK Airsoft organisations http://www.ukara.or.uk *the United Kingdom Airsoft Retailers Association or United Kingdom Airsoft Sites Governing Body* www.ukasgb.org.uk

[4]. US Airsoft Practical Shooting Association, www.usapsa.org, *the United States Association for Airsoft*

38.6 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation United Kingdom Airsoft Retailers Association Email admin@ukara.org.uk Web site http://www.ukara.org.uk	**Organisation** Irish Airsoft Association Email info@irishairsoft.ie Web site http://irishairsoft.ie/
Organisation International Airsoft Practical Shooting (IAPS) Web site www.airsoft-shooting.org	

Part G – Field Sports Disciplines

Summary

Field Sports disciplines simulate moving and static targets found in traditional field sports, such as stalking. Moving target disciplines include the enormously popular Clay Pigeon shooting, and so-called Running Boar and Running Deer shot with Smallbore and Fullbore rifles, respectively. Shooting at static 'game' targets includes Silhouette Rifle, popular in the United States, and Field Target shot with Air Rifles.

Chapter 39 - Silhouette Rifle, Pistol and Shotgun

Silhouette shooting comprises shooting at heavy metal targets of chickens, pigs, turkeys and rams, with the aim of knocking them over, using rifles and pistols, and also shotguns.

Chapter 40 - Sporting Rifle

Popular with field sports shooters, the rifles used must be in the style of a 'sporting rifle' rather than that of a target, match or sniper rifle. It encompasses static targets (e.g. fox, buck) that are shot prone, kneeling, standing and from the bench, and moving/running mechanical targets (e.g. deer, boar) that are shot standing.

Chapter 41 - Clay Pigeon Shooting

Clay pigeon shooting is the art of shooting flying targets (i.e. clays) with a shotgun. Formal Clay shooting consists of a number of disciplines, such as Trap and Skeet. Trap shooting has targets fired away from the participant at different angles as well as different heights. Skeet involves shooting at targets fired horizontally from a low and high house both as singles and pairs. Each round consists of 25 targets.

Chapter 42 - Field Target (Air Rifle)

Field target shooting – shot with highly accurate air rifles – combines the outdoor field conditions of rough shooting, with the precision of target shooting. A typical course is laid out, outdoors with a route to walk and at set points are shooting points with a knockdown target (cf. Silhouette Shooting) at any distance from 7.5 metres to 55 metres.

Chapter 43 - Hunter Field Target (Air Rifle)

Hunter Field target shooting (HFT) – shot with air rifles – combines the skill of outdoor field conditions of rough shooting, with the precision of target shooting. A typical course is laid out, outdoors with a route to walk and at set points are shooting lanes with one knockdown targets in each at any distance from 8 metres to 45 metres with hit zone from 15 to 45mm diameter.

Other Shooting Disciplines

There are other 'outdoor' disciplines that combine shooting with other sports.

- **Biathlon Shooting** – the Biathlon usually refers specifically to the winter sport that combines cross-country skiing and rifle shooting. Another popular variant is summer biathlon, which combines cross-country running with rifle shooting.

- **Pony Club Tetrathlon** - the Pony Club Tetrathlon, similar to the Modern Pentathlon, is a competition combining cross-country riding with running, shooting and swimming events. There are separate competitions for boys and girls. Pony Club Tetrathlon is particularly important in the UK, as it is the entry point for many of the UK's finest female air pistol shooters.

- **Mounted Shooting** - mounted shooting is a new equestrian sport where competitors race through various patterns of barrels and poles within in an area while firing 45 calibre pistols loaded with black powder blanks at balloon targets. There are more than 5,000 mounted shooters (in over 135 mounted shooting clubs) throughout 47 states in the US.

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Chapter 39

Silhouette Rifle and Pistol

Silhouette shooting – highly popular in the United States - comprises shooting at heavy metal targets of chickens, pigs, turkeys and rams, with the aim of knocking them over, using rifles and pistols.

Figure 39.1: Silhouette Shooting

Silhouette shooting originated in Mexico in the days of Poncho Villa as entertainment. The sport 'emigrated' to the US in the early 70's. The first sanctioned shoot was held in Tucson in 1973 when the NRA-USA sponsored the first national championship.

A variety of rifles, pistols and shotguns, especially black powder are used. Shooting is done standing or prone; IHMSA and NRA-USA's freestyle positions are shot prone. As with many United States shooting disciplines, a class system exists so shooters compete against shooters of similar ability. Hence novice shooters need not shoot against master class shooters.

The two major governing bodies are the National Rifle Association (NRA-USA) and the International Handgun Metallic Silhouette Association (IHMSA).

39.1 Rifles and Ammunition

The NRA-USA rules allow a wide variety of rifles, pistols and air guns to be used for Silhouette shooting [2]. Rifle categories include: High powered rifle, Smallbore rifle, Black powder cartridge rifle, Open Air Rifle, Target Air Rifle and Sporter Air Rifle. Pistol categories include: Long Range Pistol, Hunter's Pistol, and Smallbore Hunter's Pistol.

High powered Rifles

Two categories of rifle are allowed: a) **Hunting rifles** – a standard bolt action rifle with a maximum weight including scope of 9 lbs; and b) **Silhouette rifles** – a more flexible category with a maximum weight of 10 lbs, 2 oz.

Smallbore Rifles

Smallbore rifles comprise any unmodified .22 rifle chambered for .22 calibre rimfire short, long and long rifle, and using commercial ammunition. Again two categories are allowed: a) Hunting rifles, and b) Silhouette rifles.

Black Powder Rifles

With BP rifles, almost any pre-1896 (American) manufactured single shot hunting or military style rifle is allowed. The most popular calibre used is the .45 70.

Pistols

NRA-USA rules [1] designate three types of Silhouette pistols. **Long Range Silhouette** pistol categories comprise: a) *Conventional* – permitting minor modifications to commercial pistols, and b) *Unlimited* – allowing custom pistols below a 15" barrel length and 4½ lbs weight. **Smallbore Silhouette** pistols are similar in specification, but restricted to .22 calibre. Lastly, the **Hunter**, intended for distances up to 100 meters, allows minor modifications to conventional pistols, with restrictions on barrel length of 10¾ inches and weight of 4½ lbs.

Air Guns

Any calibre of air rifle and air pistol up to .22 calibre may be used outdoor and indoor ranges.

Three categories of rifle are used: a) **Open Air Rifles** – any air rifle weighing no more than 16 lbs, b) **Target Air Rifle** – any unmodified factory air rifle, and c) **Sporter Air Rifle** – any unmodified factory rifle weighing less than 11 lbs.

39.2 Ranges and Targets

The rifle targets are heavy steel 'silhouette' cut-outs of animals at a range of distances. Typically chickens are shot at 200 metres, pigs at 300 metres, turkeys at 385 metres and rams at 500 metres. Targets are placed in banks of 5 targets, on a stand.

Pistol targets and ranges are: chickens 50 metres, pigs 100 metres, turkeys 150 metres and rams 200 metres.

Figure 39.2: Silhouette Targets *(Pyramyd Air)*

39.3 Equipment

Silhouette shooting demands very little expense associated with equipment. A spotting scope (for the Coach), shooting mat, gloves and any type of normal clothing, as long as it doesn't afford any artificial support.

39.4 Competitions

Competitions comprise shooters firing a specific number of shots at groups of targets. To score a hit the target must fall off its stand, with the winner being the one who knocks down the most targets.

Shooters typically divide themselves into relays that shoot together, with each relay being up to eight shooters: two for chicken, two for pigs and so on. A match consists of 40 shots. At each stage the shooter fires 10 shots at 10 animals, comprising 2½ minutes to fire 5 rounds, one at each of 5 targets in a single bank, followed by then another 2½ minutes to fire 5 rounds at 5 targets in a second bank. Pistol time is only 2 minutes.

A match proceeds through a number of stages under the instructions of the Chief Range Officer.

Stage 1 – a relay is called to the line of fire.

Stage 2 – the command 'Listo' (Spanish for ready) is announced. The shooters start their times, load a magazine or a single round, check their sights and aim at the lower left-most animal in their bank of five targets. Banks are shot lower-left, upper-left, lower-right.

Stage 3 – the command 'Fuego' (Spanish for fire) is announced. The shooters commence firing, one shot per target; hit or miss. When the shooter finishes, he lays the rifle or pistol on the adjacent bench, unloaded, breech open and muzzle pointing down range.

Stage 4 – after two minute 45 seconds the command 'Alto Fuego' (Spanish for cease fire) is announced. Firing ceases immediately and the shooters place their weapons on the adjacent benches. Each shooter then records their score, marking an 'X' for a hit and a '0' for a miss.

Stage 5 – after a short break, the relay shoots the next bank of targets, with the Chief Range Officer repeating the 'Listo-Fuego-Alto Fuego' sequence.

Stage 6 – when the relays have completed all their banks, the Chief Range Officer will stop all shooting, to allow the relays to go forward safely to reset the animals.

Traditionally a shooter may start with any animal, but the progression is always chickens-pigs-turkeys-rams-chickens etc.

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39.5 Further Information

[1]. Wikipedia, the free encyclopedia, http://en.wikipedia.org/wiki/Metallic_silhouette, *good introduction to Silhouette shooting.*

[2]. Elgin Gates, "Gun Digest" Book of Metallic Silhouette Shooting", (1988).

[3]. NRA-USA, "Silhouette Competition – how to get started", www.nrahq.org/compete/silhouette.asp

[4]. International Handgun Metallic Silhouette Association (IHMSA), www.ihmsa.org.

39.6 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation The National Silhouette Association Ireland Address NSA, P.O.Box 9, Blackrock, Co. Dublin, Ireland. Email silhouetteireland@eircom.net Web site http://homepage.eircom.net/~ntsai/nsai.html	**Organisation** International Handgun Metallic Silhouette Association Telephone +1 801 733-8423 Address HQ IHMSA, PO Box 901120, Sandy, UT 84090-1120 Email lorene@ihmsa.org Web site www.ihmsa.org

Chapter 40

Sporting Rifle

This discipline fosters competitive shooting with the sporting rifle, working for the greater safety and accuracy in the use of the sporting rifle on the range and in the field. It encompasses moving/running mechanical targets (e.g. boar, deer) that are shot standing, and static targets (e.g. fox, buck) that are shot prone, sitting, kneeling, standing and from the bench. All the Sporting Rifle targets are electronically scored.

40.1 Rifles and Ammunition

The rifles used must be in the style of a 'sporting rifle' rather than that of a target, match or sniper rifle. Shooters typically use rifles with heavy barrels both for the moving and static targets, due to the number of rounds fired in quick succession and for the 'swing'.

a) Running Target *(Pilkguns.com)*

b) Static Target

Figure 40.1: Sporting Rifle

Centrefire Rifle

Sporting rifles used on the running deer or statics are divided into: a) Open class – any centrefire rifle within range limits, and b) Class B – calibres not less than .240 and greater than 1700 ft/lbs muzzle energy (e.g. .243,.308).

.22LR Rifle

For the running boar, special heavy barrel .22LR rifles are typically used.

.177 Air Rifle

For the ISSF 10m running target .177 Air Rifles are used.

40.2 Ranges and Targets

One of the benefits of the Sporting Rifle discipline with Northern Europe's inclement weather is that shooting is on covered outdoor ranges, comprising an undercover firing point, while the target is in the open at 100m for static targets and running deer, and 50m for running boar. The 10m ranges are fully enclosed.

100m Static Targets

The 'Statics', comprise targets such as Fox and Buck, shot at 100m in a variety of positions: prone, sitting, kneeling, standing and from the bench, with and without shooting aids such as sticks and slings; depending on the competition.

100m Running Deer

Shooting takes place from an enclosed firing point at a 'Siamese', or two headed, moving target at 100m on a trolley across a 23m wide opening between two banks. Either one or two shoots are fired at the target in each direction, using a centrefire rifle, depending on the event.

50m Running Boar

Running boar is similar to the running deer in as much as shooters fire at a 'Siamese' target as it crosses a gap in front of them. The main differences between this and running deer are that it is shot at 50m, with .22" rimfire rifles only, and that the speed of the runs can be either 'slow', 'fast' or a mixture of 'slow' and 'fast'.

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10m Running Target

10 m Running Target is one of the ISSF shooting events, shot with an airgun at a moving target. The target travels across a two-meter wide aisle at the range of 10 metres from the firing point. The target moves at either slow or fast speed, and is visible for 5 or 2.5 seconds, respectively.

a) Statics

b) Running (Boar)

Figure 40.2: Sporting Rifle Targets

40.3 Equipment

Besides a centrefire rifle (e.g. .223.308) for the running deer and statics, a .22LR rifle (ideally heavy barrelled) for the running boar and a target air rifle for the 10m, the important pieces of equipment are ear defenders, plus for the statics a full-length bipod and optionally a sling.

The one distinctive piece of equipment used by International-level competitors is the so-called Twin-post scope. With Twin-post scopes the reticle has two independently adjustable posts, which are used to correctly set the scope for the required amount of lead for the 'slow' and 'fast' runs of the target.

40.4 Competitions

The Sporting Rifle discipline offers a wide variety of static and moving target competitions, as discussed above.

100m Static Targets

The statics embrace a number of competitions shooting a static buck or fox target. A popular test is the 'stalkers' where the shooter takes 2 shots prone, 2 seated, 2 kneeling 2 standing, and 2 from the bench. As shooting aids, for the seated, kneeling and standing shoots, the shooter can use a bipod or a sling.

100m Running Deer

The running deer embraces a number of competitions. Typically each shooter has 2-4 'sighters' or practice shots followed by 10 or 20 scoring shots, taken as the deer alternatively traverses left then right at 100m. In addition, there is the 'doubles', where the shooter fires twice during each run.

50m Running Boar

The running boar competitions are similar to running deer, but are shot at 50m, with each shooter typically allowed 2-4 sighters shots followed by 10-20 scoring shots. The boar's speed can be set to slow, fast or random slow/fast. Shooters find the running boar addictive.

10m Running Target

10m running target completions are essentially the same as the 50m running boar; with the speed being set to slow, fast or random slow/fast. The full course of fire in a regular event is 20 shots at each speed; each competitor shooting 20 slow and 20 fast.

40.5 Further Information

[1]. A. A. Yur' Yev, "Competitive Shooting," (Russian to English translation by the NRA (1985), *this is a truly wonderful book, but hard to find*.

[2]. Wikipedia, the free encyclopedia, http://en.wikipedia.org/wiki/10_m_Running_Target, *introduction to ISSF 10m running targets.*

40.6 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation The British Sporting Rifle Club (BSRC) Address c/o NRA, Bisley Camp, Brookwood, Woking, Surrey. GU24 0PB Email secretary@bsrc.co.uk Web site www.bsrc.co.uk	**Organisation** Welsh Airgun Association Email iharris@btinternet.com Web site www.welsh-airgun.org.uk

Chapter 41

Clay Pigeon Shooting

Clay pigeon shooting is a hugely popular international sport across the globe. It is the art of shooting flying targets (i.e. clays) with a shotgun. Formal Clay shooting consists of a number of disciplines, such as Trap and Skeet:

- **Trap** shooting has targets fired away from the participant at different angles as well as different heights.
- **Skeet** involves shooting at targets fired horizontally from a low and high house both as singles and pairs.
- **Sporting Clays** are presented to the shooter in ways that mirror the flight pattern of game birds, or rabbits, in their natural habitats.

Each round consists of 25 targets for Trap and Skeet and up to 100 targets for Sporting Clays [1].

Figure 41.1: Clay Pigeon

41.1 Shotguns and Ammunition

For clay pigeon shooting at registered events [4], the maximum permitted bore is 12 (gauge), equivalent to 0.729 inches (18.5mm) in diameter. Shotguns used are under and over, side-by-side or semi-automatic (Pump action shotguns are generally considered unsuitable). Barrel lengths typically vary from 26-32 inches (66-81cm).

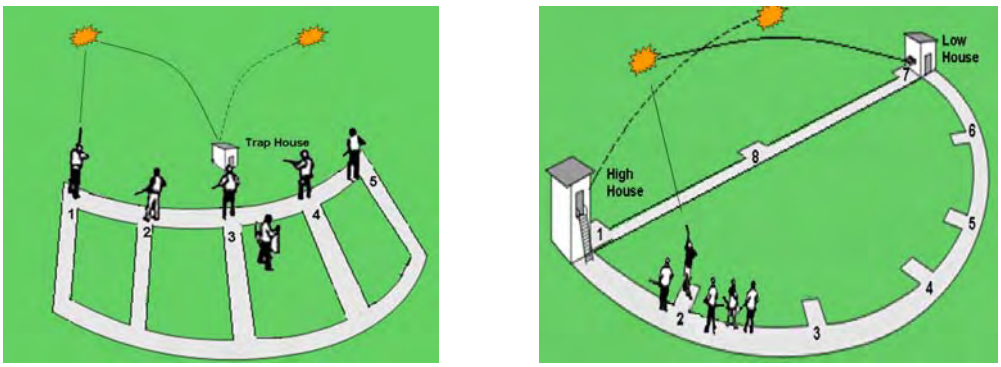
For clay pigeon shooting, shot size must not exceed 2.6mm (i.e. English No. 6 shot). The shot load must be a maximum 24 gram for Olympic Trap, Olympic Skeet and Double Trap; and 28 gram (1 oz) for all UK competition disciplines.

a) Under and Over b) Semi-Automatic

Figure 41.2: Clay Pigeon Shotguns

41.2 Ranges and Targets

Clay pigeon ranges broadly subdivide into Trap and Skeet [1], illustrated by Figure 41.3.



a) Trap b) Skeet

Figure 41.3: Clay Pigeon Ranges

Trap Ranges

Trap targets are thrown either as singles or doubles from one or more traps situated some 15 metres in front of the shooter and are generally going away from the firing point at varying speeds, angles and elevations.

Skeet Ranges

Skeet targets are thrown in singles and doubles from 2 trap houses situated some 40 metres apart, at opposite ends of a semicircular arc on which there are seven shooting positions. The targets are thrown at set trajectories and speeds.

Clay Pigeon Targets

Clay pigeon targets (clays) are saucer-shaped and made from a mixture of pitch and clay; robust enough to be thrown, but fragile enough to smash when hit. Targets are usually orange or black (see Figure 41.4), and are of a precise weight and size for each of the various disciplines [1]. The 'standard' weighs 105 grams, has a diameter of 110 mm and a thickness of 25-26 mm, and is the only clay used in all of the trap and skeet disciplines.

a) Standard b) Midi c) Mini d) Battue e) Rabbit

Figure 41.4: Clay Pigeon Targets [1]

41.3 Equipment

For clay pigeon shooting the 'standard' equipment is an 'over-or-under' or semi-automatic 12 bore (gauge) shotgun, a clay pigeon shooting vest, plus eye and ear protectors.

41.4 Competitions

Clay pigeon shooting has over 20 official competitions (referred to as 'disciplines'). They divide into Trap and Skeet, plus the popular Sporting Clays [1].

Trap Shooting

As introduced, in Trap disciplines targets are thrown away from the firing point at varying speeds, angles and elevations. Trap disciplines include:

- **Down-the-Line (DTL)** – traditional DTL, popular in the UK and Commonwealth, is similar to American trap but allows two shots at each target with a penalty for a second barrel hit. DTL uses a layout set up with 5 stands in a crescent shape 16 yards from a traphouse which throws a target between 0 and 22.5 degrees to either side of a centre line to a distance of 50-55 yards from the traphouse. A typical competition has a competitor shooting at 100 targets, 25 at a time across 4 different layouts with 5 targets shot on each stand rotating on a 1, 2, …5 basis.

- **American Trap** – in this trap discipline, popular in the USA, standard targets are thrown as singles at constant height but at a random angle at a maximum of 22 degrees to the centre line. A round comprises 25 targets with one shot allowed at each target.

- **Olympic Trap** – Olympic Trap, one of the ISSF shooting events, uses fifteen machines arranged in five stations. Targets have a minimum height of 1.5 metres and a maximum height of 3.5 metres, with a maximum target angle of 45 degrees. A squad of six competitors take turns in shooting from the five stations. The course of fire is 125 shots for men and 75 shots for women.

Other disciplines are: Single Barrel, Double Rise, Automatic Ball Trap (ABT), Double Trap and Universal Trench.

Skeet Shooting

With Skeet disciplines, targets are thrown at set trajectories and speeds from 2 trap houses situated some 40 metres apart, at opposite ends of a semicircular arc. Worldwide the main disciplines are:

- **English Skeet** – a round of skeet consists of 25 targets in a sequence with squads of five shooting from seven stations. With English Skeet each squad member takes shots: on station 1 & 2 a high single, a low single and then a double (i.e. high/low simultaneous pair, shooting the high target first); on station 3 a high single and a low single (no double); on station 4 a high single, a low single and then a double(the shooter has to nominate which target they are shooting first); on station 5 a high single and a low single; on station 6 a high single, a low single and then a double (shooting the low target first); and on station 7 a low single, a high single and then a double(shooting the low target first).

- **American Skeet** – a round of skeet consists of 25 targets in a set sequence, with squads of five shooters taking their turn from the eight shooting stations. Here each squad member takes two singles and one double on stations 1, 2, 6 & 7; and two singles on stations 3, 4, 5 & 8.

- **Olympic Skeet** - Olympic or International Skeet is one of the ISSF shooting events and comprises a mixture of high and low clays, and shot as singles and doubles. A round consists of 25 targets with squads of five shooters taking turns at the eight stations. Each squad member takes: on stations 1, 2 & 3 one high single and double (shooting high target first); on station 4 one high single and low single, then one double (shooting high target first) and one double (Shooting low target first); on stations 5 & 6 one low single and a double (shooting low target first); on station 7 a double (shooting low target first); and on station 8 one high single followed by one low single (both targets have to be broken before they reach the centre) .

- In Olympic Skeet, the targets are set to fly faster than those of English Skeet with a total flight length of between 65m and 67m and there is a random delay of between 0 to 3 seconds after the shooter has called for the target before it appears. Also, the shooter must hold his gun so that the toe of the gun butt is visible beneath the elbow until the target appears.

Sporting Clays

Sporting Clays covers a number of disciplines (e.g. English, American) devised to simulate live quarry shooting, with targets being thrown in a great variety of trajectories, angles, speeds, elevations and distances. A typical Sporting Clays course is laid out over a 10, 20 or 30-acre site, with the course consisting of 10 – 14 stations. Varying numbers of targets, either as singles or pairs, are shot at each station, with the total shots for an outing adding up to 50 or 100 (two or four boxes of shells, respectively). The gun position (whether in the shoulder or below the arm pit) in Sporting Clays is optional for English Sporting but must be placed in designated position for International (FITASC) Sporting and can not be moved before the target comes into view.

41.5 Further Information

[1]. Wikipedia, the free encyclopedia, http://en.wikipedia.org/wiki/Clay_Pigeon_shooting, *good introduction to clay pigeon shooting, with additional entries for each of the clay pigeon disciplines.*

[2]. C. Stewart Meinert, “The CPSA Clay Target Shooter’s Handbook”, CPSA (2006), CPSA Official Handbook, ISBN 0-9552221-0-9. *CPSA Official Handbook; a really excellent book*.

[3]. John King, “Clay Pigeon Shooting: For Beginners and Enthusiasts,” The Sportsmans Press (1991) ISBN-10: 0948253495.

[4]. Tony Hoare, “Successful Clay Pigeon Shooting,” The Crowood Press Ltd (1991) ISBN-10: 1852235667

[5]. Clay Pigeon Shooting Association (CPSA), http://www.cpsa.co.uk/epromos.cfm, *provides a list of Clay Pigeon Associations throughout the UK, Europe, the Commonwealth and USA.*

[6]. US National Sporting Clays Association, www.mynsca.com, *the governing body for clay pigeon shooting in America.*

[7]. Federation Internationale de Tit Armes Sportives de Chasse, www.fitasc.com, *the international governing body for Clay Pigeon Shooting.*

41.6 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation British International Clay Target Shooting Federation Telephone 01483 485400 Address BICTSF, PO Box 1500, Brookwood, Surrey. GU24 0NP Email secretary@bictsf.com Web site www.bictsf.com	**Organisation** Irish Clay Pigeon Shooting Association Telephone 00 353 (0)87 2988030 Address Suite 20A, The Mall, Beacon Court, Sandyford, Dublin 18, Ireland Email icpsa@eircom.net Web site http://www.icpsa.ie/
Organisation Clay Pigeon Shooting Association Telephone 01483 485400 Address CPSA, Bisley Camp, Brookwood, Woking, Surrey. GU24 0NP Email info@cpsa.co.uk Web site www.cpsa.co.uk	**Organisation** Scottish Clay Target Association Email Julian Cordery (Julian.cordery@scta.co.uk) Tony Lithgow (tony@awlithgow.co.uk) Web site www.scta.co.uk
Organisation Welsh Clay Target Shooting Association Telephone 07751 353020 (Phone after 6PM only please) Address Glanyrhafon, Caersws, Powys SY17 5SA Email wctsa.membership@hotmail.com Web site www.wctsa.co.uk	**Organisation** Ulster Clay Pigeon Shooting Association Telephone 028 25898 075 Address 60 Shankbridge Road, Ballymena, Co Antrim, BT42 3DL Email ucpsasec@hotmail.com Web site www.ucpsa.com

Chapter 42

Field Target (Air Rifle)

Field target shooting – shot with highly accurate air rifles – combines the outdoor field conditions of rough shooting, with the precision of target shooting. A typical course is laid out, outdoors with a route to walk and at set points are shooting lanes with two knockdown targets in each (cf. Silhouette Shooting) at any distance from 7 metres to 50 metres.

Figure 42.1: Field Target Air Rifle

Targets are shot freestyle with no more than 10% of the targets being free standing and no more than 10% being kneeling, as set discipline targets. In the typical freestyle position, the shooter sits on a cushion to take the shots.

42.1 Rifles and Ammunition

To shoot Field Target competitions, a good quality air rifle is required together with a high-magnification, range-finding telescopic sight, as illustrated in Figure 42.1. All air weapons calibres are allowed (.177, .22, .20, .25 etc), but in the UK air guns must be within the non-FAC limit i.e. 12 ft/lbs for rifles, 6ft/lbs for pistols. Recoiling spring air weapons are at a disadvantage to recoilless pre-charged pneumatics (PCP's), as the latter will enhance the shooter's ability (although both are equally accurate).

Any design of pellet that is completely made of lead or lead alloy may be used.

42.2 Ranges and Targets

The targets in Field Target shooting are made of metal and are shaped to look like the typical airgun prey: rabbits, rats, pigeons and squirrels or shapes such as squares diamonds or circles. Each target, as illustrated in Figure 42.2, has a circular hole, with a metal disc behind, linked to the mechanism that holds the target upright. The objective of the shooter is to hit the 'hit zone' - if they manage to hit the 'hit zone' the target will fall flat to the ground (Hit recorded) - if the shooter hits any other part of the silhouette the target will remain standing (No hit scored).

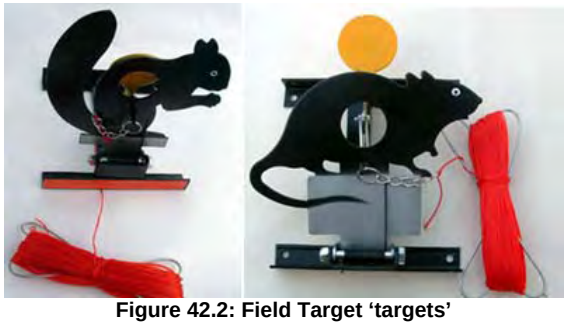


Figure 42.2: Field Target 'targets'

42.3 Equipment

Besides an accurate air rifle, you will also need a precision telescopic sight. The popularity of Field Target shooting has led to the development of sophisticated range finding and bullet drop compensating telescopic sights. With these the FT shooter can accurately estimate the distance to the target and then accurately set the cross hairs.

42.4 Competitions

As discussed above, a typical course is laid out, outdoors with a route to walk and at set points are shooting points with a knockdown target at any distance from 8 yards (7.3 m) and 55 yards (50.3 m). Targets are shot from open "gates" in a firing line, and are divided into "lanes" of two targets each. The majority of shots may be taken in any stance, and most competitors carry a small beanbag or cushion to sit on while shooting. It may also be used under the knee or to support the ankle during kneeling shots.

In competition [1], 20% of the lanes will be designated as compulsory standing or kneeling, and there must be as even a split as possible between the two. Most competitions have 40 targets arranged in 20 lanes, so it is usual to have 2 standing lanes and 2 kneeling lanes. Grand Prix events have 25 lanes, so there will be 2 lanes of one position and 3 of the other. Standing or kneeling targets must be no more than 45 yards (41 m) from the firing line. Points are scored with 1 for a hit (resulting in the

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faceplate falling), and 0 for a miss (whether it strikes the surrounding faceplate, misses it, or “splits” on the edge of the kill but fails to down the target).

Members of the British Field Target Association (BFTA) are graded according to their performance every six months.

42.5 Further Information

[1]. Wikipedia, the free encyclopedia, http://en.wikipedia.org/wiki/Field_Target, *introduction to Field Target Air Rifle shooting*.

[2]. The British Field Target Association (BFTA) (www.bfta.net), *the BFTA is the National Association of Governing Bodies related to Field Target shooting in Scotland, Wales, and the seven regional associations in England.*

[3]. American Airgun Field Target Association, www.aafta.org, *as the name suggests the governing body of Field Target in the United States.*

[4]. World Field Target Federation, www.nifta.com, *the world governing body*.

42.6 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation British Field Target Association Address BFTA, P.O Box 2242, Reading, Berks RG7 5YY Email Secretary@BFTA.net Web site www.bfta.net	**Organisation** Scottish Air Rifle and Pistol Association Web site www.sarpa.co.uk
Organisation Welsh Airgun and Field Target Association (WAFTA) T Email secretary@wafta.co.uk Web site www.wafta.co.uk/index.htm	**Organisation** Northern Ireland Field Target Association Telephone 07921 676 231 Email info@nifta.com Web site www.nifta.com/

Chapter 43

Hunter Field Target (Air Rifle)

Hunter Field target shooting (HFT) – shot with air rifles – combines the skill of outdoor field conditions of rough shooting, with the precision of target shooting. A typical course is laid out, outdoors with a route to walk and at set points are shooting lanes with one knockdown targets in each at any distance from 8 metres to 45 metres with hit zone from 15 to 45mm diameter.

Figure 43.1: Hunter Field Target

A total of 30 Targets are shot, the majority freestyle where the shooter can stand, kneel or take the shot prone (sitting is not permitted) but 9 targets must be shot from compulsory positions 3 shot standing, 3 kneeling, and 3 from a prone position at set discipline targets.

43.1 Rifles and Ammunition

To shoot Hunter Field Target competitions, any air rifle is required together with a telescopic sight, as illustrated in Figure 43.1. All air weapons calibres are allowed .177, .22, .20, .25 pre-charged pneumatics (PCP's) or spring air weapons etc, but in the UK air guns must be within the non-FAC limit i.e. 12 ft/lbs for rifles, 6ft/lbs for pistols.

Any design of pellet that is completely made of lead or lead alloy may be used.

43.2 Ranges and Targets

The targets in Hunter Field Target (HFT) shooting are made of metal and are shaped to look like the typical airgun prey: rabbits, rats, pigeons and squirrels etc or shapes such as squares diamonds or circles. Each target, as illustrated in Figure 43.2, has a circular hole, with a metal disc behind, linked to the mechanism that holds the target upright. The objective of the shooter is to hit the 'hit zone' - if they manage to hit the 'hit zone' the target will fall flat to the ground and 2 points will be awarded, 1 point for a faceplate strike (hitting the target anywhere other than the hit zone) and zero for a complete miss.

Figure 43.2: typical Hunter Field Target 'targets'

43.3 Equipment

Besides an air rifle, you will also need a telescopic sight. All settings to scope and rifle must be done prior to taking your first shot in the competition. After that no further adjustments to your equipment or scope are allowed. Therefore range finding must be done by eye. Hence most competitors tend to use scopes settings with a maximum of 10x magnification and a parallax setting of 25-30 yards which allows a reasonable view of the targets at both end of the target range distances.

43.4 Competitions

As discussed above, a typical course is laid out, outdoors with a route to walk and at set points are shooting points with a knockdown target at any distance from 8 metres to 45 metres.

A competition comprises 30 target positions with 1 scoring point for each 'knocked down' of the target. They comprise:

- **3 Targets** – 3 must be standing shots using 35mm to 45 mm hit zones only and un-obscured; a minimum of 2 must allow the shooter support on a tree or other inanimate object.
- **3 Targets** – 3 must be kneeling shots using 35mm to 45 mm hit zones only and un-obscured; a minimum of 2 must allow the shooter support on a tree or other inanimate object .
- **3 Targets** – 3 must be prone-only shots using any UKAHFT hit zone size.

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- **21 Targets** – the remaining 21 must be placed so each target is able to be shot from any of the permitted (standing, kneeling and prone) shooting positions.

43.5 Further Information

[1]. Wikipedia, the free encyclopedia, http://en.wikipedia.org/wiki/Hunter_Field_Target, *introduction to Hunter Field Target Air Rifle shooting*.

[2]. The United Kingdom Association for Hunter Field Target (UKAHFT) (www.ukahft.co.uk), *the UKAHFT is the governing body for national HFT shoots.*

[3]. World Hunter Field Target Association, www.whfta.org, the world governing body.

43.6 Contacts

A comprehensive list of target shooting organisations can be found in the appendix.

Organisation United Kingdom Association for Hunter Field Target Email info@ukahft.co.uk Web site www.ukahft.co.uk	**Organisation** World Hunter Field Target Association Email info@whfta.org Web site www.whfta.org

Glossary[1]

.177 (4.5 mm)	The standard airgun calibre for international (ISSF) target shooting. Pellet diameter is nominally 4.5 mm, with a range of sizes in .01 mm steps to allow exact matching to specific guns for best accuracy.
.22LR	The standard .22 rimfire cartridge used in target rifles and pistols; typically subsonic with a 40-grain bullet.
10 Ring	The centre ring of the target used in pistol, rifle or running-target events, worth 10 points. It is also known as a 'bull' or 'bullseye'.
3P (Three Positional)	As the name implies, a competition that is shot using three different body positions to support the rifle; in the order prone, standing, kneeling.
5.56 mm (.223)	The standard NATO centrefire, small arms calibre. The normal bullet diameter is .224 inch and weights range from 40 to 70 grain, with the heavier being favoured for long ranges.
7.62 (.308)	The old 'standard' NATO centrefire calibre. The 7.62x51 mm or .308 inch used in the UK and Commonwealth for Fullbore rifle shooting outdoors at ranges up to 1200 yards. Bullets are .308 inch diameter and range from about 110 to 200 grains, with the 155-grain the most common.
9 mm	A centrefire calibre, much used by the military in both handguns and sub-machine guns. The actual bullet diameter in Imperial units is .354 inch with the bullets being 115 grains.
Accidental discharge (AD)	Any firing of a gun that is not deliberate. Sometimes called an 'unintentional discharge'.
ACP	Automatic Colt Pistol defines a type of ammunition.
Action	The firing mechanism for loading a cartridge, locking the mechanism, firing the cartridge and extracting the fired case.
Action release	The part of a firearm that opens the action to give access to the chamber.
Action shooting	A shooting sport in which competitors fire at small metallic targets in the shortest possible time, typically using a pistol drawn from a holster.
Aim(ing)	The process of aligning the gun with the target, usually by means of the sights.
Aiming Mark	That part of the target that is used to align the sights onto the target. In rifle shooting the centre of the Bullseye; in target pistol the aiming mark is often the base of the black disk in the centre of the target.
Aiming picture	The appearance of both sights and target when they are correctly aligned.
Air resistance	The slowing effect on a bullet in flight, due to friction with the air.
Airgun	The general term for a pneumatic firearm that fires projectiles using compressed air.
Airsoft	Airsoft is a modern combat sport or recreational hobby in which participants eliminate opponents by hitting each other with spherical airsoft pellets, launched from airsoft guns.
Ammunition	The general name given to cartridge comprising case, primer, propellant and bullet.
Antique (firearm)	Typically a firearm manufactured prior to 1899 or a firearm for which ammunition is not generally available or a firearm incapable of firing fixed ammunition.
Anti-splash curtains	Curtains made of a rubber compound (e.g. Linatex) hung in front of the 'Bullet Catcher' so as to stop any 'back-splash' from the bullets when they break up on impact.
Aperture (iron) sight	A type of rear sight used on firearms that comprises an aperture with a small opening mounted on the firearm's receiver. The fore sight contains a ring in the centre of which the (round) aiming mark is placed. This is the standard type of sights used on air rifles, Smallbore and Fullbore rifles for target shooting.
Assault rifle	A military issued Selective Fire or Fully Automatic rifle with a short overall length designed to fire a reduced power rifle cartridge.
Automatic	A semi automatic is a self-loading firearm which fires one shot for each pull of the trigger. A full automatic is a firearm, which continues to fire once the trigger is pulled.
Ball	Originally a used for a spherical bullet fired by black powder firearms, now generally a used for a fully jacketed bullet of cylindrical profile with round or pointed nose. Most commonly used in military terminology.
Ballistic coefficient (BC)	A measure of a given bullet's ability to overcome air resistance in flight when compared to a standard bullet. Used to calculate ballistic tables.
Ballistics	The science of cartridge discharge and the bullet's flight and what affects them; including trajectory, force, impact and penetration. This includes internal ballistics (in the barrel), external ballistics (in flight) and terminal ballistics (within the target).
Barrel	That part of a gun along which the bullet or pellet(s) travel when fired, it is usually but not always circular in cross-section.
Barrel length	The distance from the muzzle to the chamber, including the chamber itself; but not accessories or barrel extensions like flash suppressors or muzzle brakes.
Bayonet lug	A mounting point on a small arm that allows a bayonet or other accessory to be attached.
BB	The standard definition is a round ball Airgun projectile of .175-inch diameter. In the UK it can also mean a round shotgun cartridge projectile of .181 inch diameter.
BB gun	A type of Airgun designed to use spherical steel BB pellets.
Bedding	The manner in which the barrel and action of a rifle are fitted to the stock.
Belted (cartridge) case	A rimless cartridge case with a raised integral belt around the case just ahead of the extractor groove to provide a positive headspace surface while retaining the extractor groove.
Benchrest (shooting)	The standard definition is a form of shooting done with the firearm supported on a 'bench' rather than solely by the marksman. It is also used for a device for testing the accuracy of guns and ammunition.
Berdan (primer)	A centrefire primer system developed by Hiram Berdan, having multiple flash holes and an integral anvil in the case.
Biathlon	A shooting sport that combines both skiing and rifle shooting.
Big bore	A rifle shooting term that refers to (large calibre) centrefire firearms or ammunition.
Bipod	A twin legged support for a rifle, musket or carbine, usually fixed at the end of the forend away from the shooter. (Illegal for competition use under ISSF rules.)
Bird shot	Individual shotgun pellets of less than .24" in diameter. The size of the shot is given as a number or letter with the larger number the smaller the shot size.
Bisley	The home of UK and Commonwealth shooting; a range complex located at Bisley, Surrey, England.
Bisley style	The term often used in Commonwealth countries for any large or Fullbore shooting competition. It also refers to a specific style of grip and hammer configuration on a revolver.
Black powder (BP)	The original finely-ground propellant powder, used in muzzle-loaders and antique cartridge firearms. The basic ingredients are salt-petre (potassium nitrate), charcoal (carbon) and sulphur.
Blank (ammunition)	A cartridge loaded with a primer and powder but without a bullet. On firing it produces the usual loud 'bang' but with little danger to life.
Blowback (or blow-back)	The method of operating low-powered semi-automatic guns. The bolt is literally 'blown' open by the cartridge when the gun is fired. It is typically used for .22 rimfire ammunition only, as any more powerful cartridge would require either an excessively

[1] A more extensive Shooting and Firearms glossary can be found at www.saami.org/Glossary/index.cfm

	heavy bolt and / or a very strong spring to keep the breech sealed until the pressure had dropped to a safe level before opening the chamber.
Bluing	The chemical process of artificial oxidation (rusting) applied to gun parts so that the metal attains a dark blue or nearly black appearance.
Boat tail (bullet)	The tapered rear end of some bullets, used to increase ballistic efficiency (by reducing drag) at long range. So-called because in plan view the bullet outline resembles that of a boat.
Bolt	A steel rod-like assembly (similar in design and operation to a normal door bolt) that moves back and forth in an action, sealing the cartridge in the chamber during firing.
Bolt action	A type of firearm, usually, but not always a rifle, which is loaded and unloaded by means of a bolt. It can be either a single shot, or a multi shot firearm.
Bolt face	The forward end of the bolt that supports the base of the cartridge.
Bore	The standard definition is the interior of a firearm's barrel excluding the chamber, through which the bullet or other projectile is fired from the gun. It is also the British word for the calibre of a shotgun (in America they use 'Gauge').
Bore diameter	The measurement from one side of the bore to the other; the land-to-land diameter taken from the raised lands (not the inside of the grooves).
Bore line	An imaginary line projected from the muzzle of a gun along the centre of the bore.
Bottleneck case	Cartridge case with a neck diameter smaller than its body diameter thus creating a shoulder and giving the case the appearance of a wine bottle in profile.
Boxer	A centrefire primer system developed by Edward Boxer, characterised by having one central flash hole and the anvil as an integral part of the primer. Standard primer for Hand loading cartridges.
Brass (cartridge case)	A synonym for expended metallic cartridge cases, and a term used to mean empty, reloadable cartridge cases.
Breech	The end part of the barrel nearest the shooter with the chamber into which the cartridge is loaded.
Breech loader	A firearm loaded through the breech.
Breechblock	The part in the breech mechanism that locks the action to enable the firing of the cartridge.
Broken target	Used to describe a shotgun target (i.e. clay pigeon) that falls apart before being fired upon.
BSA	Birmingham Small Arms company.
Buck shot	Large lead pellets used in shotgun shells where the individual projectiles are of .24" in diameter or greater.
Bull (or Bullseye)	Short for bull's-eye. The centre of a target, usually scoring a 5, 7 or 10 when hit.
Bull barrel	A heavier, thicker than normal barrel with little or no taper. It thus reduces recoil and minimises the effects caused by heating when firing rapidly.
Bullet	The name given to the single, usually cylindrical and pointed projectile that comes out of the barrel of a gun. If there is more than one projectile, then usually the term used is 'pellet', as in a shotgun cartridge.
Bullet catcher	The part of the butts that actually stops and retains the fired bullet.
Bullet mould	A device of either steel or aluminium used to cast bullets for home reloading.
Bullet path	The track or path taken by a bullet in flight. Also known as the bullet trajectory.
Bullet puller (or inertia puller)	A device used to 'pull' a bullet from its cartridge case. Normally, either a collet is clamped round the bullet and it is literally pulled from the case, or an inertia hammer is used, whereby the case is held and the bullet 'pulled' by its own inertia, when the tool is struck against a hard object.
Bullet, flat-nosed	A bullet with a flattened tip, used mainly in cartridges designed for rifles with tubular magazines.
Bullet, Full Metal Jacket	A jacket, usually of copper completely covering a bullet, so as to leave no lead exposed.
Bullet, Hollow point	A metal jacketed or unjacketed bullet design in which the core of the bullet is exposed by means of a cavity in its nose to ensure the expansion of the bullet upon impact. Often abbreviated "JHP" or "HP."
Bullet, Jacket	A covering over the lead core of a bullet, usually made of copper and is either complete (i.e. full metal jacket), or partial.
Bullet, Round nose	A bullet with a rounded head such as used in most .22 rimfire target cartridges.
Bullseye	The standard term is the centre of a target, however it is also used for a type of fast burning smokeless powder suited to cartridges intended to be shot by short barrelled firearms.
Burning rate	The relative speed at which a propellant powder burns in comparison to other powders in a controlled combustion chamber. A fast burning powder is used in short barrelled guns, such as pistols and a slow burning one in rifles.
Butt	The rear end of a rifle or shotgun (the portion that rests against the shoulder.) In a handgun, the bottom part of the grip.
Butt Plate	A plate put on the butt end of a stock. The plate, usually of rubber, plastic or metal cushions the shooters shoulder from recoil when a firearm is fired.
Butt stock	In rifles and shotguns, the part of the stock which extends from the receiver to the butt.
Butts	The name given to that part of the range that contains the target frames and the bullet catcher, which traps and safely contains the fired bullets.
Calibre (or caliber)	The diameter of the bore of a barrel measured from land to land, usually measured in tenths of an inch or in millimetres. It does not designate the actual diameter of a bullet.
Call for the target:	To call out a command when ready for the shotgun target to be released.
Calling the shot	The action of stating the position on the target of the last shot fired, before looking through the spotting scope, or retrieving the target.
Cannelure	A groove or indention around the circumference of a bullet. Its purpose is to permit the cartridge casing to be crimped tightly against the bullet shank to hold it firmly to the casing.
Cant	The angle of lean from the vertical that the firearm has whilst being held by the shooter.
Cap	An explosive device fitted over the nipple of a percussion Black Powder gun in order to initiate ignition of the main charge and fire the bullet.
Capping off	The process of firing a cap on its own before attempting to load a percussion fired Black Powder gun, in order to clear any oil or other residue from the nipple and chamber.
Carbine	Originally a shortened version of a standard rifle with a barrel less than ?? inches. Commonly used today to indicate any rifle of short overall length.
Carbon dioxide (powered)	A propellant in which the energy source is obtained from compressed carbon dioxide gas.
Card	Another word for target, notably in Smallbore target shooting.
Cartridge	A complete unit of ammunition (or round) for small arms consisting of a cartridge case, primer, propellant, and projectile(s), which is inserted into the firing chamber.
Cartridge case	A container made of metal or other material that holds the propelling charge, primer, and projectile in a single unit of ammunition.
Cartridge magazine	A device or container from which ammunition may be fed into the firing chamber of a firearm. The two common types are box-type magazine and tubular magazine.
Case (or Casing)	The envelope (container) of a cartridge. For rifles and handguns it is usually of brass or other metal; for shotguns it is usually of paper or plastic with a metal head and is more often called a "shell."
Cast	The two definitions are: a) the lateral displacement of the centreline of a shotgun (or rifle) stock from the centreline of the bore, to better align the shooters eye with the centre line of the bore; or b) the process of making bullets for reloading by melting lead or an alloy of lead.

Cease-fire	The command to stop shooting, unload the firearm and step behind the cease-fire line.
Centrefire (or Centerfire)	A cartridge in which the primer is seated in a pocket or recess in the center of the base of the cartridge case. Also, refers to a firearm that uses centrefire cartridges.
Chain-firing (or flashover)	The term used in black powder revolvers to describe the dangerous result of not using grease over the balls in the cylinders. When the primary cylinder is fired, lack of grease on the other cylinders may cause them to discharge before they are lined up with the barrel.
Chamber	The two meanings are a) The part of a firearm containing the cartridge (or separate powder and ball) at the moment of firing it, normally at the opposite end of the barrel to the muzzle; and b) The action of loading a round of ammunition into the firearm.
Charge (powder)	In terms of propellants: a) for nitro powder and Black Powder, the amount, by weight, of the powder in a cartridge or load; b) for Pyrodex, the amount, by volume, of the powder used; and c) To fill a magazine with cartridges.
Cheek Piece	A lateral projection from the comb of the stock that provides additional support and contact to the shooter's cheek when the rifle is shouldered in the firing position. It is used to assist positioning the aiming eye correctly behind the sights.
Chief Firearms Officer	The person in authority responsible for issuing licences, authorizations to transport, authorizations to carry and other functions related to the administration of the Firearms Act and its Regulations.
Choke	The restriction at the muzzle of a shotgun barrel used to control the dispersion of the shot.
Chronograph	A device to measure the velocity of projectiles fired from a gun.
Cleaned (target)	A perfect target, in which the shooter hits a 10 on each of the 10 targets on the sheet for a score of 100.
Cleaning kit	A set of specialized accessories used to clean and maintain a firearm.
Cleaning rod	The cleaning rod for a rifle, handgun or shotgun, usually of plastic coated metal, longer than the barrel to be cleaned and often fitted with a rotating (ball-bearing) handle.
Click	The name given to the smallest adjustment of a aperture or telescopic sight.
Clip	A device for holding cartridges together before inserting them into a firearm's magazine. (It is also used - incorrectly - to mean a detachable Magazine.)
CO2	Carbon dioxide is used as a propellant for Airguns. It is stored on the gun in liquid form under pressure and typically will give around 180 shots per fill from the reservoir.
Cock (full-cock, half-cock)	The cock on muzzle-loading firearms, holds the flint or match. The term full-cock is to set the action into position for firing. The term half-cock is to set the action in an intermediate position from which the gun cannot be fired.
Coking	The burning of black powder residue with much heat and little smoke.
Comb	The upper part of the stock where the shooter's cheek rests during aiming.
Combat Shooting	A generic reference to a shooting sport (generally using handguns) that seeks to simulate the use of small arms as an instrument of personal protection. (see Practical shooting)
Compensator	A muzzle brake, designed to reduce the effects of recoil by redirecting the escaping gases and to limit the muzzle jump on firing so as to assist rapid subsequent shots.
Conical bullet	A cylindrical shaped bullet with a cone shaped tip.
Cordite	The trade name of one of the earliest smokeless propellants made in Britain, so called because of its long, cord-like appearance.
Core	The centre of a bullet that is covered by a jacket.
Count back	The system used to break a tie between two or more competitors with the same total score.
Crimp	The inward folding of a cartridge case used to retain the bullet (or shot charge in a shotgun). It can be either tapered, or rolled.
Cross-bolt safety	A safety device that blocks the firing mechanism of a firearm.
Cross-hairs	The sighting lines in a telescopic sight.
Crown (or muzzle crown)	The bevelled, countersunk, or rounded muzzle surface of a barrel.
Crowning	The act of forming the radius on the muzzle end of a barrel.
CUP.	'Copper Units of Pressure' is a standard method of estimating the pressure inside a gun when it is being fired. It is of great importance for safe reloading, as cartridge cases are quoted by their manufacturers as having a particular maximum CUP, which must not be exceeded.
Cylinder	That part of a revolving firearm that holds the ammunition in individual chambers. The cylinder then rotates as the gun is used to present each round in turn to the barrel for firing.
Cylinder bore	A shotgun barrel having the same diameter throughout, i.e. without choke.
Cylinder gap	The gap between the front of the cylinder and the rear of the barrel of a revolver. This can be as small as 1/1000 of an inch in a high quality gun, but is usually nearer 1/100 of an inch.
Cylinder Stop	On a revolver, a spring activated device housed in the bottom of the frame beneath the cylinder that engages alignment notches in the cylinder. It stops the cylinder's rotation and holds it in place each time a chamber in the cylinder is in alignment with the barrel.
Damascus (barrels)	An early method of making barrels out of welding together two or more rods of twisted iron and rolling them into a ribbon. This ribbon was then wrapped round a mandrel and hammered so that the edges became fused together.
Delayed blowback	A self-loading firearm whose breechblock and barrel are not positively locked together, but which incorporates a mechanism which initially restricts the breechblock from moving when fired, delaying its opening.
Die	A tool used in reloading metallic cartridge cases to resize the case to the specified dimensions, or a tool used to de-prime fired cases, or a tool used to seat bullets in cases, or a tool used to load powder into cases prior to seating the bullet.
Disconnector	Mechanical device in a semi-automatic firearm that is designed to prevent the firing of more than one shot from one pull of the trigger.
Dominant eye (and hand)	The stronger, or 'master' eye and hand. The dominant eye is the one through which a person would usually view an object when using a telescope. The dominant hand is what the shooter would describe himself as being for example, 'right-handed'.
Double Action (DA)	The type of firearm action whereby one pull of the trigger performs the two separate functions of a) cocking the gun and b) firing the gun.
Double action only (DAO)	An action that cannot fire in a single action mode.
Double trap	A trapshooting event where two targets are released simultaneously at different heights and angles and the shooter must fire a shot at each target.
Double-action revolver	A revolver that both cocks and fires with a complete pull of the trigger.
Double-barrel	A firearm with two barrels, either side-by-side or over-and-under.
Double-base (powder)	Propellant powder in which nitro-cellulose is supplemented by nitro-glycerine.
Down range	The direction from the firing point towards the target on a range.
DPM	Disruptive Pattern Material – the pattern used in modern (British) military camouflage clothing.
Dry firing	Firing of an unloaded firearm to practice handling and shooting techniques. This can damage some types of actions, particularly rim-fire.
Dud	A popular term for a cartridge that fails to fire after its primer is struck by the firearm's firing pin.
Dummy ammunition	Inactive ammunition without a primer or propellant used for practising handling of firearms.

Dummy cartridge	Sometimes called, 'Drill rounds'; inactive ammunition without primer or propellant.
Ears (or cans)	The popular name given to hearing protectors of whatever type.
Ears on	The command by the Range Officer to put on hearing protection prior to commencing firing.
Effective range	The maximum distance for a firearm at which a competent shooter can expect to hit the target.
Ejector	The mechanism that expels the cartridge or case from the firearm.
Ejector star	On a revolver, the collective ejector, manually operated through the center of an opened cylinder, which clears all chambers at once.
Elevation	Vertical adjustment of the rear sight to change the projectile's point of impact either up or down.
English match	A 60 shot course of fire for .22 rimfire rifles shot from the prone position over 50 metres.
Equipment control	The person(s) who checks all shooting equipment and clothing before a shooter is allowed to take part in a competition, so as to ensure that it all complies with the current specifications. Normally the gun will be marked with a sticker to show that it has passed inspection.
Extractor	The device that extracts, or removes the cartridge case from the chamber of the gun. This is not the same as the Ejector (see above).
Eye piece	The lens of a telescopic sight nearest the shooters eye.
Eye relief	The distance that the shooters eye is positioned behind the ocular (eye) lens of a sight in order to obtain the best view of the target and to avoid a black-eye on firing. Somewhere between 2 to 4 inches is the usual distance.
F-Class	The F ('Farquarson') Class, or F-Class shooting discipline involves prone target rifle shooting using a variety of aids, such as telescopic sights, bipods, front-rests and sandbags, and any calibre of ammunition up to 8mm.
Feed	The action of moving a fresh cartridge into the chamber.
Feeding path	The path a cartridge follows within an action.
Felt recoil	The way that a shooter actually feels the recoil, or 'kick' of a gun when it is fired.
Fg, FFg, FFFg, FFFFg	Size grades of Black Powder particles, from coarsest to finest. FFFFg is mainly used as a priming powder for flintlocks, wheel locks and matchlocks.
Field stripping	Taking apart a firearm for regular maintenance and cleaning.
Firearm	Any instrument that projects a bullet by gas pressure generated by the combustion of a propellant. Specifically a rifle, shotgun or handgun using gunpowder as a propellant.
Firearms Certificate (FAC)	In the UK, the necessary permit to hold any firearm or ammunition.
Fireform	The process of improving accuracy and functioning by firing the case so that it becomes an exact fit of the chamber of a particular gun.
Firing line (or point)	The or point from which shooting takes place, with each position numbered consecutively from 1 upwards with contrasting colours i.e. if 1 is painted black, 2 should be white, etc.
Firing pin	The part of a gun's action which actually strikes the primer so as to set it off and initiate firing the cartridge's main charge of propellant.
Fixed sights	Non-adjustable sights on firearms, typically used on sporting and military firearms.
Flash hider (or suppressor)	A muzzle attachment intended to reduce visible muzzle flash caused by the burning propellant.
Flash hole	For a centrefire cartridge, the small diameter hole through which the flame from the primer ignites the main charge in the cartridge case; and for muzzleloaders, the small diameter hole through which the 'flash' from the priming charge travels to ignite the main charge.
Flash suppressor	Muzzle attachment designed to cool emergent gases and prevent/reduce muzzle flash.
Flechette	A small dart stabilized by fins, encased in a discarding sabot (case) and loaded into a shotgun shell.
Flintlock	A muzzle loading firearm with its powder charge ignited by a flint striking a metal surface (the frizzen) to produce sparks which ignite fine priming powder, which in turn sets off the main charge.
Floor plate	The hinged metal plate at the bottom of some cartridge magazines, held by a release spring located just ahead of the trigger guard.
Flyer	A shot well outside the normal group on a target due almost always to shooter error.
Follower, magazine	The metal plate or part of a magazine between the spring and the ammunition.
Follow-through	Staying in the same position after squeezing the trigger or continuing the swing in firing at a moving target. This helps to shoot accurately.
Forcing cone	The tapered section of a rifle, handgun or shotgun where the bullet or pellet is guided into the bore.
Fore-end (fore-stock)	The front portion of a one-piece or two-piece firearm stock, which serves as a hand-hold.
Fouling	The deposits that build up in the barrel of a gun after it is fired. Fouling can either be soft and harmless carbon residue, or more persistent lead or copper, both of which are detrimental to accuracy.
Fouling Shot	The process of firing a shot off before starting trying to shoot accurately, so as to remove any oil from the barrel and to coat the bore with a layer of powder residue.
FPS (feet per second)	Feet per second is the standard measure of projectile velocity in the Imperial measurement system.
Frame	The common part of a handgun that the action, barrel and grip are connected to.
Free pistol	A .22 calibre target pistol which is 'free' of most constraints such as barrel length, sight radius, weight etc.
Free rifle	A .22 or centrefire rifle which is 'free' of most constraints such as barrel length, trigger, sight radius, weight etc.
Frizzen	The upright steel plate in a flintlock gun that is struck by the flint in order to produce the sparks for igniting the priming powder.
Front sight (or foresight)	The sight attached to the muzzle end of the barrel of a rifle or handgun.
Front Strap	The part of a revolver or pistol grip frame that faces forward and often joins with the trigger guard.
Full cock	The position of the hammer or striker when the firearm is ready to fire.
Full course	In Smallbore, a full course consists of 120 record shots, 40 in each position, fired in the following order prone, standing, kneeling. In Air rifle, a full course is 40 shots.
Fullbore (or Full-Bore or Full Bore)	Generally taken to mean centrefire calibres, such as 7.62 calibre.
Gain twist	A system of rifling where the pitch (of the twist) increases towards the muzzle.
Gauge (or gage)	An American term for the measurement of the diameter of a shotgun's bore expressed as the number of lead balls of bore diameter that weigh one pound.
Gauging, inward	The scoring process whereby the edge of the bullet hole nearest the centre of the target determines its value. In this method the shot hole has only to touch (not cut) the next higher scoring ring to be awarded the higher values.
Gauging, outward	The scoring process whereby the edge of the bullet hole furthest from the centre determines its value. In this method, the shot hole has only to touch (not cut) the next lower scoring ring to be awarded the lower value.
Greenhill's Formula	An empirical formula that relates bullet weight and length to rifling twist. Twist in inches (T) = [150/(L/D)]xD where L = bullet length in inches and D = bullet diameter in inches.

Grip	The small portion of the stock gripped by the trigger hand, or the handle of a handgun.
Groove	The sunken part of rifling.
Groove diameter	The distance across the bore of a rifled barrel from the bottom of one groove to the bottom of the one opposite.
Grooves	Spiral cuts into the bore of a barrel that give the bullet its spin or rotation as it moves down the barrel.
Group	The pattern of shots on a target.
Group Size	It is the distance between the centres of the two farthest apart shots in a group.
Gun Lobby	A term used by the media to describe the National Rifle Association of America, and anyone else who does fights against firearms laws.
Guncotton	Nitro-cellulose form of smokeless propellant.
Gunpowder	The original black powder made up of 70% saltpetre, 15% sulphur and 10% charcoal.
Half Cock	A position of the hammer in a hammer-activated firing mechanism that acts as a manual safety.
Hammer	In firearms the term hammer has a number of meanings: a) The part of the action that drives the firing pin forward; b) the part of the action which strikes the cap in a Percussion gun; and c) The term is also, used to describe two very quick shots fired from a handgun with the first directed by the sights and the second held on target by the power of the shooter's grip.
Hammer Spur	The thumb piece on the top rear of the hammer that enables it to be manually drawn back to full cock.
Hammerless	This general term for a firearm where the hammers are fully encased inside the frames, typically used for handguns and shotguns.
Handgun	Synonym for pistol, but covers single shot pistols, semi-automatics and revolvers.
Handload(ing)	The practice of loading and reloading centrefire cartridges to produce specific cartridge characteristics; for example accuracy, low velocity, minimum recoil rounds for rapid-fire target shooting.
Hang fire	A term applied to an excessive delay in ignition of the main charge after the primer has fired. This is usually associated with Black Powder muzzle loaders and especially Matchlocks.
Headspace	This is the distance from the breech face to that part of the chamber that stops the forward movement of the cartridge case. Different cartridge designs obtain their headspace in different ways.
Headstamp	The manufacturers marks stamped into the base (or primer end) of a metallic cartridge case giving various details of its construction, such as calibre, maker, load, date of manufacture, etc.
High house	The trap house from where targets are thrown from a point higher than the low house in skeet events.
High power	A term applied to the first smokeless powder cartridges with velocities of approximately 609.6 metres per second (2,000 feet per second).
High power rifle	Generally, a firearm that uses centrefire ammunition.
Hit	A shotgun target that has been struck and broken by the shooter.
Holding	The action of keeping the sights on the target while squeezing the trigger.
HPS (highest possible score)	The highest possible score on competition targets. In ISSF normally this has a value of 100 when shot to international rules.
Hull	The outer covering or casing of a shotgun shell.
ICFRA	The International Confederation of Fullbore Rifle Associations. The governing body of Target Rifle (TR) world championship events.
Inner-10	The name given to a smaller ring enclosed by the 10 ring on a target. Normally the Inner-10 does not have a score value, it is used as a tie-breaker between competitors with an identical numerical score; the one with the higher number of Inner-10's being the winner.
Iron sights (or metallic sights)	A somewhat loose term used to describe non-optical sights, especially open sights as fitted to handguns and aperture sights fitted to target rifles.
ISSF (International Shooting Sport Federation)	The international Shooting Sport Federation (ISSF) is a governing body of the international shooting sport; formally called the Union Internationale de Tir (UIT) or International Shooting Union (ISU). The official web site is www.issf-shooting.org.
Journee's formula	The empirical formula used to calculate safe distances for shotgun pellets. It says that the maximum range in yards for a round pellet is 2200 times its diameter in inches.
Jump, muzzle	The vertical movement of the muzzle on firing the firearm caused by the centre of the barrel being higher than the centre of support for the gun.
Keyhole	Elongated hole made in a target by a bullet that is tumbling in flight and hence striking the target other than point first. Caused by inadequate rotational stabilization of the bullet, usually due to insufficient barrel twist or too low a velocity for the calibre.
Lapping	The process of repeatedly passing a lead 'slug' (usually a wadcutter bullet mounted on a cleaning rod) through the bore of a gun barrel in order to lap, or polish it. The polishing is assisted by means of dipping the slug in a mild metal polish.
Leade	The short unrifled section of the bore, in front of the chamber, into which the bullet's nose is introduced.
Leading	The deposition of lead in the bore of a firearm due to the passage of lead bullet (pronounced "ledding"). Often caused by firing the bullets at too great a velocity, or by a slight roughness in the barrel, stripping a sliver of metal off as they pass.
Lever action	An action operated by a lever located underneath it.
Linatex	A self-healing, or self-sealing rubber sheet material, used in the UK to reduce splatter from bullets impacting on the bullet catcher.
Line of sight	An imaginary straight line from the shooter's eye to the target; usually through the sights.
Live ammunition	Ammunition containing primers and propellants capable of firing bullets or other projectiles.
Load	The two meanings are firstly to place a round of ammunition in a firearm chamber or magazine, and secondly a specific type or composition of ammunition.
Loading gate	The hinged cover over the opening through which cartridges are inserted into the magazine or chamber on a revolver.
Loading port	The opening through which cartridges are inserted into the magazine or chamber on a revolver.
Lock	In firearms that are loaded through the breech, the lock is both the firing mechanism and breech-sealing assembly.
Lock time	The time taken from the release of the sear by the trigger to the moment the primer is struck, usually very short, less than 2 milliseconds being the aim.
Long recoil	A semi-automatic pistol in which the barrel and breechblock are locked together for the full distance of rearward recoil travel, after which the barrel returns forward, while the breechblock is held back. After the barrel has fully returned, the breechblock is released to fly forward, chambering a fresh round in the process.
Long-arm (or long gun)	Generic term used to describe rifles and shotguns.
Lost	The description for a shotgun target that has not been hit.
Low house	In skeet events, the trap house from where targets are thrown from a point lower than the high house.
Machine gun	A fully automatic firearm using a cartridge designed and intended for use in rifles or larger firearms.
Machine pistol	An automatic weapon using a cartridge designed and intended for use in pistols, and is fired one or two handed, and does not include a shoulder mount. (see "submachine gun" of difference.)

Machine rest	A device for securely holding a firearm in a consistent position so as to allow accuracy testing of firearm and ammunition.
Macrae Handicap system	A handicapping system for competitions that tries to ensure that all participants have an equal chance of winning by recognising that it takes more effort for a skilled shot to improve their scores than a beginner.
Magazine	A spring-loaded container either fixed to a firearm's frame or detachable, which holds cartridges under spring pressure to be fed into the firearm's chamber.
Magazine release	A button or switch that allows for the removal of a magazine from the firearm.
Magnum cartridge	The term is used to mean a small arms cartridge loaded to higher than "standard" power levels. (The .357 Magnum cartridge is actually the .38 Special cartridge loaded to about twice the normal pressure level.)
Mainspring	A strong spring which activates the striker or hammer of a firearm.
Malfunction	The failure of a firearm or ammunition to work properly. This can be caused by a jam or stoppage, or a mechanical or structural failure.
Marksman	A person who can shoot their firearm accurately.
Marksman, Master	A person who can shoot up to the mechanical capability of their weapon.
Master eye	The stronger eye; the eye through which a person usually views an object as when sighting a firearm.
Match	In shooting, either a) a target shooting competition, or b) in muzzle loading, a string soaked in nitrate so as to burn slowly and steadily without going out in wind, used to fire a Matchlock gun.
Matchlock	A muzzle loading firearm which is fired by means of a slowly burning match being applied to a flash hole by means of the trigger.
Meplat (or Metplat)	The (diameter of the) tip of a bullet.
Mid-range	The point in the trajectory halfway between the firing point (cf. muzzle) and the target.
Mil	A 'mil' is short for milliradian – $1/1000^{th}$ of a radian. See MOA below.
Military firearm	Any firearm that is or has been used by the military services.
Millisecond	One thousandth of a second (1/1000 second).
Minie ball (or mini-ball)	A cylindrical shaped bullet used in muzzle-loaders. It has a pointed tip and a hollow base that spreads as it is fired.
Mirage	The observed apparent movement and/or distortion of a target due only to temperature created air disturbance between the shooter and the butts.
Misfire	The failure of a cartridge to fire after the firing pin has struck the primer. Not to be confused with 'hangfire', which is a delay in firing.
MLAGB	Muzzle Loaders Association of Great Britain (MLAGB) is the governing body for muzzle loading shooting and competitions within the UK.
MLAIC	Muzzle Loaders Association International Committee (MLAIC) the body that governs all International muzzle loading competitive target shooting.
MOA (minute of angle)	The MOA is used in target shooting as a handy reference of accuracy and for sight adjustment. At a range of 100 yards 1 MOA represents a distance of 1.0472 inches (or approximately 1 inch).
Modified Estonian (stance)	The name of the popular stance used in prone target shooting, where the body is at 5^{0}-15^{0} degrees to the line of fire, with the body slightly tilted by pulling up the right knee (right hander).
Monte Carlo stock	A stock with a raised comb. Provides elevated eye alignment when using a telescopic sight.
MPI (mean point of impact)	The mathematical centre of a group of shot holes on the target.
Mushroom	The term used for the shape many soft-point bullets become when they expand upon impact.
Musket	The name of a shoulder fired muzzle loading (and usually) smoothbore gun held in both hands.
Muzzle	The end of the barrel from which the projectile exits.
Muzzle blast	The blast, or shockwave felt by a shooter and observers when the bullet exits from the barrel.
Muzzle brake	A device attached to the muzzle of a firearm that is designed to reduce the recoil by redirecting the powder gases produced during firing.
Muzzle energy	The energy measured in Foot-Pounds (ft/lb) or in Joules that a projectile contains when it leaves the barrel of a gun.
Muzzle flash	The flash caused by unburned powder burning-up in free air after the bullet has left the barrel.
Muzzle loader (or muzzleloader)	Any firearm that is loaded from the muzzle end, usually by means of a separate powder charge, with the bullet seated afterwards. Muzzle loaders can be Matchlocks, Wheel Locks, Flintlocks, or Percussion fired.
Muzzle velocity	The velocity of a projectile as it leaves the barrel of a gun, the speed being measured in feet per second or metres per second.
ND (negligent discharge)	The unplanned discharge of a firearm caused by a failure to observe the basic safety rules.
Neck	The constricted forward section of a bottle-necked cartridge casing, namely the portion that grips the bullet.
Nipple	A drilled cone shaped part of a Black Powder firearm or chamber at the closed end used to hold the percussion cap(s) needed to fire the main charge(s).
Nitrocellulose or Nitro	Short for Nitrocellulose, the standard form of smokeless propellant used today for cartridge firearms. Also known as guncotton.
No bird	A 'non-counting' clay pigeon target: being broken when it emerges, not propelled or released before the shooters call.
NRA	The 'National Rifle Association' is the name used in America, United Kingdom and many Commonwealth countries by organisation promoting shooting.
NRA (National Rifle Association)	National Rifle Association (of United Kingdon, American, Australia etc.) is the body that deals with rifle (e.g. Fullbore) and pistol target shooting.
NSRA (National Smallbore Rifle Association)	National Smallbore Rifle Association is the body that governs .22, airgun and crossbow target shooting in the UK.
Object lens	The lens of a telescopic sight (or any optical device) nearest the object being viewed.
Obturation	The expansion of a cartridge case on firing to seal off the chamber and prevent gases from escaping.
Ocular Lens	The lens at the rear of an optical device and nearest the user's eye.
Offhand	Shooting in a standing position; the standard shooting position for pistol and the unsupported standing position in rifle shooting.
Ogive	A type of curve portion represented by the section of a bullet between its bearing surface and its tip or metplat.
Olympic final	A 10 shot shoot-off between the top 8 shooters in an ISSF competition. Scoring is done to 1/10 of a point for each shot, with a maximum score for a perfectly central shot of 10.9 and thus a maximum total score for all 10 shots of 109.
Open frame	Refers to a revolver frame that has no topstrap over the cylinder.
Open sight	A type of rear sight characterized by an open topped notch (e.g. "V" or "U" notch). It is mounted on the rear portion of the barrel on rifles and shotguns or on the rear portion of a handgun's receiver and used in conjunction with a blade type front sight. This is the standard type of sight on handguns.
Over bore capacity	Common term used to describe cartridges with a propellant capacity overly large in relation to the bore. Expanding gas produced by propellant combustion can only be forced through a given aperture at a certain rate. Thereafter increasing the

	amount of gas by increasing the amount of propellant merely raises pressures without raising velocity. For example a .300 H&H case necked down to .22 calibre has twice the powder capacity of a .22-250 and produces maximum pressures that are much higher, but without noticeably higher velocities.
Over-and-under	A firearm, usually a shotgun, with two barrels placed one over the other, especially those used for clay-pigeon shooting.
Over-travel	The amount of rearward travel of the trigger after the release of the sear.
Pair	Two shots fired quickly with the use of the sights (in particular used in Clay Shooting)..
Palm rest	The two definitions are: a) a height adjustable support for the non-firing hand of the user of a target rifle, extending downward from the forearm of the stock, or b) a height adjustable rest at the base of the grip of a handgun.
Pan	That part of a matchlock, wheel lock or flintlock muzzle loading firearm that holds the priming powder next to the flash hole so that the main charge can be ignited by it.
Parabellum	A term synonymous with the 9 mm pistol calibre cartridge.
Parallax	The apparent shift in position of a viewed object attributable to the difference between two separate and distinct points of view.
Patch	There are three definitions: a) Muzzleloader - a small piece of leather or cloth that is greased and placed around a bullet before ramming it down the barrel of a muzzleloader so as to hold it firmly in place and prevent it rolling out; b) Cleaning - a piece of cloth or paper drawn through the bore of a firearm to clean it; and c) Targets - the action of covering bullet holes in a target using small adhesive disks, so as to extend its useful life.
Patch box	A small compartment in the butt of a muzzle-loader used to store patches or other small items.
Pattern distribution	The distribution of the shot in a shotgun cartridge. This is measured at a standard distance of 40 yards and in a 30-inch circle.
Peep sight	Another name for an aperture (iron) sight where the rear sight has a hole through which the target is viewed.
Pellet	Either an airgun projectile (usually of lead), or a shotgun projectile (e.g. lead or steel) fired from a cartridge/shotshell.
Pellet gun	A rifle or pistol using compressed air, CO2 or spring to propel a skirted pellet as opposed to a spherical BB.
Penetration	The depth that a projectile travels into a target before it stops.
Percussion cap	A small metal explosive filled cup that is placed over the nipple of a percussion firearm.
Percussion gun	The name given to firing a gun by means of a percussion cap placed over the flash hole (called a 'nipple' on a percussion gun).
Perfect match score	In Smallbore 1,200 is perfect score; while in air rifle, 400 is the perfect match score.
Pistol	A relatively short barrelled handgun, usually under 24 inches overall and held in one or both hands without any other support. This includes self-loaders, manual repeaters, single-shots, double or multiple barrel pistols, derringers etc.
Pistol grip	The handle of a handgun or protrusion on the buttstock or fore-end of a rifle or shotgun that resembles the grip or handle of a handgun. A "semi-pistol grip" is one less pronounced than normal; a "vertical pistol grip" is more pronounced than normal.
Plinking	An American term for casual, non-precision shooting, usually aimed at informal targets such as tin cans etc.
Plug	A metal device the same size as the shot hole, used to mark the score on targets.
Pneumatic power	A propulsion system in which compressed air is stored under pressure and when released provides the energy to propel the projectile.
Polygonal rifling	Rifling without hard-edged lands or grooves, typically consisting of flat surfaces that meet at angles round the bore.
Position	The position of the body of the shooter when firing, for competition under ISSF rules, this will be either, standing, kneeling or prone (lying face down)
Powder	The general term for any propellant used in firearms which burns upon ignition. The two major types are smokeless powder (a propellant) and black powder (an explosive).
Powder burn	Charring caused by gunshot residue.
Powder charge	The amount of powder by weight in the case of smokeless powder, and by volume, in the case of black powder.
Powder, Grain	The unit of weight used to measure powder charges and bullets. By definition it is 1/437.5 of an ounce and therefore there are 7000 grains to the pound. Modern powders are measured by weight. Black powder and its substitutes are measured in grains by volume.
Practical shooting	A shooting sport that simulates the use of a firearm in its intended role personal defence.
Prime	The two definitions are a) to place a primer in a cartridge case, and b) in the case of a black powder firearm, to place powder on the pan or percussion cap on the nipple.
Primer	That component of ammunition that ignites the propelling charge when struck by the firearm's firing mechanism.
Primer pocket	The recess in the base of the cartridge case that accepts the primer.
Primer pop	The term to describe when a cartridge does not contain the correct amount of gunpowder.
Primer ring	Refers to a visible dark ring created by the primers in centerfire ammunition around the firing pin hole in the frame after much use.
Progressive (press)	Name given to a type of reloading press whereby one pull of the operating lever competes one stage of the process and allows the press to be moved to the next stage.
Projectile	The name given to any item coming out of the barrel of any type of firearm when it is fired.
Prone	Shooting from a lying position.
Proof	The process of proving a firearm is safe for use, usually done by firing a special test cartridge which will apply at least 30% more pressure to the gun than shown.
Proof mark	The stamping on the barrel of a firearm to how that it has passed the proof test. In the case of a revolver, each chamber is separately proofed.
Proving safe	The action of demonstrating that a firearm is not loaded.
Pull-through	The cord used to pull a bore brush or cleaning patch through the bore of a firearm.
Pump action	A repeating firearm that has a magazine and is manually set in motion usually parallel to the barrel; also called slide action.
Pyrodex	A trade name for a Black Powder substitute propellant.
Ramrod	A rod used to 'ram' the ball (or bullet) down the barrel of a muzzle loading gun so as to seat it firmly on the charge of Black Powder.
Range	Range has the following meanings: a) the distance travelled by a projectile from firearm to target; b) a projectile's maximum travelling distance; and c) an area or facility designed for the safe shooting of firearms.
Range commands	The instructions given by the Range Officer to the shooters, detailing how the current course of fire is to be carried out. These can vary from the very simple, "Fire" and "Cease Fire", to quite elaborate instructions, depending on the event.
Range Safety Certificate	The certificate supplied by the Army (in the UK), stating the maximum calibre, muzzle velocity and muzzle energy that can be used and over what distances and from what firing positions for any given Range.
Receiver (or action)	The portion of a firearm that contains the operating parts and into which the barrel is fitted. In handguns, this refers to the frame.
Recoil (or kick)	The backward movement of a firearm when it is fired.
Recoil-operated	Refers to a semi-automatic pistol where the recoil is rearward in reaction to the discharging bullet (e.g. Blowback).

Record shots	These are the shots that are counted toward the match score, with "sighters" not included.
Regulate, Barrel	In double-barrel firearms, the process of getting both barrels to shoot to the same point of impact with a given load at a given distance. This distance is normally set to the range for which the firearm is intended to be used.
Reloading	The practice of reloading brass cartridge cases with primer, propellant and bullet so as to use them again.
Reticule	The aiming device built into a telescopic sight, traditionally in the form of crosshairs for target shooting purposes.
Revolver	A repeating handgun characterized by having a revolving cylinder separate from the barrel, that contains a set of chambers that rotate into line with the barrel for firing.
Revolving action	An action with a revolving cylinder containing a number of cartridge chambers. One chamber at a time lines up with the barrel.
Ricochet	The redirection of a bullet after impact, usually with a hard surface. For example, a bullet bouncing off a rock.
Rifle	A 'long gun' firearm characterized by spiral grooves cut on the inside of its projection tube or barrel.
Rifle, Martini	A type of falling block action used in single shot firearms. Viewed from the side with the breech open these firearms bear a passing resemblance to under lever repeating centre fire rifles.
Rifled slug	A large, single projectile with spiral grooves used in shotguns.
Rifling, barrel	A series of spiral grooves cut in the bore of a firearm designed to stabilize a projectile by spinning it.
Rifling, Lands	Raised portions of the bore left between the grooves of the rifling in the bore of a firearm. In rifling, the grooves are usually twice the width of the lands.
Rim	The edge on the base of a cartridge case. The rim is the part of the case that the extractor grips to remove the cartridge from the chamber.
Rimfire (cartridge)	Relating to a cartridge where the explosive that ignites the powder is contained in the rim of the case.
Rimless	Refers to a cartridge in which the base diameter is the same as the body diameter. The casing will normally have an extraction groove machined around it near the base, creating a "rim" at the base that is the same diameter as the body diameter.
RO/RCO (Range Officer or Range Conducting Officer)	The person in charge of shooting on the range.
Round	A unit of ammunition consisting of the primer, casing, propellant and bullet. A cartridge.
Running target	A target moved across a track to simulate a moving animal or other target.
SA (Single action, single-action)	An action that only releases the hammer from a cocked position when the trigger is pulled.
SAAMI	Sporting Arms and Ammunition Manufactures Institute, the American body that specifies many of the data used in reloading.
Sabot	A lightweight carrier surrounding a heavier projectile of reduced calibre, allowing a firearm to shoot ammunition for which it is not chambered.
Safety (Safety Catch)	A mechanical device built into a weapon intended to prevent accidental discharge. It may be either manually operated or automatic.
SD (Sectional density)	The ratio of the bullet mass to the square of its diameter, so SD=bullet weight in pounds / bullet diameter in inches x 2; or equivalent units.
Sear	The part of a gun's action that is 'tripped' by the trigger to release the hammer, or firing pin and initiate firing the cartridge.
Selective-Fire Firearm	Any firearm that may be operated in either the fully automatic or semiautomatic mode at the selection of the user.
Self-Loader	Another term for semi-automatic firearm. More commonly refers to early designs of semi-automatic pistols.
Semi-automatic	A firearm designed to fire a single cartridge, eject the empty case and reload the chamber each time the trigger is pulled.
Semi-wad cutter	A cylindrical bullet with a short truncated cone at the nose. Often used for paper target shooting.
Serpent	The part of the action of a Matchlock firearm that carries the match to the pan when the trigger is pulled in order to ignite the priming powder and hence fire the gun.
Set trigger	A very light trigger that is prepared, or set, by the operation of either another lever, or by manipulating the trigger itself.
Shooting glove	A padded glove or mitt, with or without fingers, used to ensure the comfort of the non-trigger hand as the shooter supports the rifle.
Shooting jacket	In target shooting, the jacket is made of leather or canvas and provides support and pads the shooter to minimize the effect of pulse and recoil. There are strict guidelines regarding the thickness.
Shooting shoes	Light athletic shoes designed for rifle shooting. They often have the toe end of the sole and the heel cut flat for stability.
Shooting station	The marked area where shooters must stand when firing.
Shooting trousers	Snug canvas and/or leather trousers often having padded reinforcements sewn on both knees and the seat to prevent the slipping of elbows and knees when firing from the kneeling position.
Shoot-off	A form of tie-breaker in a shooting competition.
Short recoil	Refers to a semi-automatic pistol in which the barrel and breechblock are locked together for only a short distance of rearward recoil travel, at which point the two are uncoupled, the barrel is stopped and the breechblock continues rearward, extracting the spent casing from the chamber.
Shot	Small spherical projectiles loaded in shotgun cartridges/shotshells.
Shot shell (or shotgun cartridge)	A cartridge used in a shotgun. It contains multiple shot pellets or a single projectile called a slug.
Shotgun	A shoulder firearm with a smooth bore designed to fire multiple pellets called shot, or a single projectile called a slug.
Side lever	Typically refers to a lever on the left or right side of either a) a pistol's frame that is used to release the slide for removal, maintenance and cleaning, or b) a firearm's action to open the breech.
Side-by-side	A double-barrelled firearm, the barrels of which are horizontally aligned, one beside the other, as distinct from an, over-and-under. This is the traditional arrangement for shotguns and big game rifles.
Sight (or sighting shots)	Device fitted to a firearm to assist the aiming of it in relation to a target.
Sighter	A practice shot fired at the beginning of a match to check sight adjustments. Sighters are not counted toward the final score.
Sighting picture	The appearance of the sights when they are correctly aligned with each other before the target is in view.
Silhouette shooting	A shooting sport in which the competitors attempt to knock over metallic game-shaped targets at various ranges.
Single action revolver	A revolver that requires the hammer to be cocked manually. Pressing the trigger will not cause it to fire until this is done.
Single shot	A single-barrel firearm that is manually loaded and has no magazine-feed device.
Single stroke pneumatic	An Airgun where only one stroke is needed to power the gun.
Skeet	A form of clay-target shooting where targets cross in front of the shooter, being thrown from two traps about 40 metres apart and the shooter moves in an arc to different stations, firing from various angles.
Slide	The upper portion of a semi-automatic pistol that houses the barrel and contains the breechblock and portions of the firing mechanism. As its name states, it slides along tracks in the top of the frame during the recoil process providing the linkage between the breechblock and barrel.
Slide safety	A device that blocks the firing mechanism of a firearm that has a slide.

Sling	In target shooting, an adjustable strap with buckle adjustments and arm cuffs that provide stability. A sling is attached to the rifle fore-end and helps to support the rifle in prone and kneeling positions.
Slug	More correctly a "rifled slug." An individual cylindrical projectile, usually of bore diameter, designed to be discharged from a shotgun. The term is often incorrectly used to mean a Bullet.
Small arms	Firearms designed to be carried and used by an individual or individuals.
Smallbore (or Small-bore)	Generally refers to a .22 calibre firearm or rim-fire ammunition.
Smokeless powder	A term usually used to refer to nitro powders. Note that nitro is not totally smoke-free.
Smoothbore (or Smooth bore)	A firearm with a bore that is not rifled, such as a shotgun.
Snap cap	An inert cartridge with a spring-loaded primer, used to check gun functioning, for dry fire practice and to release the spring tension for storage.
Snub-nosed	Descriptive of (usually) a revolver with an unusually short barrel.
Soft point, bullet	A metal jacketed bullet design in which the nose of the core of the bullet is exposed to ensure the expansion of the bullet upon impact. Often abbreviated "JSP" or "SP."
Speed loader	The speed loader is a circular device or clip that holds a complete set of revolver cartridges aligned to insert into all chambers of the cylinder simultaneously.
Spent bullet	A bullet near the end of its flight that has lost nearly all its energy. Despite a loss in energy, spent bullets can still penetrate targets.
Sporting clays	A shotgun shooting sport that combines elements of skeet and trap, and that is designed to simulate field conditions.
Sporting firearm	Any firearm that has been designed for field sports.
Spotter	A companion to the shooter on the firing point, who undertakes recording the accuracy of shooting and can advise on wind conditions, especially for long range shooting.
Spotting scope	A telescope on a stand, used to observe the position of a shot on the target from a distance and without having to retrieve it. Normally a magnification of between 20 and 30 times is used.
Spring (air) pistol	Also known as spring-air or adiabatic system. A system in which the projectile is propelled by air pressure that is created by a piston moved by a spring.
Stance, Kneeling	Shooting from a kneeling position with the offhand (nontrigger side) supported by the off knee.
Stock	The part of a rifle or shotgun used in holding the firearm against the shoulder when firing.
Stopping power	A popular but imprecise term used to refer to the ability of a small arms cartridge to cause a human assailant or a large game animal to be immediately incapacitated when shot with it.
Striker	In a firearm that does not have a hammer, the striker is a linear driven, spring-loaded cylindrical part which strikes the primer of a chambered cartridge. The striker replaces both the hammer and firing pin found in hammer driven firearms.
String	A series of shots, normally five or ten.
Submachine gun	An automatic firearm commonly firing pistol ammunition intended for close-range combat, that is typically fired two-handed and with a shoulder mount.
Swaging	A process of manufacturing bullets out of lead wire using great pressure to cut and 'swage', or 'squeeze' the bullet into shape. Swaged bullets can be jacketed.
Swiss (powder)	Very fine Black Powder, finer than FFFFg and used as a primer in muzzle loading guns.
Tang safety	A device that blocks the firing mechanism of a firearm.
Target	The object that shooters aim to 'hit'; for example, a board marked with concentric circles which shooters aim to hit.
Telescopic Sight (or scope)	A sight that employs optics to provide a magnified view of the target.
Throat	The unrifled part of the bore immediately in front of the chamber.
Throat erosion	The erosion of the throat area caused by the hot gasses of the propellant burning away the metal and limiting the barrel's useful life.
Topstrap	The part of a revolver frame that extends over the top of the cylinder and connects the top of the breech with the forward portion of the frame into which the barrel is mounted.
Torque reaction	The tendency for the gun when fired to twist in the opposite direction to the rifling.
Tracer ammunition	A type of ammunition that utilizes a projectile or projectiles that contain a compound in its base that burns during its flight to provide a visual reference of the projectile's trajectory.
Trajectory	The curved path that a bullet takes through the air.
Trap (or trapshooting)	A shotgun shooting sport in which the competitors attempt to break clay pigeon targets going away from them at different angles and elevations. It is an Olympic shooting sport.
Trigger	The device normally operated by the shooter's index finger that initiates the firing of a gun.
Trigger guard	The metal loop around the trigger made to protect it and prevent accidentally touching the trigger.
Trigger pull weight	The minimum pressure that must be exerted on the trigger before a firearm will fire.
Trigger shoe	Broadly a device which fits over the standard trigger so as to offer a wider surface to the trigger finger and thus give the impression of reducing its apparent weight.
Trigger stop	A device to limit the over-travel of a trigger when pulled.
Trigger weight	The related definitions are: a) the weight that a trigger must support to comply with competition rules, and b) the weight (often made of brass) used to check a competitor's trigger before passing the gun as complying with the rules for shooting.
Turning targets	A device, usually electrically operated that twists a target through 90^0 very rapidly so as to present the target to the shooter. Used in timed fire events and controlled by an electronic timer.
Twist, rate of	The length over which the rifling grooves in a barrel make one complete revolution of 360 degrees. For example, a rate of 1:10 equates to one revolution in 10 inches.
Two stage trigger	A type of trigger that typically has about half the trigger weight to fire the gun taken up by a relatively long rearward movement and the remainder by a crisp sudden let off.
UIT	Union International de Tir (UIT) The old (French) name for the International governing body of target shooting. It means, International shooting union.
USA Shooting	The national governing body for Olympic shooting sports for the United States
V Bull	The inner ring of a bulls eye target.
Velocity	The speed of a projectile after it has left the barrel, usually quoted as feet per second (fps) or in metres per second .
Wad	A paper fibre or plastic disc used to separate the powder charge from the shot or slug, to seal propellant gases behind the charge, and to hold the shot together in the barrel.
Wadcutter (or wad-cutter)	A bullet with a flat, circular head the same diameter all the way along its length. Especially used in target shooting as they punch a neat round hole the same diameter as the bullet and thus make scoring easier.
WCF ammunition	Winchester Centerfire; a type of ammunition.
Weaver stance	A specialized form of two-handed pistol shooting that provides enhanced recoil control, mobility, and accuracy.
Wheel Lock (or wheel-lock)	An early type of muzzle loader lock system which came before the flintlock. A spring driven wheel was released by the trigger. This spinning wheel struck a shower of sparks off a lump of pyrite which led to ignition of the priming charge and

	hence the main charge.
Wildcat (cartridge)	A cartridge designed and made by a handloader by altering an existing cartridge case and usually displaying enhanced velocity over the original donor cartridge.
Windage	The lateral sight adjustment used to move the point of impact horizontally (right or left) on the target.
Wind-doping (or wind reading)	The ability to read the changing wind conditions at long range outdoors, so as to be able to compensate for them on a shot-by-shot basis.
WMR ammunition	Winchester Magnum Rimfire, a type of ammunition.
X-Ring	The name given to a smaller inner ring enclosed within the 10 ring and used as a tie-breaker. Normally the X-Ring does not have a numerical value.
Yaw	The motion of a bullet in flight spinning erratically around its own axis.
Zero	This term is also used to mean the process of insuring that the sights of a firearm are properly aligned so the sight settings in windage (lateral) and elevation (vertical) where the point of aim and the point of impact coincide. It can be set to any range desired.
Zoom	A term used to describe variable magnification optical devices.

Target Shooting Organisations

Below are the contact details of some of the principal target shooting federations and associations. There are a number of governing bodies of target shooting, such as the International Shooting Sports Federation (ISSF), next there are various regional bodies and worldwide bodies for specific disciplines, such as the European Shooting Federation, Federation Internationale de Tir aux Armes Sportive de Chasse, and the World Benchrest Shooting Federation. Below these are the national governing bodies, such as the National Rifle Association of the United Kingdon and the National Target Shooting Association of Ireland, and then there are bodies such as the Clay Pigeon Shooting Association which governs clay shooting in England.

International, European and Commonwealth

Organisation International Shooting Sports Federation Telephone +49 89 544 355 0 Address ISSF Headquarter, Bavariaring 21, D-80336 München Germany Email munich@issf-sports.org Web site www.issf-shooting.org	**Organisation** International Confederation of Fullbore Rifle Associations Telephone Address Email info@nra.org.uk (or contact 'NRA' national association) Web site www.icfra.com
Organisation European Shooting Confederation Telephone +47 22920627 Address Skadalsveien 26A, 0781 Oslo, Norway Email unni.nicolaysen@mac.com Web site www.esc-shooting.org	**Organisation** Commonwealth Shooting Federation Telephone Address Email martinmace@hotmail.com Web site
Organisation Federation Internationale de Tir aux Armes Sportive de Chasse Telephone 33.(0)1.42.93.40.53 Address 10 RUE DE LISBONNE 75008 PARIS FRANCE Email fitasc@fitasc.com Web site www.fitasc.com	**Organisation** World Benchrest Shooting Federation Telephone Address Email Web site www.world-benchrest.com
Organisation International Practical shooting Confederation Telephone 905-849-6960 Address PO Box 972, Oakville, Ontario, Canada L6J 5E8 Email info@ipsc.org Web site www.ipsc.org	

United Kingdom

Organisation British Shooting Limited Telephone +44-1483-486948 Address Edmonton House, Bisley Camp, Brookwood, Surrey GU24 0NP Email admin@britishshooting.org.uk Web site www.britishshooting.org.uk	**Organisation** National Rifle Association of the UK Telephone 01483 797777 Address Bisley Camp, Brookwood, Woking, Surrey GU24 0PB Email info@nra.org.uk Web site www.nra.org.uk
Organisation National Smallbore Rifle Association Telephone 01483 485505 Address Bisley Camp, Brookwood, Woking, Surrey GU24 0NP Email info@nsra.co.uk Web site www.nsra.co.uk	**Organisation** British International Clay Target Shooting Federation Telephone 01483 485400 Address BICTSF, PO Box 1500, Brookwood, Surrey. GU24 0NP Email secretary@bictsf.com Web site www.bictsf.com
Organisation Muzzle Loaders Association of GB (MLAGB) Telephone 01926 458198 Address MLAGB, 7 Olympus Court, Tachbrook Park, Warwick CV34 6RZ Email membership@mlagb.com Web site www.mlagb.com	**Organisation** The UK Practical Shooting Association Telephone 07010 703845 Address UKPSA, PO Box 7057, Preston, Weymouth, Dorset DT4 4EN Email alan@mediainc.co.uk Web site www.ukpsa.co.uk
Organisation British Field Target Association Telephone Address BFTA, P.O Box 2242, Reading, Berks RG7 5YY Email Secretary@BFTA.net Web site www.bfta.net	**Organisation** The British Sporting Rifle Club (BSRC) Telephone Address c/o NRA, Bisley Camp, Brookwood, Woking, Surrey. GU24 0PB Email secretary@bsrc.co.uk Web site www.bsrc.co.uk
Organisation Great Britain 300m Club Telephone Address Bisley Camp, Brookwood, Woking, Surrey GU24 0NP Email info@GB300m.com Web site www.gb300m.com	**Organisation** United Kingdom Benchrest Association Telephone Address Email Web site www.ukbra.co.uk
Organisation United Kingdom Association of Rimfire Benchrest Shooting Telephone Address Email ukbr22web@fsmail.net Web site http://www.benchrest22.org	**Organisation** British Pistol Club Telephone 01483 486293 Address B.C.M 5114 London WC1N 3XX Email britishpistolclub@ntlworld.com Web site www.britishpistolclub.org
Organisation Historical Breechloading Smallarms Association Telephone Address BCM HBSA, LONDON WC1N 3XX Email general.secretary@hbsa-uk.org Web site www.hbsa.fsnet.co.uk	**Organisation** High Power Rifle Association of the UK Telephone Address PO Box 5977, Elsenham, Hertfordshire CM22 6GH Email Web site www.highpowerrifle.co.uk
Organisation GB F Class Association Telephone Address Email mrmister@tinyonline.co.uk Web site www.f-class.org.uk	**Organisation** Single Shot Black Powder Cartridge Rifle Club of Great Britain Telephone Address Email secretary@ssbpcrc.co.uk Web site www.ssbpcrc.co.uk/index.htm

Republic of Ireland

Organisation National Target Shooting Association of Ireland Telephone 00 866 504 9073 Address PO Box 9, Blackrock, Co. Dublin, Ireland Email Lcrawford@kildarecoco.ie Web site www.targetshootingireland.org	**Organisation** Shooting Sports Association of Ireland Telephone 087 900 7501 Address PO Box 9, Blackrock, Co. Dublin, Ireland Email SSAI@eircom.net Web site www.shootingsportsireland.com
Organisation National Rifle Association of Ireland Telephone Address NRA of Ireland, Leabeg, Blueball, Tullamore, Co Offaly, Ireland Email info@nrai.ie Web site www.nrai.ie	**Organisation** Irish Clay Pigeon Shooting Association Telephone 00 353 (0)87 2988030 Address Suite 20A, The Mall, Beacon Court, Sandyford, Dublin 18, Ireland Email icpsa@eircom.net Web site www.icpsa.ie
Organisation Irish Practical Shooting Association Telephone Address I.P.S.A. c/o Fitzgerald Kitchens, Bective Street, Kells, Co. Meath. Email pro@ipscireland.org Web site www.ipscireland.org	**Organisation** The National Silhouette Association Ireland Telephone Address NSA, P.O.Box 9, Blackrock, Co. Dublin, Ireland. Email silhouetteireland@eircom.net Web site http://homepage.eircom.net/~ntsai/nsai.html

England

Organisation English Target Shooting Federation Telephone +44-1483-486948 Address Edmonton House, Bisley Camp, Brookwood, Surrey GU24 0NP Email admin@britishshooting.org.uk Web site	**Organisation** English Twenty Club Telephone Address Email www.englishtwenty.org.uk Web site www.englishtwenty.org.uk
Organisation English Smallbore Shooting Union Telephone Address The ESSU, 125 Turnpike Link, Croydon, Surrey CRO 5NU Email ecretary@essu.org.uk Web site www.essu.org.uk	**Organisation** English Pistol Association Telephone Address Email englishpistolassociation@blueyonder.co.uk Web site
Organisation Clay Pigeon Shooting Association Telephone 01483 485400 Address CPSA, Bisley Camp, Brookwood, Woking, Surrey. GU24 0NP Email info@cpsa.co.uk Web site www.cpsa.co.uk	

Scotland

Organisation Scottish Target Shooting Federation Telephone Address Email admin@stsf.org.uk Web site www.stsf.org.uk	**Organisation** Scottish Rifle Association Telephone Address 164 Ledi Drive, Bearsden, Glasgow G61 4JX Email mabooonscottland@ntlworld.com Web site www.scottishrifleassociation.org.uk
Organisation Scottish Smallbore Rifle Association Telephone Address Email executive@ssra.co.uk Web site www.ssra.co.uk	**Organisation** Scottish Pistol Association Telephone Address Email scottishpistolhq@aol.com Web site www.scottishpistolassociation.co.uk
Organisation Scottish Clay Target Association Telephone Address Email Julian Cordery (Julian.cordery@scta.co.uk) Tony Lithgow (tony@awlithgow.co.uk) Web site www.scta.co.uk	**Organisation** Scottish Air Rifle and Pistol Association Telephone Address Email Web site www.sarpa.co.uk

Wales

Organisation Welsh Target Shooting Federation Telephone Address Email iharris@btinternet.com Web site www.wtsf.org.uk	**Organisation** Welsh Rifle Association Telephone Address WRA, c/o National Rifle Association, Bisley Camp, Brookwood, Surrey Email Web site www.welshra.co.uk
Organisation Welsh Smallbore Rifle Association Telephone Address Email Web site	**Organisation** Welsh Clay Target Shooting Association Telephone 07751 353020 (Phone after 6PM only please) Address Glanyrhafon, Caersws, Powys SY17 5SA Email wctsa.membership@hotmail.com Web site www.wctsa.co.uk
Organisation Welsh Airgun Association Telephone Address Email iharris@btinternet.com Web site http://www.welsh-airgun.org.uk	**Organisation** Welsh Airgun and Field Target Association (WAFTA) Telephone Address Email secretary@wafta.co.uk Web site www.wafta.co.uk/index.htm

Northern Ireland

Organisation Target Shooting Federation of Northern Ireland Address Email patrick.wilson@brewin.co.uk Web site	**Organisation** Ulster Rifle Association Address URA, PO BOX 1860, LISBURN, BT27 6YP Email membershipsecretary@ulsterrifleassociation.org.uk Web site www.ulsterrifleassociation.org.uk
Organisation Northern Ireland Smallbore Shooting Union Telephone 028 9446 4514 Address Email des.clyde@ukonline.co.uk Web site	**Organisation** Ulster Clay Pigeon Shooting Association Telephone 028 25898 075 Address 60 Shankbridge Road, Ballymena, Co Antrim, BT42 3DL Email ucpsasec@hotmail.com Web site www.ucpsa.com
Organisation Northern Ireland Field Target Association Telephone 07921 676 231 Address Email info@nifta.com Web site www.nifta.com	

United States

Organisation USA Shooting Telephone 719 866 4670 Address 1 Olympic Plaza, Colorado Springs, CO 80909 Email membership@usashooting.org Web site www.usashooting.com	**Organisation** National Rifle Association Telephone 1-800-672-3888 Address NRA, 11250 Waples Mill Road, Fairfax, VA 22030 Email Web site www.nra.org
Organisation US National Sporting Clays Association Telephone +1 (210) 688-3371 Address 5931 Roft Rd. San Antonio, TX 78253 USA Email nssa@nssa-nsca.com Web site www.mynsca.com	**Organisation** United States Practical Shooting Association Telephone (360) 855-2245 Address P.O. Box 811, Sedro-Woolley, WA 98284 Email office@uspsa.org Web site www.uspsa.org
Organisation National Benchrest Shooters Association Telephone Address Email http://nbrsa.org/contact Web site http://nbrsa.org/	**Organisation** Civilian Marksmanship Program Telephone +1 (419) 635-2141 Address PO Box 576 Port Clinton, OH 43452 Email custserve@odcmp.com Web site www.odcmp.com
Organisation Single Action Shooting Society Telephone +1 (714) 694-1800 Address SASS, 23255 La Palma Avenue, Yorba Linda, California 92887 Email www.sassnet.com/Contact-Us-001A.php Web site www.sassnet.com	

Australia, Canada, New Zealand, South Africa

Organisation Australian International Shooting Ltd Telephone +61 8 8296 0951 Address PO Box 375, Brighton, SA, 5048 Email office@ausshooting.org Web site www.ausshooting.org	**Organisation** Shooting Federation of Canada Telephone (613) 727-7483 Address 45 Shirley Boulevard, Nepean, ON, K2K 2W6 Email info@sfc-ftc.ca Web site www.sfc-ftc.ca/main.cfm
Organisation New Zealand Shooting Federation Telephone 64 3 352 0077 Address PO Box 5042, Papanui, Christchurch, New Zealand Email nzcta@xtra.co.nz Web site www.nzshootingfed.org.nz	**Organisation** South African Shooting Sport Federation Telephone +27-16-9313125 Address 5 James Champman Street, Vanderbijlpark 1911 Email sassf@telkomsa.net Web site
Organisation National Rifle Association of Australia Telephone +61 7 3398 1228 Address Belmont, Queensland Email membership@nraa.com.au Web site www.nraa.com.au	**Organisation** Dominion of Canada Rifle Association Telephone 613.829.8281 Address 45 Shirley Boulevard, Nepean, ON, K2K 2W6 Email office@dcra.ca Web site www.dcra.ca
Organisation Target Shooting New Zealand Telephone +64 06 368 6749 Address P.O. Box 49, LEVIN 5540 Email targetshootingnz@xtra.co.nz Web site www.targetshootingnz.co.nz	**Organisation** National Rifle Association of New Zealand Telephone (04) 528 4843 Address P.O. Box 47-036 Trentham 5018 Email nranz@xtra.co.nz Web site http://www.nranz.com/
Organisation South African Bisley Union Telephone +27 12 547 7803 Address P O Box 1522, MONTANA PARK, 0159 Email sanra@sanra.org.za Web site www.sanra.co.za	**Organisation** Sporting Shooter Association of Australia Telephone 02 8805 3900 Address PO Box 282, Plumpton NSW 2761 Email mem@ssaa.org.au Web site www.ssaa.org.au

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