



Research Press
Journal



Issue 5 | Winter 2018/19

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*Royal Small Arms Factory, Enfield
Benson-Poppenburg Breech-Loader
Small Bore and Match Shooting*



Research Press Journal

Editor: David Minshall

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Firearms

- Long range rifle fire. Long range target rifles. British military longarms. Small arms trials. Ammunition. Accessories. Gunmakers.

Marksmanship

- Military marksmanship. The art of shooting. Long range muzzle loading. National Rifle Association. Creedmoor and the international matches.

19thC Riflemen

- Those who pioneered the sport of target rifle shooting from the muzzle loading and into the black powder breech loading era. Biography.

Rifle Volunteers

- The Volunteer Force was established in 1859. From 1881 territorial regiments included regular, militia and volunteer battalions.

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by W.S. Curtis

On The Cover

Original Victorian range box.
Storage is for 42 glass phials plus bullets.

See page 14, *Small Bore and Match Shooting*

Research Press Library

Research Press has a library of free downloadable reference texts for students of firearms, target shooting and associated history.

English and Welsh Gunsmiths and Gunmakers, 1550 – 1850

- This document contains a list of English and Welsh gunsmiths and gunmakers from around 1550 to about 1850, but excluding London gunsmiths/gunmakers. The list has been compiled from free on-line sources such as County Record and Archive Offices and The National Archives, but it must not be considered a definitive list, as new information is added from time to time.

The Crossed Sceptres & Crown Mark

- Proof marks on English firearms made outside London and the developments which led to the establishment of the Birmingham Proof House in 1813, with its familiar “V” and “BPC” marks under crossed sceptres.

Why The Tombstone?

- Some arms proved in Birmingham after 1813 show additional stamps which take the form of “tombstone” shaped impressions with a variety of numbers and symbols enclosed therein.

English Provincial Makers’ Marks

- Provincial makers’ marks, i.e., those struck by gunmakers who were not members of the London Gunmakers Company. The fundamental question is whether these marks were struck merely to identify the maker of the piece, or whether they also signified that the item had actually passed a proof test successfully.

The Gunmakers of Oxford

- The development and growth of the gun trade in Oxford during the 17th and 18th centuries. Features: William Upton, John Nicholes, William Hawkes, William Emms, John Collis, Martin Brown (Browne), Samuel Sykes, Thomas Beckley, John & James Forrest, William Dupe, Frederick Rudolph Beckhusan, John Venables, Field, Pether, George Webb.

Ketland Guns in America

- A fresh look at the family of English industrialists who dominated the early American firearms trade.

A Pair of Early Samuel Nock Detonating Pistols

- This article documents a previously unknown and very rare pair of early detonating pistols by Samuel Nock. The pistols are designed to be fired by an early form and variant of the percussion system, known by collectors today as a pellet-lock, which uses a round detonating wafer. Samuel was the nephew of the celebrated London gunmaker Henry Nock. He was apprenticed to his uncle in 1791 and he opened a shop at 180 Fleet Street in 1806. In 1823 Samuel moved his business to the more upmarket and fashionable Regent Circus where he remained until his death in 1852.

The Probin Gunmakers of 18th Century Birmingham

- This article attempts to trace the fortunes of the Probins, a family (indeed, one might say, a dynasty) of Birmingham gunmakers.

John Townson and His Pistol

- The small flintlock pocket pistol that features in this article was once part of the collection of the late John Cooper, an authority on 17th century English pistols. The pistol is a magnificent example of the quintessentially English pistols that were produced during the middle decades of the 17th century and of which very few have survived. It was made by John Townson of London during the 1660s, a period when London was embroiled in a succession of the most dramatic and life changing events.

The English Snaphance Lock

- The English snaphance is not only one of the most innovative “flint-locks” but is probably one of the rarest gun mechanisms to have survived. Recent research has found that only about 80 English snaphance muskets, pistols and detached locks have survived worldwide, although this does not include excavated, converted or incomplete locks. Modern tests by the author have proved it to be a fast and reliable mechanism and it must have been a serious challenger to the matchlock and wheellock in the 16th century. This article looks at the history of the lock and examines two examples.

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Priming

News, Events, People & Places

Thomas Wilson his Patents, Arms and Ammunition

Andrew Appleby of Cape Town, South Africa, is researching the little known Victorian Engineer, Thomas Wilson and his rifle systems in order to write a definitive book on this man and provide some insight into his weapons system work conducted during the 1860's and later.

In his Christmas Newsletter of 2018 Andrew has posed a question about lock marking. Perhaps readers can assist?

Strange things do come out of the wood work and one which remains unresolved came from a Wilson M1859 Short Rifle secured by US. Land forces in Japan during 1945 and saved from being dumped in the Tokyo Bay, a standard disposal method at the time.

The rifle has an interesting history which dates back to the year it was imported into Japan during 1867. Years passed and in 1929 it was catalogued and photographed before its loss in an earthquake, but that's another story you will have to read in the book.

In trying to identify this rifle we know it was manufactured in 1867, coincidentally the year Wilson moved into 90 Bath Street, Birmingham. This move was to expand production which included his capping breech-loader but more importantly his new 'Central Fire' Breech-loading rifle utilising a full metal cartridge. The changes noticed on this particular Japanese rifle in terms of stamped markings seem to indicate possibly a change of manufacturer. At the time Wilson was concentrating

on his new rifle. The markings found on the 1867 rifle are also noted on all later M1859 rifles manufactured from this time forwards to as late as 1874.

The intriguing marking of the lock shows a Palm Tree and the Letters R B either side of the trunk. My thought immediately went to Rose Brothers (1860-1870) of Birmingham and Halesowen. The year and initials seem to be plausible and ticked the boxes but what was the significance of the palm tree? If anybody can shed light on this symbol or provide any feedback it really would be helpful. I have investigated Rose Brothers but to date I cannot find them using such a logo. The only one I know of was that of a small armoury

in the US, but there is no connection. For interest and to eliminate a false trail the other I noted was for the Palmetto Armoury in Columbia, South Carolina, which operated between 1851-1853 completely outside the Wilson production time frame. The Palmetto Palm tree happens to be native to South Carolina and is regarded as the state tree.



For more information on Andrew's research and contact information see:

www.researchpress.co.uk/index.php/firearms/british-military-longarms/small-arms-trials/thomas-wilson

British Military Breech-Loading Cavalry Carbines, 1850-1903

Tom Heptinstall is a Mechanical Engineering PhD student exploring the historical development of breech-loading technologies. His research question is: *‘What Were the Most Important Developments in British Military Breech-Loading Cavalry Carbines from 1850-1903?’*

Tom writes, “Obviously the subject matter is huge, and the dates will probably have to be reduced down. The scope of the project means that facts will often become missed or go by unnoticed. So, in terms of public help, I am interested in any collectors who have examples of breech-loading carbines from that period - especially if there is any provenance, such as who it was issued to, or where it was used attached to them. (And also don’t mind images of their carbine featuring in the PhD.) I am also curious to see if anyone has any original reports, patents or documentation (especially regarding the ammunition used) on these items. General information is also welcome.”

The peer reviewed annual Journal of the Historical Breechloading Smallarms Association (HBSA) has, in the December 2018 edition, published a study by Tom on “The Origins of Brand’s Rifle Patent and the Calisher and Terry Cavalry Carbine.” For more information on the HBSA see www.hbsa-uk.org.

If able to assist Tom with his research please contact him at: Thomas.Heptinstall@hud.ac.uk

2019 Calendar of Events

A Calendar of Events for 2019 is available on the *Research Press* web site. Events featured include muzzle and breech loading black powder rifle target shooting at distances of 200 yards and beyond.

Event details and entry forms are included or linked to organiser sites. See:

www.researchpress.co.uk/index.php/news/events

For those seeking Black Powder Cartridge Rifle silhouette shooting matches then please refer to Black Powder Cartridge Rifle Silhouette Shooters Association:

www.facebook.com/groups/256570855019155/

2019 USIMLT Nationals

The United States International Muzzle Loading shooters hold their Nationals once a year, and are proud to be associated with the Arizona Western Independent Shoot. The USIMLT Nationals will be held 2-4 March 2019 at the Ben Avery Shooting Facility in Phoenix, Arizona. There is a new competition class in 2019 - Bench Shooting, for those who can no longer get up and down like they used to, but still want to compete. We welcome everyone. Shooting is at 300, 500, 600, 900 and 1000 yards.

The event invitation with course of fire and timings, and registration form can be downloaded from the USIMLT web site: www.usimlt.com/Longrange.html

The Arizona Western Independent National Shoot is 26 February - 3 March 2019. Check their website www.azmuzzleloading.com for details of events.

Ed Decker, Captain, USIMLT Long Range Team

31st Challenge Europeen Des Carabiniers De Souppes Sur Loing

The above match will be held 20-22 April 2019 and the event comprises prone shooting at 100, 200 and 300 metres with black powder rifles. There are four events:

- Burton military muzzle-loader
- Snider military breech-loader
- Turner sporting muzzle-loader
- Bodine sporting breech-loader

Prizes are awarded to the first five of each event and there are also aggregate prizes for Military Rifle and Sporting Rifle.

For more details and entry form see:

www.researchpress.co.uk/index.php/news

[/souppes-2019](#)

Recreating History, Creedmoor Match 2024 Oak Ridge, TN starts now!

Past NRA President Pete Brownell spoke at the 2017 Competitive Shooting Meeting and expressed his thoughts of growth in shooting sports by giving opportunities for people to 'Pull the Trigger'. I totally agree as there is so much more to shooting than the shooting itself.

After over 20 years of hosting long range muzzle loading (LRML) matches, I'm going to expand to allow more people to 'pull the trigger'. I have been given approval from the Oak Ridge (ORSA) BOD to host a historical recreation of the original Creedmoor Match in 2024. The NMLRA BOD have agreed to assist with sponsoring the match. 22-23 March 2019 will be the 1st year of this 5 year quest for LR-ML and LR-BL to prepare at Oak Ridge for the Historical 150th Anniversary of the Creedmoor Match of 1874. Yes, it will be Muzzle Loaders vs Breech Loaders.

I will be hosting these matches in the same manner in which I have hosted previously (some slight adjustments may occur year-after-year as we learn), the only difference - there will be more shooters that include both ML and BP Breech Loaders. I believe I can run both simultaneously and separate on the same line at the same time. My current thinking is everyone will run in our traditional 4 man squad rotation. ML will be pair firing for the 1 hour relay. The BL will be paired as well, but each of them will only get 30 min by themselves - totaling the 1 hour relay. Then, well rotate the same as we've done for years.

We'll be shooting 300 & 600 yards on Friday and 2x 1000 yards on Saturday (1 with support, 1 without). Relay times will be 1hr at each distance, although these relay times may vary (extended) depending on participation. Sighters and 10 scored shots at each distance on standard NRA HP targets. (NRA Approved Match, as of now).



As with all my previous matches, this Match is designed to be an enjoyable shoot and as much as everyone wants to do their best, sportsmanship is needed in order for it to work successfully. This means that when you are shooting you'll need the utmost attention

from your spotter and pitman to assist you and vice-versa. This especially holds true at 1000 yards. This translates into good communication / feedback to the shooter when the pitman and spotter are doing their job.

Let me highlight that ORSA is allowing you use of their facilities and it shall be treated with respect at all times. This also means there are NO pit boys/girls (at this time) and we all must be willing to spot and pull targets for each other. I will serve as range officer. High-power shooters primarily use the ORSA range and there are NO provisions for muzzle loaders. i.e. Loading Tables or covered firing line! Muzzle loading shooters are expected to bring their own loading table to safely support their rifle.

Rick Weber
rweber@nmlra.org

Full details including match rules are available for download at:

www.researchpress.co.uk/index.php/news/spring-2019-oak-ridge

News updates and information are also available via the event facebook group:

Creedmoor 150 (1874-2024)
www.facebook.com/groups/361707117741162/

**Long Range Rifles:
Rigby Cup and Whitworth Cup**

Bisley was a bitterly cold day on Saturday 27 October 2018 for the *Long Range Rifles Branch* of the Muzzle Loaders Association of Great Britain 600 yard *Rigby Cup* and *Whitworth Cup* matches. There was frost still on the ground when shooting started at 08:30am, and the arctic wind added to the misery! Despite the conditions there were some good scores made and congratulations go to Henri van Koot for winning the Rigby Cup and Alan Beck for winning the Whitworth Cup.

The evening was the Branch Annual Dinner and Prize Giving at the Artists Rifles Clubhouse, Bisley, where warmed and relaxed members enjoyed a hearty meal. In addition to the Branch prizes, opportunity was also taken to present the MLAGB Mid and Long Range National Rifle Championship prizes, the whole making a fine display.

See you on the range in 2019!



Rigby Cup

H.van Koot	58.1
A.Beck	56.2
C.Goed	54.3
P.Wolpe	54.1, D.Minshall 54.1, J.Womble 53,
T.van der Vlist	51.1, B.Collot 50.1, P.Hendy 42.1,
S.Collot	41.1, M.Hall 40, F.Brouwer 39.1,
M.Jouan	39.1, G.Evans 39, B.Lange 37,
J.Whittaker	37, P.Cornelissen 35.1, A.Whiffin 34,
W.Burrows	33.1, L.Jackson 32, A.van Rijssen 25.1

Whitworth Cup

Hexagonally bored Whitworth rifle only

A.Beck	52.1
P.Wolpe	51
M.Hall	42.1
J.Womble	42.1, G.Evans 40.1, L.Jackson 40,
H.van Koot	30, A.Fuller 27, J.Buckingham 23,
B.Riaud	12

www.longrangerifles.co.uk

Royal Small Arms Factory, Enfield

Robert Smiles

This article was found in 'Great Industries of Great Britain' published by Cassell, Petter, Galpin & Co. (London, Paris & New York) c1877-1880. As part of coverage of the Iron and Steel Industry, several articles were devoted to firearms and have been reprinted in previous editions of the Journal. This article on the Royal Small Arms Factory is extracted from a series on 'Model Establishments' and offers a fitting conclusion to the firearms articles.

Anyone who has an opportunity of comparing ancient arms with those of modern manufacture, will be surprised that there is so little of novelty in the essential characteristics of the weapons of precision of our time, and will be led in the direction of believing, with the wise man, that, "the thing that hath been is that which shall be; and that which is done, is that which shall be done: and there is no new thing under the sun." The "roaring culverin" of the olden time was the true progenitor of the modern cannon, with the important difference that the "infant" greatly surpasses his sire in size and weight. The "wall pieces" and rampart-guns – the connecting link between artillery and small arms – had important features common to both. The "arquebus," or hooked hand-gun, resembled in essentials the muskets and rifles of modern times, as did the "petronel," the parent of our horse-pistol.

It is probably a prevailing belief that rifling the barrels of large guns and small arms, and loading the pieces at the breech are modern improvements. But such is not the case; each of these principles of construction was known and practised centuries ago. Rifled small arms, with match-locks and wheel-locks, date from, at least as far back as the time of Henry VIII, circa 1522, and an example is extant of a wheel-locked arquebus of the same period, breech-loading, upon something strongly resembling the Snider principle; one, or more, double-barrelled, rifled, breech-loading wall-pieces are also in existence, that date from the time of Louis Quatorze, about 1643. Percussion, as well as flint locks, were known as early as the time of James II, 1685-8; in the time of William III, wheel-lock

*Very many experimental rifles
have been made at Enfield,
introducing from time to time
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with a view to obtaining
the most effective weapon possible.*

carbines were made with barrels 24.75 inches long, and of .766 inch calibre; also wheel-lock petronels, with similar barrels. The long muskets served to the troops from that time down to the present century had 39 inch barrels, calibre .753 inch. The Brobdingnagian arms, known as rampart-guns, or wall-pieces, although fired upon a tripod or other rest, were fashioned with butt and stock as huge muskets; they had barrels from seven feet long upwards, with calibres of from about .650 inches, to .860 inches. The match and wheel-lock guns of the sixteenth to the eighteenth centuries had barrels of from 48.7 inches to 39 inches in length, and were of about .764 inch calibre.

The date of 1552, given as that of the introduction of rifled arms, is quoted because at that time Danner, of Nuremberg, was supposed to have perfected the rifle, but this mode of treating the barrel was practised previously. In 1848 a rifled gun was taken from the Hungarian insurgents, which bears the date 1547. It has six well-cut grooves, that have a twist of one turn in twenty-six inches. The Danes were armed with wheel-lock military rifles, as early as 1611. Among the old arquebuses that have been preserved, some of which are beautifully finished arms, there is one, of date 1690, that has a double-action lock for match and flint. The Palliser principle of lining the bore of a gun with an iron or steel tube was known to the Danes at a very early period. The American breech-loader of 1856, and the Krupp field-guns of the present day, are, as regards the breech action, on precisely the same principle as a wall-piece of date 1690. A rampart-gun of 1619 anticipates the essentials of the Martini lock. A bronze gun from Lucknow repeats the arrangements

for breech-loading of the rampart-guns of the time of Louis XIII, about 1610, and again, an existing six-chambered revolving petronel, two hundred years old, is constructed on precisely the same principle as Colt's revolvers. Chinese guns have been preserved that are almost exactly the same in the breech-loading parts as the wall-pieces of the time of Edward IV, about 1461. Wheel-lock arquebuses were used by Napoleon I.

The Royal Small Arms Factory at Enfield is not as easily accessible as many of the other sights in or near London, and the operations carried on in it may not be very familiar to the general public. It is open to visitors on Mondays and Thursdays, and is only a short distance from the Ordnance Factory Station, on the Cambridge branch of the Great Eastern Railway. The factory cannot by any stretch be regarded as a sacred place or a holy shrine. It, nevertheless, receives the visits of many pilgrims from Occident and Orient, that have come from far countries, and are careful to see this model establishment before they return. It cannot be surprising that the operations of a place where arms of precision are manufactured, of the best kind, in the most efficient manner, and on the largest scale, should be objects of interest to the natives of "civilised" countries that take much interest in "guns and gunnery." We have reason to believe that there is a consensus of opinion among foreign visitors that Enfield Factory is the most perfect of its kind with which they are acquainted, or of which they have ever heard, for efficiency of management; ingenuity of automatic machinery; admirable arrangements, and accommodation provided in the various workshops and premises; and the perfection, cheapness, and quality of the productions, with the celerity that characterises the various operations.

The factory closely adjoins the river Lea, and the Lea Conservancy navigation, with which the works are connected by a fine basin in front of the office and other buildings near the entrance, and by a branch, with about a third of a mile of wharfage, furnished with three cranes, capable of lifting from fifteen to twenty tons each. The first impressions likely to be produced upon the mind of the visitor are admiration of the cleanly and sprightly appearance of all he sees, including the pretty water basin, ornamental as well as useful, in the centre of the square, with its clean stone coping all round. He

is also likely to be struck by the care and taste manifest in the condition of the pleasant garden-ground in this part of the premises. Anticipating entering any of the shops, it may be said here, once for all, that, throughout, they are as scrupulously clean as whitewash, sweeping, and scrubbing can make them, and the nature of the processes carried on will permit. The grounds occupy an area about 475 yards long by an average of 150 yards wide, or, stated freely, about 15 acres.

Muskets were made at Enfield in small numbers by hand labour, about half a century ago, but it is only within the last quarter of a century that it has become of any account as a Government factory; and that its superb equipment in self-acting machinery has been developed. Up till 1825 "Brown Bess," with a flint-lock, continued to be the arm with which British infantry were supplied. The flint and steel were converted into percussion locks about that time – 1825, but percussion locks had long before been known and used by the Russians. In the percussion principle introduced by Westley Richards in 1831, he made use of detonating *pellets* instead of caps. Prior to 1820, very beautiful breech-loading sporting rifles were made in England, but they had nothing better than the old flint-lock: George IV possessed some, very fine rifles of this class.

Machinery, on a considerable scale, began to be introduced at Enfield for the manufacture of rifles about 1852. It was at first imported from America, and the machinery was managed for about three years by Mr. Perkins, inventor of the steam gun. Since his time the works have been managed and carried on by Government officials exclusively.

The numerous experimental rifles made at Enfield, and the modifications from time to time tried as improvements, involved the invention of new machines, or the adaptation of those in use.

Royal Small Arms Factory

About 1852 iron-mounted percussion rifle muskets, made at Enfield, were served out to the first-class reserves. The locks were stamped "W.R.R¹ Manufactory, Enfield." The barrel was 30 inches long; calibre, .618 in.; weight, 8 lbs. 11oz.; twist 1 in 40 inches. The Enfield pattern of 1853 had a barrel 39 inches long; calibre, .577 inches; weight, 9.6 lbs.; it had 3 grooves, and 1 turn in 78 inches. These arms superseded "Brown Bess," that could scarcely be depended on at a range of 200 yards, whereas the short Martini-Henry carbines now made at Enfield, with which the artillery and cavalry are armed, will, in the hands of a good marksman, hit at 1,000 yards. Telescopic sights were introduced about 1858. Very many experimental rifles have been made at Enfield, introducing from time to time new modifications, with a view to obtaining the most effective weapon possible. Of improvers of the rifle since 1850, as is well known, the name is legion.* The rifle with which the infantry were armed in the Crimean campaign in 1855, was the Delvigne-Minie; weight, 9.31 lbs.; barrel, 39 inches; calibre, .702 in.; it has 4 grooves, with a twist of 1 in 78 in.; charge, 68 grains; bullet, 670 grains. The 4th Division was not served with this weapon till after the battle of Inkermann. This rifle was first used by British troops in the Kaffir war of 1852. Enfield-rifled carbines were served to the artillery and cavalry in 1853. In 1859-60, the long and short Enfields, before referred to, were converted into breech-loaders, on the Snider principle. Most of the Volunteers continue to be armed with this rifle, but for the regulars it has been in turn superseded by the composite Martini-Henry – the Martini lock action, and the Henry barrel. This weapon having been found the most simple, efficient, and in all respects the best, is now the only pattern made at Enfield in both rifles and carbines, which are each of the same calibre, so that they may both take the regulation ammunition for small arms.

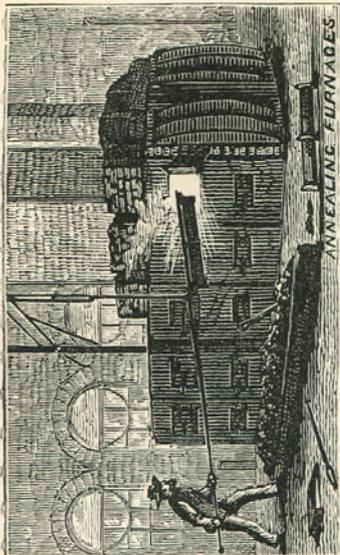
* To mention a few of them: Lancaster, Moore, Nuttall, Palliser, M. Storm, W. Richards, Whitworth, Jacob, Green, Harris, Snider, Joslyn, Burton, Henry, Peabody, Remington, Rigby, Fosbery, Sharpe, Terry, C. Shepherd, E. Baker, Witton, Maynard, Manton, Martini, &c.

The numerous experimental rifles made at Enfield, and the modifications from time to time tried as improvements, involved the invention of new machines, or the adaptation of those in use. The Martini-Henry having been definitively adopted as the approved pattern, the occasion for experiments passed for the time, and attention was concentrated upon perfecting the machinery employed in the various operations involved in the manufacture of that weapon – the object seems to have been fully attained.

In evidence of the economical wisdom of adopting the Martini-Henry as the fire-arm issued to the troops it may be mentioned – apart from its merits as a weapon of precision – that the breech-action of the Enfield rifle had fifty separate parts; the Snider had thirty-nine; whereas the Martini has only twenty-seven, stock, lock, and barrel being all firmly connected by a strong bolt passed through the butt and screwed into the body. Another great advantage of the perfected system of manufacture at Enfield is, that every one of the fifty separate pieces in a rifle or carbine, down to the smallest screw, is so made as to fit any one of 50,000 rifles or carbines, making the work of the armourer-sergeant of a regiment, if he has stock of the parts, quick and easy.

The raw material used up in the Small Arms Factory comes under very few heads. It may be classed as walnut from North Italy and Switzerland, for stocks; steel and iron rods and bars; and coal and coke; with a comparatively small quantity of general stores. All the material is delivered under contract; the wood, coal, and coke by barges, the steel and iron, chiefly from Sheffield, by railway. The stores for the raw material are deposited in the buildings running parallel to the wharf. Following, first, a barge-load of walnut for stocks, we find that they are delivered roughly shaped. The first scrutiny they undergo, after proving the accuracy of the "tale," is the test for the presence of salt, insects, metals, or other foreign substances or imperfections

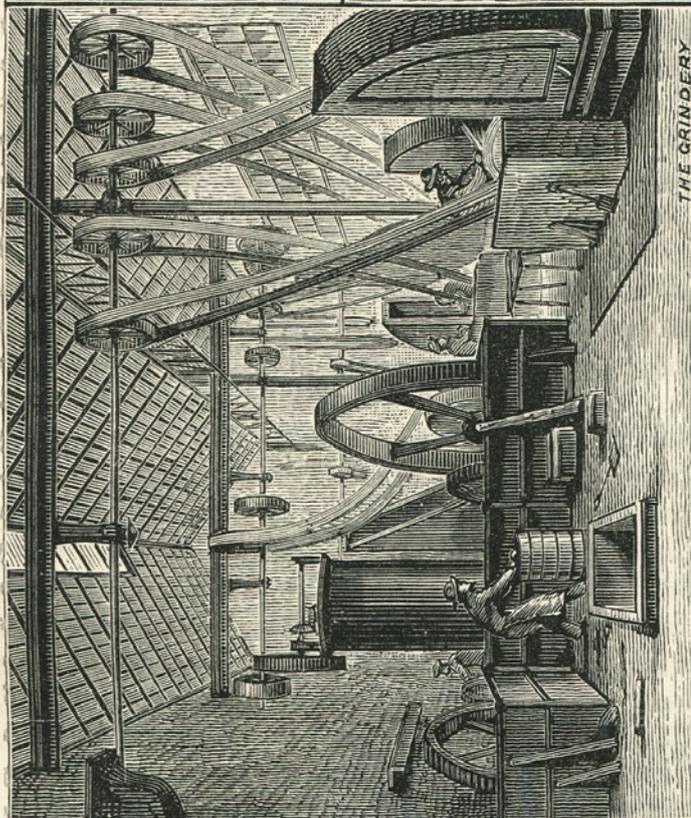
*The rifling machines have
a peculiarly beautiful action.
There are twenty-five of
these rifling machines in use.*



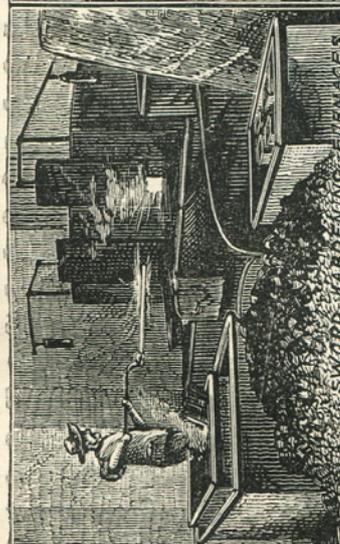
ANNEALING FURNACES



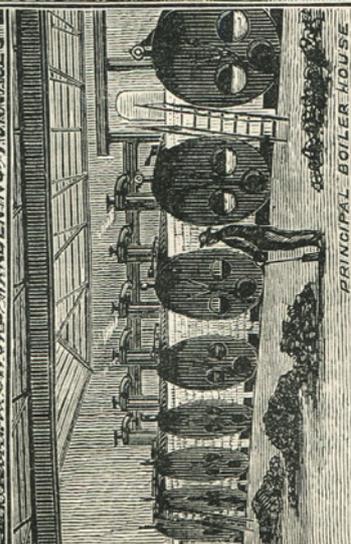
CASTING SMALL BRASS-WORK



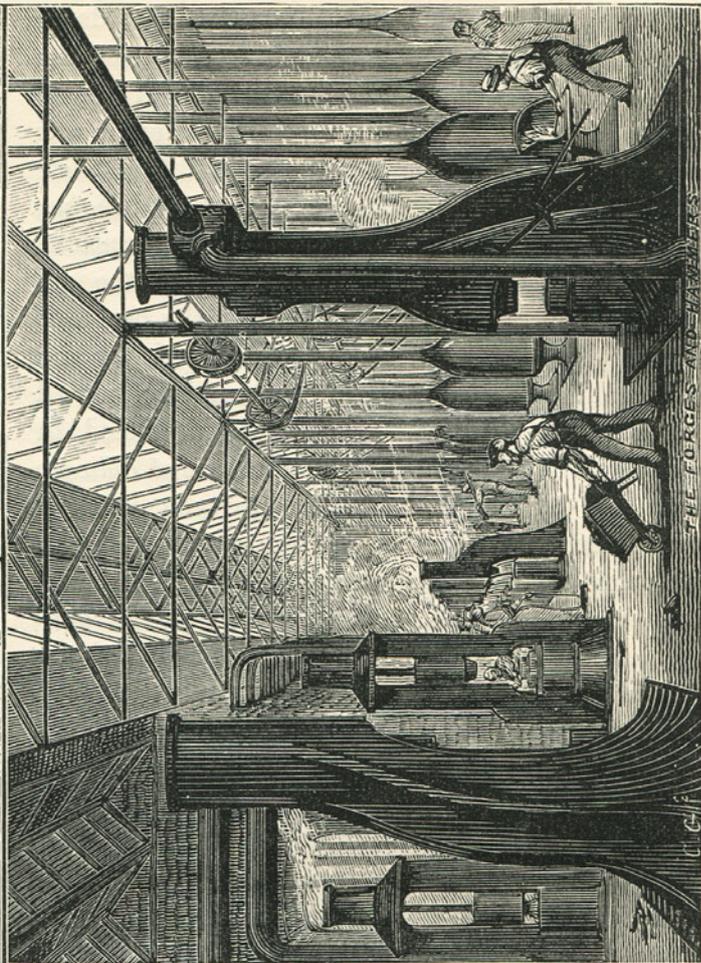
THE GRINDERY



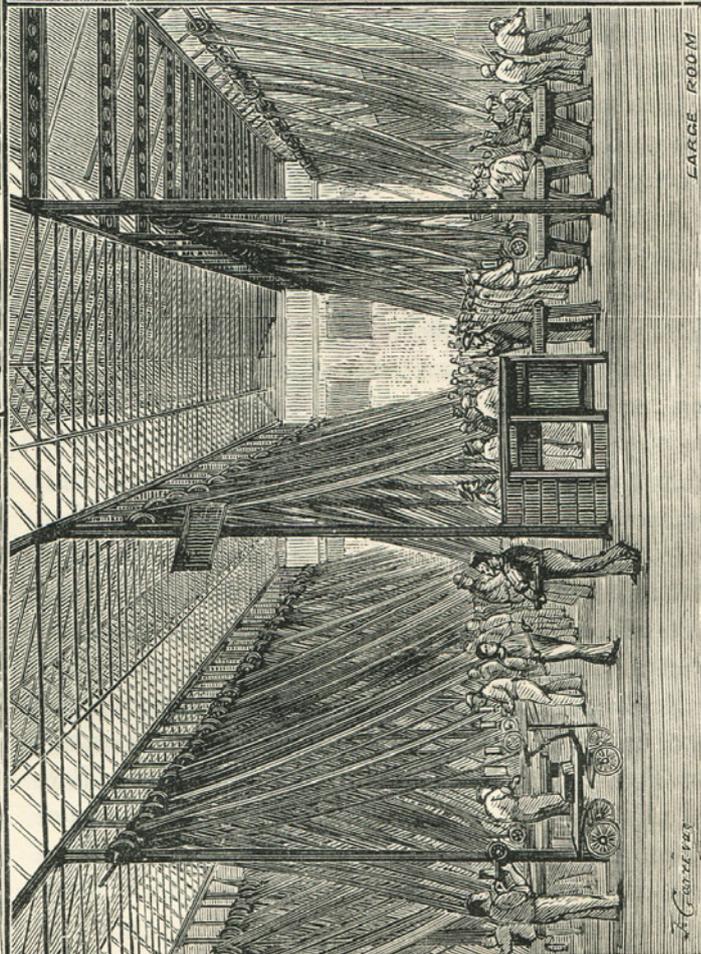
SWORD AND ENGINE FURNACES



PRINCIPAL BOILER HOUSE



THE FORGES AND HAMMERS



LARGE ROOM

VIEWS IN THE ROYAL SMALL ARMS FACTORY, ENFIELD.

W. G. WOODS

in the wood. The application of the salt test is a pretty experiment. A thick shaving is taken from the butt or stock, and dipped in a glass tube containing a detective solution. If salt is present, it is revealed at once by a white precipitate that exudes from the shaving, and the piece is condemned. Corrosion would, of course, be the result of contact between the salted wood and the steel barrel of the rifle. The presence of iron is usually detected by discoloration on the surface. In one condemned butt that we saw, there was embedded the broken point of a sword, and in another a tenpenny nail, head and all. Worms give more trouble, sometimes there are external appearances that indicate their presence, in other cases they are detected by the sense of hearing. One butt was in the store that had a worm in it heard at work more than four years since, and was still alive! These pests are shown under a glass case in about a dozen stages of development.

There are usually from 300,000 to 400,000 butts and fore-ends in store. Following the walnut to the shops in which the further processes are conducted, we witness the performances of a number of wonderfully ingenious "copying" machines. An iron butt, of the precise form wanted, is associated in the lathe with a walnut butt; by a rocking motion, a clever attachment between the original and the piece operated upon, and the action of cutters making 4,000 revolutions per minute, an exact copy is speedily produced; in like manner the fore-end is "copied," and by other tools hollowed and grooved for the barrel.

Returning to the warehouse on the wharf side, the steel and iron stores contain the variety of rods and bars of the sections suited for the parts they have to supply. The barrel-pieces for the rifles are steel bolts about 18 inches long, and for the carbines 12 inches long and 1¼ inches in diameter. They are drawn in the works to 35¼ inches for the rifles, and 22½ inches for the carbines. The boring of the barrels is effected by vertical cutters working in a long range of machines, the attendants upon which occupy a platform in line with the machines. There are eighteen boring machines, with seven spindles to each barrel – each cutter takes out its own length. The barrels are polished at Enfield by effective machinery that obviates the fatally unhealthy operation of grinding. For barrel-turning there are twenty-four machines in use, and for polishing, five

machines; the latter grip the barrel with elastic hollow pads, supplied with emery powder, and have an up and down motion. One man minds four machines and each machine takes ten barrels. The process is complete in about twenty minutes. The rifling machines have a peculiarly beautiful action; the twist is of one turn in twenty-two inches. This is given by the guide of the cutter passing along a triangular plane, that is called by the attendant an inclined plane, which it really is in effect, although moving horizontally, not on a slope. There are twenty-five of these rifling machines in use, and one barrel is operated on at a time in each machine.

We may here follow a parcel of bored barrels to the proof house, which we were privileged to enter. Every barrel is proved three times, viz., after being bored, after rifling, and at the long range when the rifle is complete. The barrels we saw tried had been bored simply, and were tested with three times the ordinary charge, i.e., with seven and a half drachms of coarse-grained regulation powder. The barrels, up to sixteen in number, are laid in a very strong iron chamber, about fifteen feet long, with a descending curvature at the further end, where the bullets are directed into a trough filled with saw-dust. The trigger discharged the lot, they went off "bang," and were taken out, every one skin and heart whole. From 200 to 300 barrels are tested daily in the proof-house.

Assuming butt, fore-end, and barrel to be complete so far, there is yet a great deal to see. The smithy has 86 fires, 20 steam hammers, 8 screw drop hammers, 15 forging machines, 3 sets of rolls for making swords and bayonets, and numerous other important appliances. Here we saw the "body" of the Martini action forged in a few seconds by four blows of the steam hammer; the "block" by three blows; the "trigger guard" by five blows; the butt plates stamped, the "carbine nose cap" formed, and a number of other operations performed, that would have taken hours against seconds, if left to hand labour.

From the smithy the rough forgings of the parts referred to, go through various stages, until they reach what is called the "component part" room, one of the largest, best lit, and cleanest workshops we have ever seen. It is about 200 feet square, contains more than 1,000 machines, and 500 work-men, obviously of a superior class. Here the sights for rifles are finished

with the most delicate exactitude by machinery of the most ingenious character, guided by intelligence; this is the rule indeed at every stage – effective ingenious machines and able steady men to control them.

The tool room is also a most interesting department; here all the tools, gauges, and machines used throughout the factory are made and repaired. In this and other rooms we observed many admirable, although small, slotting, planing, mill-cutting, drilling, and other machines; the clamp-milling machines and their products are especially meritorious.

The tests applied to the work in its progress are very searching, every part being tried by numerous delicate steel gauges, and rejected if found defective. Each steel barrel is stamped, and, so to say, its perfection attested, twelve times during its progressive stages. In some points the demand for accuracy goes to the attenuated shadow of the one thousandth part of an inch!

Time would fail to tell of the operations carried on in the rooms for finishing bayonets and swords; ram-rods, or rather cleaning-rods, the breech-loader not needing ramming; for scabbard making and mounting; and the powerful sewing machines employed in this department; of the “browning” of the barrels; of the manufacture of “assegais” for the Lancer requirements; or of the operations in the stores for finished work – finished for service in peace or war in any part of the world.

Touching payment for labour, everything is paid for by the piece as far as possible. If new machines are invented, or machines in use are so improved as to produce more work, a man or two may be dispensed with, but wages are not reduced. The rates paid for different kinds of work are almost infinitely varied, and in all cases good. In making certain kinds of screws, for instance, there are nine operations; for one of these 5d. per 1,000 is paid, for another 3d. per 100. Each rifle has about fifty parts, every part requiring many operations, some of them very delicate. In a rifle barrel alone there are seventy operations, each having its separate price. All payments are worked out by decimals, and the practice is for the foremen to report at the proper time to the paymaster that numbers such and such (each man is known by his number) have bored so many barrels, or done certain other work, and the wages are made up from the report. The pay of the 2,000 men

employed occupies about twenty minutes. None of the workpeople are under eighteen years of age. The hours worked are from 7 till 6 on five days in the week, and from 7 till 11 on Saturdays, or 54 hours per week.

In ordinary working 1,800 stand of arms can be made and stored per week, but under pressure nearly double that number can be turned out by working relays. Swords for cavalry, Horse Artillery, and mounted officers and men of the army, are supplied, under contract, by Birmingham makers chiefly. Revolvers are now issued to portions of the army, and arrangements are in progress for the manufacture of this weapon at the Royal Small Arms Factory.

The Factory has its own gas-works; and other supplements are, a very pretty church built by Government; a mechanics’ institution, with 300 members, and a library of 2,000 volumes, with a reading room supplied with almost all the London daily and weekly papers, three American scientific papers, and the best of the reviews and magazines. There are also successful science and art classes in operation with about 50 members; a boys’ school, with 100 scholars; a girls’ school, with 90 scholars; and an infants’ school, with 103 scholars. The educational institutions are under the inspection and support of Government, but moderate fees are also charged for attendance.

The Factory is under the superintendence at present of Colonel Close, R.A., Major King-Harman, R.A., being the Assistant Superintendent. There are also a Manager and an Assistant Manager, Mr. McGee, to whom our best thanks are due for his patient assistance in the tour of inquiry.

Small Bore and Match Shooting

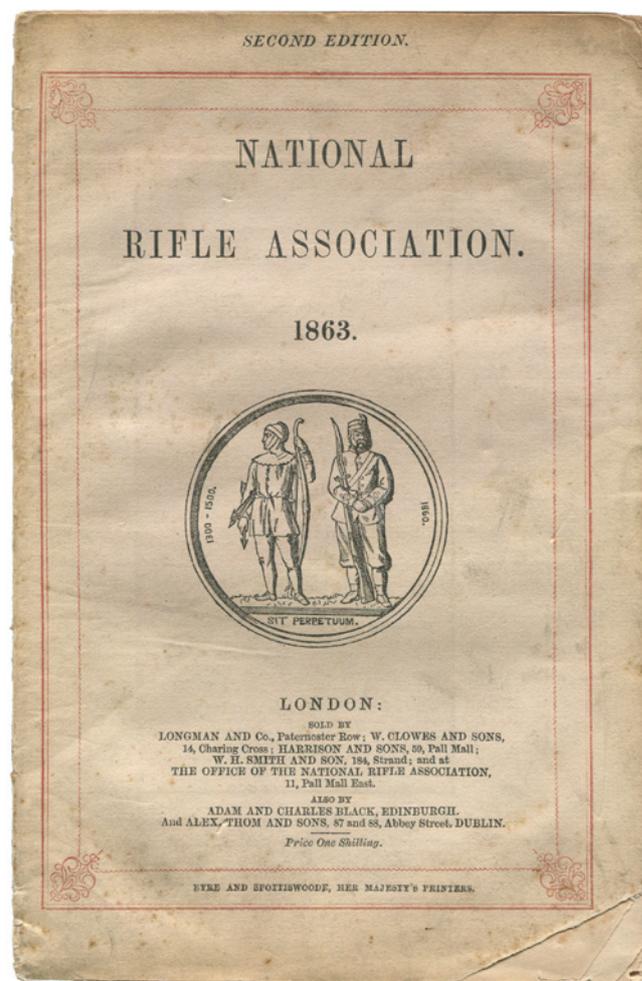
The following text is taken from 'The Book of Field Sports', edited by Henry Downes Miles (Volume 1, c1869, Henry Lea & Co., London). Notes and illustrations are provided by David Minshall.

In 1859 the British Government authorised the formation of Volunteer Rifle Corps. There was an immediate rush of Volunteering, but it was not expected to last. The subsequent formation of the National Rifle Association (NRA) late in 1859 did however put measures in place to secure the long-term prospects of the Volunteers, its aims including "the encouragement of Volunteer Rifle Corps and

the promotion of rifle shooting throughout Great Britain." The NRA established an annual rifle meeting in 1860, with matches at distances of up 1,000 yards. For the gun makers of the time this development created a new market in the form of discerning riflemen seeking accurate long range arms. Following principles established by Joseph Whitworth, there developed a special class of 'small-bore' target rifle. The majority of these rifles were around .451 calibre, and the contemporary term 'small-bore' was used to distinguish them from the 'large-bore' service rifle of .577 calibre.

Whatever may or may not be the tactical efficiency of our volunteer corps, it is admitted by all, and by none more than by the regular army, that the volunteers have excelled in the use of their weapon, and have brought rifle shooting to a pitch of perfection hitherto unattained. The National Rifle Association was established in 1859, and its inauguration took place on the 2nd July 1860, when Her Majesty fired the first shot from a Whitworth rifle, placed on a mechanical rest by Mr. Whitworth, and planted the bullet at 400 yards, within a quarter of an inch of the centre of the bull's eye. The target with the bullet mark is preserved as a trophy in the Polytechnic Institution, Regent Street. [Now in the museum of the National Rifle Association at Bisley, UK. Ed.]

The National Rifle Association took its rise among the volunteers assembled for instruction at Hythe in July and August of 1859, and was regularly founded at a meeting held in the Thatched House Tavern on the 16th November of that year. His Royal Highness the Prince Consort became its patron; Her Majesty instituting the queen's prize of £250, now so celebrated; the Prince Consort giving a prize of £50, open to riflemen of all nations; and the Duke of Cambridge instituting the prize of £50, which bears his name, for the best shooting breech-loading rifle that may be brought forward. In the first year of the meeting 67 prizes were offered, of the value of £2238. The entries were 1314, 594 of which were volunteers, and 720 all comers, 17 of these being Swiss, and 1 Russian. The progress of the National Rifle Association has been marked and triumphant, as shown by the eight annual reports now



Annual Report of the
National Rifle Association
for the year 1863
[Research Press library]

The enthusiasm increases rather than flags throughout the kingdom, in the noble pastime of rifle shooting.

published. As an indication of that progress, we will state, in contrast to the statistics we have given of the first meeting in 1860, those of the meeting in 1868. In this year the number of prizes competed for were 1045, of the aggregate value of £10,592 10s. 3d., besides £62 15s. for medals, and pool payments amounting to £1023 16s. 9d. The total entries were 93,411. In 1868 the visitors, not being volunteers in uniform or members of the association, who are admitted free, were 30,792; carriages with four wheels, not exceeding two horses, 434; two-wheeled carriages, 41; carriages with four horses, omnibuses, &c, 19. Between 1860 and 1868 the number of prizes competed for at Wimbledon, not including pool, coming man, running deer, &c, were 4669, and the value £56,955 0s. 9d. The Wimbledon Camp, now one of the most attractive and useful features of the meeting, and one which has proved of great value in the discipline of the volunteers, was instituted in 1862, when 212 volunteers took to canvas, of whom 66 were officers, and 146 non-commissioned officers and privates. The statistics of the camps in 1868 were: the association camp 1968 of all ranks, including staff, while over and above 525 tents were required for the metropolitan volunteer regiments, who bivouacked upon the common. The official report of 1869 will not be published for some time yet, but the past was the most successful of any yet held; as an indication of this, it is reported that on the 7th of July last no fewer than 2530 of all grades slept under canvas on the common. We think these facts are sufficient to indicate the progress of the rifle movement on British soil, and that the enthusiasm increases rather than flags throughout the kingdom, in the noble pastime of rifle shooting.

The association has now in connection with it in England and Scotland, 46 county and district associations. In Ireland, for political reasons, rifle corps have not been sanctioned; but Dublin, Cork, and Ulster have important rifle clubs, which send some excellent riflemen every year to Wimbledon as general

and international competitors. In our colonies and foreign possessions the Royal National Association has 17 branches - 63 in all.

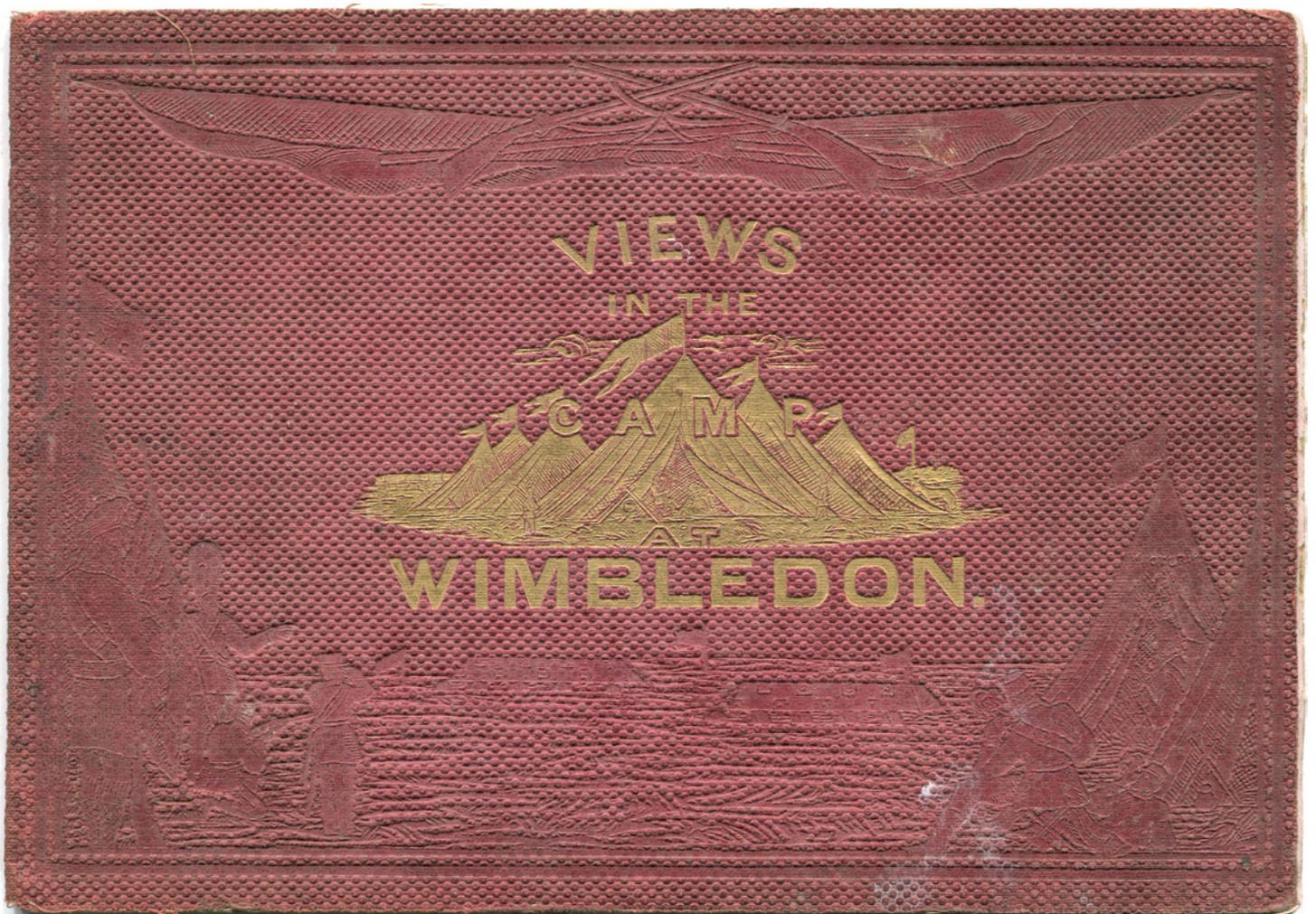
The great effect of the National Rifle Association has been, by the establishment of competitive trials of skill, and by the creation of a code of regulations for match shooting, not only to stimulate the greatest improvements in the weapon, but to render rifle shooting a most attractive scientific recreation. A new class of rifles has been evoked out of the scientific development of target practice. As horse racing was professedly established to improve the breed of horses, so have rifle associations been established all over the empire for the improvement of our riflemen in fine shooting, and we are proud to say that our rifle ranges are unpolluted by the gambling spirit which has of late years degraded the turf. Military rifles require to be of strong and simple construction, easily manipulated, and not easily damaged or disarranged. But the volunteer rifleman, after he had attained a perfect knowledge of his weapon, as well as reached the limit of the mere musketry regulation requirements, sought wider fields and more scientific practice. The ingenious gunmakers of the day readily came forward to his assistance. The Match Rifle is made entirely with an eye to high scores; and Whitworth, Metford, Rigby, Henry, Ingram, and others have, perhaps, supplied weapons that cannot now be overmatched, while our rifle experts - such as Mr. Malcolm of Poltalloch, M.P., Colour-serjeant John Clews of the 3rd Renfrewshire Rifles with the "Ingram," and Mr. Farquharson of Blairgowrie, and Mr. Burgess with the "Henry" - produce scores at 1000 yards that ten years ago would have been deemed all but impossible.¹

1. *Malcolm, Clews, Farquharson and Burgess were all noted Scottish riflemen. They were members of the Scottish 'Eight' competing for the Elcho Shield against England and Ireland in 1869.*

A good rifle shot must be a man of intelligence, education, nerve, temper, and endurance.



The iconic windmill at Wimbledon. The National Rifle Association (NRA) held their Annual Rifle Meeting on Wimbledon Common, 1860-1889. In 1890 the NRA moved to their new home at Bisley, where the Annual Rifle Meeting is held to this day. The souvenir booklet below contains engravings of the camp at Wimbledon, c1865.



TARGETS. - In 1862 the National Rifle Association introduced a new system of scoring, and also made an alteration on the size and form of the targets. Up till this period the army regulation targets were as follows:- 3rd Class, 6 feet by 2 feet, with a round bull's eye 8 inches in diameter, painted black, the centre being a concentric ring enclosing a space 2 feet in diameter; a bull's eye counted 3 points, a centre 2 points, and an outer 1 point: the 2nd Class targets were 8 feet by 6 feet, with no bull's eye, but a round centre painted black, 2 feet in diameter; a centre counted 2 points and an outer 1; the 1st Class targets were 12 feet by 6 feet, having a black centre 3 feet in diameter, and the scoring was the same as in the 2nd Class. The matter of the target created numerous discussions in the council of the National Association, and the question was settled at the meeting of 1862 by the following arrangements, which were considered to give a fairer estimate of the value of the hits at the various ranges than heretofore. The Wimbledon system therefore has since been - 3rd Class targets 4 feet by 6 feet, bull's eye 8 inches square; centres, a black line one-half inch broad, enclosing a space 2 feet square; 2nd Class targets 6 feet by 6 feet, bull's eye 2 feet square, centre 4 feet square; 1st Class targets 12 feet by 6 feet, bull's eye 3 feet square, centre 6 feet square. The scoring is the same at all distances, a bull's eye counting 4, a centre 3, and an outer 2. We now give the sizes of the regulation targets, as no estimate can be made of the shooting of riflemen in their incipient stage ten years ago, and now, without taking the various modes of scoring into account. Regulation targets, 3rd Class, are 4 feet by 6 feet, bull's eye 2 feet by 1 foot, centre 4 feet by 2 feet; 2nd Class targets 6 feet by 6 feet, bull's eye and centre same as Wimbledon; 1st Class targets 8 feet by 6 feet, bull's eye 3 feet by 2 feet, centre 6 feet by 4 feet. The scoring is the same as Wimbledon.

SCORING. - These facts being borne in mind the reader will understand that a certain number of marks at Wimbledon in 1860 does not correspond to the same number of marks at Wimbledon in 1869; while the regulation score again varies from Wimbledon in proportion to the difference in size of bull's eyes and centres, as well as of the further difference in size of the 1st Class targets. The difference practically between the Wimbledon and regulation targets is, however,

probably not very great after all, but it should be borne in mind. The following is the score of one of the earliest company competitions, which took place in the autumn of 1860. The competing companies are now considered crack shots, and they cannot but smile at their prowess nine years ago. The difference of scoring then and now, over and above the difference of length, was then 1, 2, 3; now 2, 3, 4. An ordinary score for a company team at similar ranges now would be half-centres and half-outers, which by the old scoring is 216 for the 144 shots on each side, showing an improvement on the shooting of our ordinary volunteers during the nine years of 100 per cent. We suppress names and indicate the shooting simply by numbers. The conditions were three shots at each range.

(39th.)	150	200	250	300	Tot.
1.	1	2	1	0	4
2.	4	0	0	2	6
3.	4	2	0	1	7
4.	2	2	1	2	7
5.	1	0	0	0	1
6.	2	2	0	0	4
7.	6	3	2	2	13
8.	6	0	3	1	10
9.	3	0	1	1	5
10.	3	1	1	1	6
11.	4	1	1	1	7
12.	3	0	1	2	6
Total,					76

(17th.)	150	200	250	300	Tot.
1.	4	1	2	0	7
2.	2	0	1	0	3
3.	4	2	1	6	13
4.	4	3	1	0	8
5.	7	3	0	3	13
6.	4	2	4	0	10
7.	4	2	0	3	9
8.	5	4	1	1	11
9.	5	3	2	0	10
10.	2	0	0	0	2
11.	1	2	1	1	5
12.	2	4	1	1	8
Total,					99

Small Bore and Match Shooting

We subjoin by way of contrast or comparison an ordinary score recently made by one of the above companies, premising; however, that in this instance 14 shots were fired, 7 at each distance, as against 12 at the shorter distances above indicated.

	200	500	Tot.		200	500	Tot
1.	18	25	43	6.	19	22	41
2.	19	23	42	7.	20	20	40
3.	19	23	42	8.	21	19	40
4.	20	22	42	9.	19	15	34
5.	19	22	41	10.	19	13	31
Total scores -		200 yards, 193 points					
		500 yards, 203 points					
		Total, 396.					

Shooting with the Enfield is seldom carried on above 500 or 600 yards; beyond that distance the small bores of Whitworth, Rigby, Metford, Henry, and Ingram, are the favourite weapons. In the management of these weapons the very highest skill is displayed. Shooting with a rifle, especially when the distance is 1000 yards, is not merely holding out a tube and pulling a trigger. A good rifle shot must be a man of intelligence, education, nerve, temper, and endurance. It is no easy matter to undergo one of Captain Ross's ordeal trials at Irvine² for admission into the "Scottish Eight." Each candidate for the champion "Eight" must during a two days' competition fire 100 rounds, 50 each day, at 800, 900, and 1000 yards. In June last thirty-eight riflemen from all parts of Scotland competed in presence of the veteran deer stalker for the distinction. Captain Ross selects his men by the prowess they display in this most severe test, and some of the finest shooting ever recorded was made.

2. *The trials took place on 8 & 9 June 1869 a part of the Eighth Annual Meeting of the West of Scotland Artillery and Rifle Association. Competitors fired 15 shots at each distance 800 and 900 yards, and 20 shots at 1000 yards, each day. One rifleman retired early in the competition, and of the remaining 37, the rifles used were: Ingram (14), Rigby (11), Metford (6), Henry (2), Whitworth (2), Hippleston (1), McCririck (1).*

As a specimen., of what can be done with the rifle at 1000 yards by skilful volunteers, we give the scores at that distance made in the Ross competition by seven of the selected Scottish Eight.

First Day

Captain J. T. Kinnear	30442434444433434443
R. B. Burgess	34333333444434344333
Sergeant Ferguson	33443333443333343433
R. H. W. Dunlop	33333343344433333443
Ensign T. G. Coats	44403033344344343444
Ensign Crum	04034324342333434334
J. Farquharson	3234340333333333244
Col.-Sergt. J. Clews	23344332333230343333

Second Day

		Tot.
Captain J. T. Kinnear	44343334033402433324	129
R. B. Burgess	33333443203430333444	127
Sergeant Ferguson	3233333332224343434	127
R. H. W. Dunlop	23434332444043344322	127
Ensign T. G. Coats	04333444244424332333	127
Ensign Crum	34343433322333343234	121
J. Farquharson	44433433404433343343	125
Col.-Sergt. J. Clews	32344333423323443333	118

The aggregate scores made by these splendid shots at 800, 900, and 1000 yards, out of 100 shots in the two days, was as follows –

Name	Weapon	Agg. Scoring		Grand Total
		Tues.	Wed.	
R. B. Burgess	Henry	166	164	330
Ensign Coats	Ingram	169	158	327
Captain Kinnear	Metford	167	159	326
J. Farquharson	Henry	158	168	326
Sergeant Ferguson	Rigby	158	163	321
Col.-Sergt. J. Clews	Ingram	156	164	320
Ensign Crum	Rigby	160	158	318
R. H. W. Dunlop	Metford	143	150	293



LOADING THE SMALL-BORE. Such splendid results are not obtained without the most painstaking study and constant training. The rifle volunteer is accoutred with cartouche box, and ball and cap pouches, and carries very few shooting implements; but the match shooter requires for his small-bore a well stocked magazine of necessaries. The Enfield rifle has its regulation cartridge, but the long range rifle is, every time it is fired, loaded with the care of a scientific experiment. The match shooter carries with him a case for loading his rifle alone, on which he places the utmost dependence. A few use an ordinary powder flask for their loose charge of powder, but the majority carry in their ammunition case the most delicate apothecaries or goldsmiths' balances and weights; with these they weigh out, previous to going to the range, the quantity, 85 to 90 grains, of Curtis & Harvey's No. 6 gunpowder, and empty the charge into small glass phials, of which a shooter's case is furnished with about one hundred. The bullet, as well as the gunpowder, must weigh to a

Original Victorian range box. Storage is 42 phials and bullets, plus wads. The phials have capacity for 120 grains of black powder (checked using Swiss No.3 (FFg)).

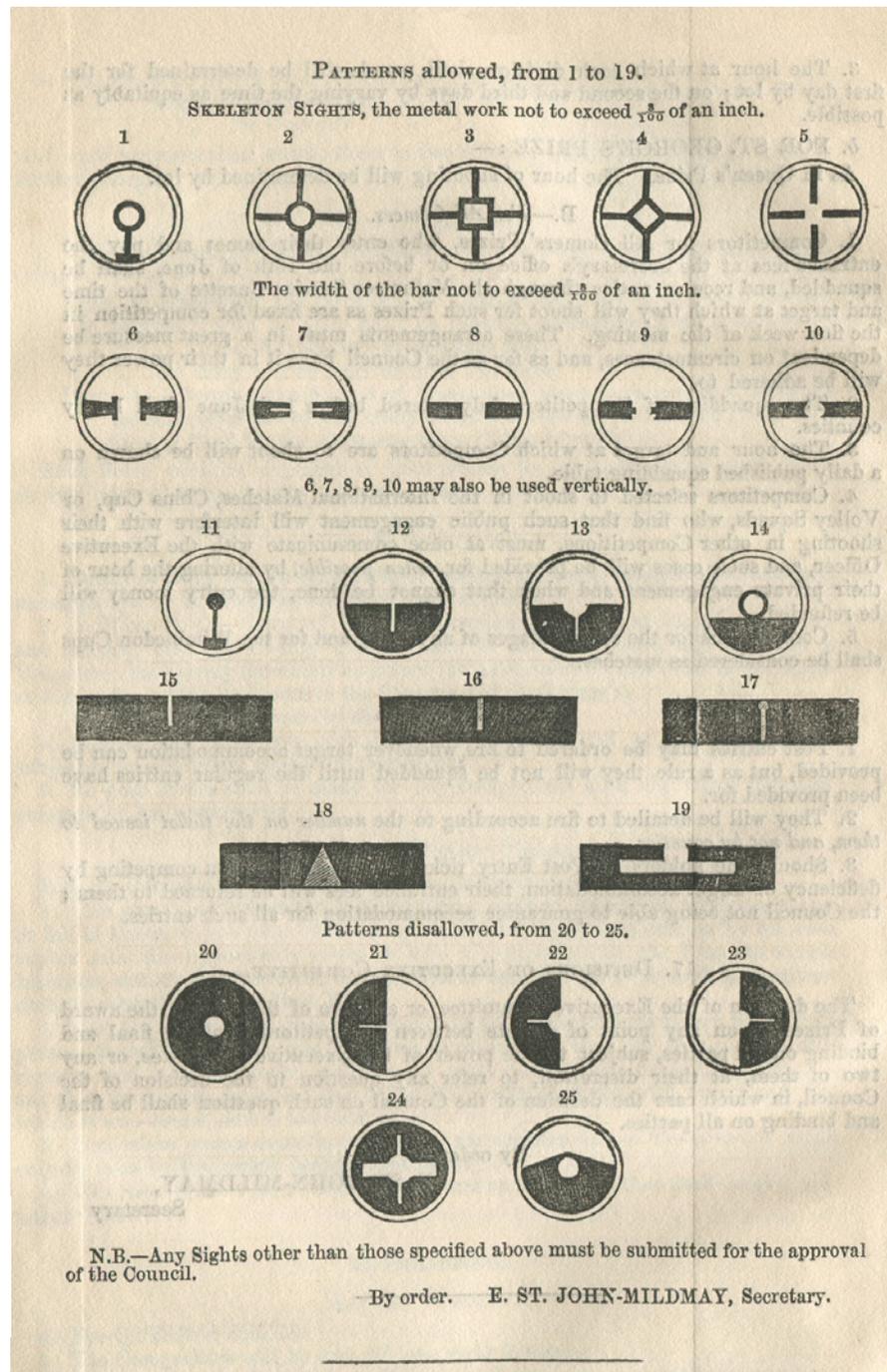
grain, or it is rejected, because if the bullet is too light or too heavy it is the same as if the charge were the one or the other, and the same result will not be got out of each discharge. With these carefully prepared charges, carefully loaded with oiled wads as carefully prepared, of which the case contains also a stock, the scientific rifle-shot can tell almost to an inch on what part of the target his bullet will rest; but then he has to judge of the strength of the wind, of the refraction of the sunlight through strata of vapour, of the effect of strong light or weak light on vision, of the solar heat on the density of the atmosphere, and on a hundred minute observations, which can only be obtained by most careful study and experiment. To assist in these observations and experiments one great desideratum is a good . . .

REGISTER BOOK. - Captain Heaton's, sold by Murcott of London, is the best in which to record every shot fired, its deviation, strength of wind, amount of light, and every minute circumstance which may tell on future practice. Nothing tells more in rifle shooting than a foul barrel; and the loading rod should be fitted with a jag scraper for the purpose of removing the dirt. A bullet will sometimes fall 100 yards short at 800 yards, because of fouling. It is most difficult to acquire a thorough knowledge of the force of wind and the amount of deviation to counteract its effects. With the Enfield, to hit the target during a gale it is necessary to aim several feet or yards to the windward; but this is guess kind of work.

LONG RANGE SIGHTS. - The small-bore rifle shooter uses a great variety of sights for the purpose of mechanical adjustment of the weapon to every change of wind and light. We figure no fewer than twenty-five of these, which have come under the consideration of the National Rifle Association. But the council of the Association, in 1865, prohibited the use of the last six, because of the danger arising from their obscuring the view of objects at the target. The fore-sights mostly in favour are Goodwin's bar sights, 15 to 19, as these are found best adapted to all weathers. These sights have delicate screw adjustments, by which the shooter can regulate his aim with the greatest precision at the longest distance. The back-sight gives the elevation, while the fore-sight regulates the lateral deviation of the bullet. The back-sight is an aperture sight graduated with an elevating scale on the Vernier principle to 100ths of an inch. The front or wind gauge sight is also marked laterally in the same manner; the centre of the scale being zero and perpendicular to the axis of the rifle. The sights should be, and generally are, placed three feet apart, and this affords great facility for calculating elevation as well as allowance for wind. Thus, for each 100 yards, 1/100th of alteration on either scale will give one inch on the target; at 1000 yards, ten inches, and so on. Great care

requires to be taken in aiming with these very delicate sights, through the centre of the disc aperture, as any deflection will cause inaccurate shooting.

Besides the wind a considerable amount of lateral deviation of the bullet is due to the rifling, which being from left to right, a spinning motion is produced, which carries the bullet to the right of the target. In Mr. Whitworth's rifle this deviation, known technically as "drift," at 100 yards is 2 inches; at 500 yards 20 inches; at 800 yards 44 inches; and at 1000 yards so much as 65 inches. Of course the wind gauge, by its lateral adjustment of the fore-sight, can be regulated to correct this error as well as that of the wind; the effect



Small Bore and Match Shooting

of these adjustments being to throw the alignment of the axis of the barrel so far to either side of the target as to counteract the opposing force of wind or "drift." Thus, with a wind twenty feet strong against the bullet, the rifle must be adjusted to throw the bullet twenty feet to the windward, supposing it were a dead calm. In still weather again, the aim would be dead on the bull's eye, after giving allowance for the normal deviation of the rifle.

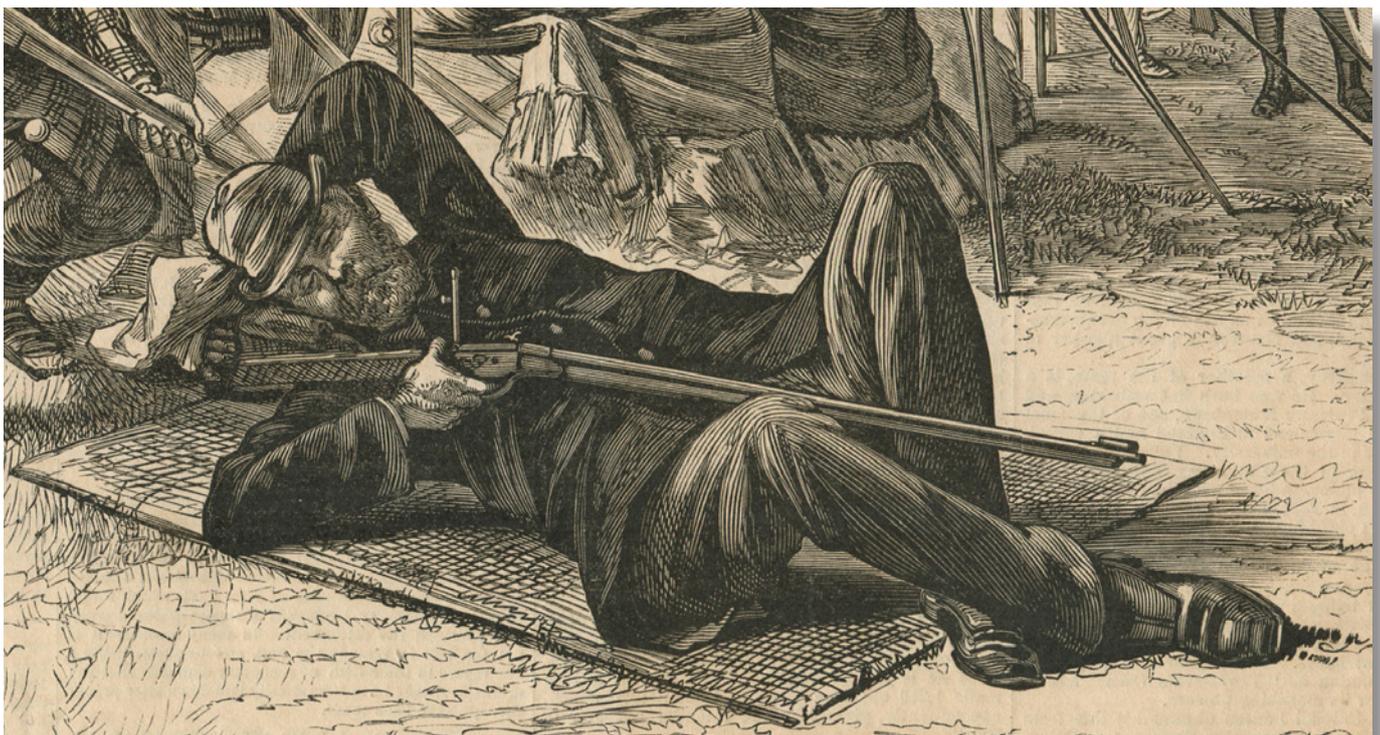
POSITION. - The positions adopted by small-bore shots are various, and may be described by the range condition "any position." Some sit, but the favourite position is to lie prone to earth on the stomach, leaning to the left side, the elbows well planted on the ground, and the whole body immovably steady. Mr. Farquharson and one or two others astonish the uninitiated by their wonderful acrobatic performances, while lying on their backs. The rifleman we have named, after, getting on the "broad of his back" and adjusting his legs as a rifle-rest, twists his left arm round his neck and grasps the butt of his rifle with his left hand at the right shoulder, using his right arm and hand for steadying the aim and pulling the trigger. In this peculiar position Mr. Farquharson seldom fails to score a bull's eye at the longest ranges.

Proficiency with the small-bore can only be acquired at great expenditure of time and labour, aided by most trustworthy experience, carefully noted down in a well-kept shooting register. Besides his own experience, the long-range shot should take opportunity of benefiting also by the experience of the best marksmen. Among the works on the subject to which we would refer the reader is that of Captain Heaton, entitled "Notes on Rifle Shooting," and published by Longmans of London.

In conclusion we have only to remark that the volunteers of Great Britain have, by keen devotion to their weapon, far outstripped the regular soldier as marksmen, and have done their country infinite service, if in nothing more than by the impetus they have given to the study and practice of musketry and to the improvement of rifled arms.

∞

Sir Henry Halford is shown below adopting a position that appears similar to that adopted by John Farquharson in the 1860s. This is from 1877 when Halford was Captain of the Great Britain team to Creedmoor to shoot against the USA.



Horatio Ross

cuttings collected by David Minshall

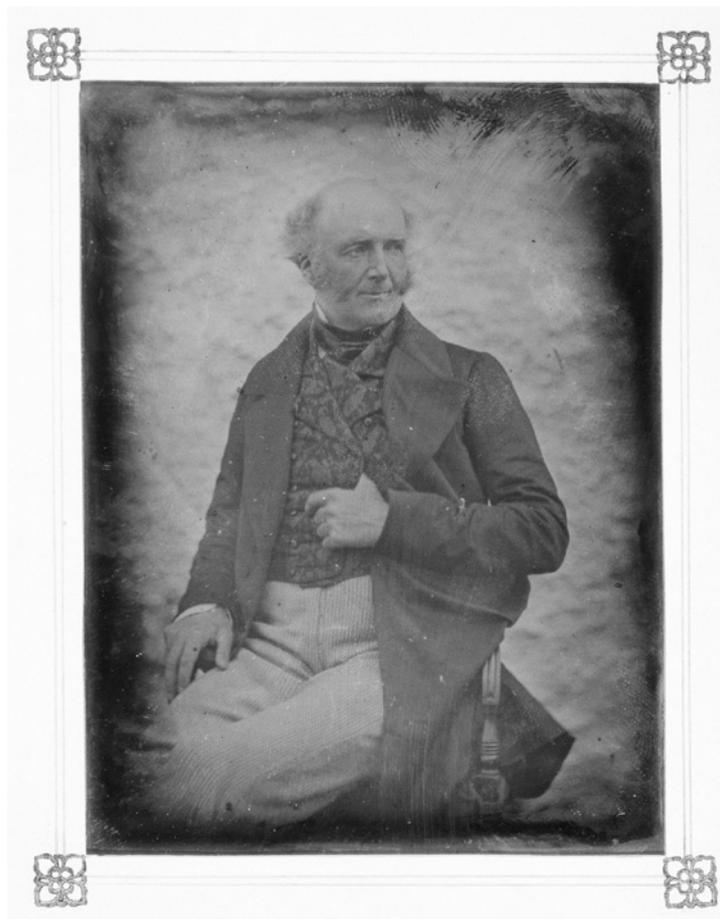
Horatio Ross (1801-1886) was a well known figure in the 19th century. His life long passion was field sports. When about eighteen, he joined the 14th Light Dragoons, remaining with the regiment for several years. Finding, however, that military duties interfered with the full gratification of his taste for

*field sports, he sold out. He later had a brief political career between 1831 and 1835, but again was reluctant to be distracted for too long from his abiding passion. The following obituary published in **The Scotsman**, 7 December 1886, provides an interesting overview of his colourful life.*

The Late Mr Horatio Ross Of Rossie Lodge

Yesterday afternoon Mr. Horatio Ross, whose name has been during half a century inseparably associated with Highland sport, died at Rossie Lodge, his residence on the banks of the Ness, about a mile from the Highland capital. The deceased, who as a sportsman was almost without equal, enjoyed robust health up to 1884, when he shot his last stag. Since that time he had been in somewhat failing health, but up to the month of August he was able to take outdoor exercise. Since that time, however, he had been practically confined to the house. He gradually grew weaker, and at ten minutes past one o'clock yesterday afternoon he quietly passed to his rest.

Born at Rossie Castle, his father's property in Forfarshire, in the year 1801, Mr Ross had attained the great age of 85. He entered while a lad a dragoon regiment. Turning his attention to sport, he soon became famous in the hunting ground, holding his place among the hardest riders of Melton Mowbray, among whom in those days were White Neville, Lord



Self-portrait of Horatio Ross
© Victoria and Albert Museum, London

Plymouth, and others. He was the winner of the first recorded steeplechase, beating Captain Douglas in a splendid ride over Leicestershire. He was also distinguished as an athlete and a yachtsman. As showing his powers of endurance, it may be stated that while acting as an umpire to the Late Lord Kennedy, Sir Andrew Leith Hay and others, in a walking match from the River Dee to Inverness – a distance of 97 miles without a halt – Mr Ross was the only one who reached the goal unassisted. It was, however, as a “shot” that he attracted attention; for his skill with the fowling piece, rifle, or pistol has rarely or ever

been excelled. At the rifle range he was singularly successful. He won numberless prizes, among these being some of the first and best, among his trophies being the Wimbledon Cup, and the Cambridge Cup, the latter of which he won in the year 1867, after two days' shooting, at 900, 1000, and 1100 yards. Four years before, in the year 1863, the gallant sportsman, with three of his sons, who seemed to have inherited much

of his skill as a shot, formed four of the Scottish Eight in the competition for the Elcho Challenge Shield. Mr. Ross did not confine himself alone to sport. In the year 1831 he successfully contested the Aberdeen, Montrose, and Arbroath Burghs, and during the two Parliaments through which he sat he took a prominent part in the debates, particularly on those subjects connected with game and agricultural matters. The duties of Parliament, however, were too irksome for a frame accustomed to the exhilarating exercise of the field or the hill, and he retired to seek fresh pleasure in the Highlands. As a deerstalker he had no equal. He was the first sportsman on the hill in the year 1814, and last in the year 1884; and during this long period of seventy years he never missed a season. Writing as to his experiences on the hill in 1878, he said – “I was glad to find that I could still walk very fairly, and I got every bird I shot except two.” Again, in the year 1882 he wrote – “I made some wonderfully good shooting (my best). I fired 93 shots, and brought down 83 grouse. This is my 69th Twelfth. My first was Mr. Maule’s moor – afterwards Lord Paumure – in 1814: a long but very pleasant look back. On 5 September I shall be 81 years old. I was up this morning at 3am, but heavy rain sent me back to bed.” For two seasons more he was permitted to enjoy the sport he loved so well, spending the shooting season at the forest of Wyvis, in Ross-shire, which he had held for several years. A gentleman of undoubted honour, he was even in his earlier days never known to interfere in a quarrel except as a peacemaker. In the old days of duelling, he acted sixteen times as a second; yet he never saw a duel fought, always effecting, by

tact and good temper, a reconciliation between the parties. In his quiet retreat at Rossie Lodge the veteran deerstalker delighted to meet his friends. Possessed of a strong fund of humour, he cheered his visitors with happy reminiscences of bygone days, and of sport in the deer forest. During his long career he was revered and respected for he was a man of undoubted honour and integrity. His spare hours were spent in photographing his trophies he had secured from the forest, and few amateurs have succeeded in portraying animal life or the scenes of nature with greater success. By his death Inverness loses one of her best known citizens, and one who delighted to extol the praises of the Highland capital. The deceased was married to Miss Macrae, a Highland lady, by whom he is survived, their golden wedding having been celebrated with great rejoicing about two years ago. He leaves a family of five sons. The eldest, Mr Horatio Ross, is manager of the Bank of England at Portsmouth, while the second, Mr Hercules Ross, who, as a shot, was for three years in succession the champion of India, is a Commissioner at Nani-Tal. His third son, Mr Colin Ross, who took part in the Scottish Eight competition at Wimbledon in 1863, resides in London. Mr Edward Ross, who on one occasion won the Queen’s Prize (*at the inaugural NRA rifle meeting of 1860. Editor*), and holds the gold and silver medals of the National Rifle Association, resides at Wimbledon; and the fifth son, the Rev. Robert Peel Ross, is rector at Drayton, Tamworth. In his later years the deceased was surrounded by his grandchildren; and it is worthy of note that his own death creates the first break in his family.

Game Shooting

“I never tried to make a great bag of grouse in a day. I think sixty-five brace was the largest number of grouse I ever shot in one day. That is nothing. Two hundred brace have since then been shot in a day by one man, easily, 12th August. In 1828 I rented from the Duke of Athol a large range of shooting called Feloar. I shot eighty-seven deer that season to my own rifle. I worked hard. I was always up at 3 a.m. and seldom

back to the lodge before 7 or 8 p.m., walking, running, or crawling all the time. This was the grandest training in the world! In 1851 I shot one hundred and eighteen deer in Mar Forest. During that season I killed thirteen in one day with fourteen chances. In 1837 I killed seventy-five deer in Sutherlandshire. These are my three best seasons.”

Sportascrapiana, edited by C.A. Wheeler
(Simpkin, Marshall & Co., London, 1868)

Ross as a Pistol Shot

In reference to the Captain's pistol shooting an old friend says: "As a steady shot (I mean by that expression taking a slow aim), I believe he was quite the best shot in Britain. Quick shooting – i.e., shooting by word of command – he did not, I believe, practise, and in that style of pistol shooting I have no doubt some could have beaten him; but I may safely say he never lost a pistol match in his life. Long ago, a Spanish gentleman challenged him to shoot a match, and offered to back himself for £50, which he of course accepted. It came off at the Red House enclosure. The distance was very short, only twelve yards, the target a common playing-card, and the bull's-eye was exactly the size of a sixpence, marked on the back of the card. Ross won the match just easily, and made some very remarkable shooting. With the last twenty-five shots he fired (the match was for fifty shots), he hit the small sixpenny bull's-eye twenty-three times.

"Ross was a universal favourite then, as now, and though we had, from our perfect faith in his superiority over all that had yet entered the lists with him, backed him heavily, we hardly calculated on seeing each precision as that day was displayed by our much-loved friend. He has made good practice up to a hundred yards with the pistol, almost equal to the rifle; and has with the pistol killed deer, both roe and fallow."

Sportascrapiana, edited by C.A. Wheeler
(Simpkin, Marshall & Co., London, 1868)

Mr Horatio Ross on Rifles

"Mr Ross, of Netherley, has addressed a letter to the *Inverness Courier*, from which we make the following extract:

"My practice with rifles of all descriptions has been considerable, and I have no hesitation in pronouncing the Enfield to be the worst of "modern rifles". It has every fault – a high trajectory, rendering it a matter of great chance hitting a distant object when the ground is not accurately measured, a slow flight, which increases very much the difficulty of hitting a mark in motion; and very inferior powers of penetration. I lately read a

paragraph in the newspapers of very great significance, and which bears on this point. It stated that Mr Whitworth had an interview with the Emperor of the French, the object of that interview being to conclude a bargain for the purchase of 30,000 Whitworth rifles. Experiments were carried on in the presence of the Emperor for two days, and he was quite satisfied with the shooting of the rifles, the order was not given. We know something in this country about Whitworth rifles, and if that most shrewd of men, the Emperor, did not think them good enough for his army, we may form some notion of the excellence of the arms with which he ultimately intends to equip his soldiers. Put two regiments down in an open country at the distance of a mile, one armed with Whitworth rifles, the other with Enfields, what would be the result? I believe the latter would be destroyed before their opponents came within the range of the Enfield rifle. I therefore think that 'all comers prizes' are most useful for the sake of bringing out the best shot and best rifle. But they all cease to have any interest beyond that of the mere neighbourhood of the meeting if they are not left to perfectly free and open competition. I, however, gather this, that the people of Inverness are dissatisfied that so many prizes fell to the lot of my son and myself, and thus they want to exclude us from their competitions by heavy handicaps. I must confess that I am disappointed at finding Highlanders to be the first who have called out. But I will relieve their anxiety; we won't compete next year, but if alive and well, we may perhaps join the shooting of 1863, by which time, if they attend the spirited advice of Cluny, and follow the manly example of the Master of Lovat, who shot beautifully, and spoke with becoming spirit at the meeting, they will, I hope, have gained proper confidence, and prove themselves 'foemen worthy of any man's steel'."

The Western Daily Press, 8 October 1861

Note

- See *Journal* issue 1 (Winter 2018) for Horatio Ross' "Hints for Long Range Riflemen", written in 1864.

The Cambridge Cup, 1867

“This great match* was brought to a conclusion on Friday last week. At the close of the previous day, Thursday, Mr. Metford held the first place with 148, Captain Horatio Ross the second, with 145, and Mr. Colin Ross the third, with 140. On Friday the twenty-four competitors were punctually on the ground at 9.15, and fired the first shot at 9.30. The 900 and 1,000 yards ranges were shot through without stopping, and the Party then adjourned for luncheon. Captain Horatio Ross then headed the score, but the position of the others had a good deal changed, as Ensign Pixley and Lord Ducie had come well into the match. During luncheon a regular hurricane arose; it was so strong, and came in such sudden gusts, that the hat of one competitor was blown off while he was lying down to shoot – indeed, twenty-five feet of allowance for wind had to be made, and this, of course, upset all the 1,000 yards sighting, and the target had to be felt for simply by observation. Captain Horatio Ross, indeed, commenced this range with a miss; but Mr. Pixley found the target, and was never off it for the remainder of his shooting. Absolute want of space forbids us to enter upon many of the incidents of this exciting match – in our opinion the greatest rifle contest of the year, requiring the largest amount of staying powers, the keenest sight, the nicest skill. One incident, however, we must mention. On a former occasion, Captain Ross and his two sons, shooting at the same time at different targets at the thousand yards, each got a hull’s-eye, and they repeated the very same feat in this match at the same range. It was also a strange coincidence that in the same place, the Hall of Caius College, the father and son should have had to return thanks as the winners of this much-coveted prize. On this occasion Lord Ducie, in proposing the health of the winner, said he was sure, now that the struggle for the Cup was over, there was not a man present who was not gratified at seeing the veteran rifleman carry off this great prize, as it was a most remarkable feat for a man of his advanced age to

(*) *The Cambridge Cup Match extended over two days, the ranges being 900, 1000 and 1100 yards; fifteen shots at each range each day.*

meet some of the best shots in England and beat them all, two of his famous sons being in the number. No man had done more than Captain Ross to encourage rifle-shooting in this country, and he called on them to give three hearty cheers to the toast.

“Captain Ross, in returning thanks, said that it was needless for him to assure Lord Ducie and his old and young friends in the Cambridge Club that this was one of the most cheering events of his when he had the happiness, he might say the glory, of rising to thank them for drinking his health as the winner of the far famed Cambridge Cup, a prize which was the envy of every man who had any right to call himself a rifleman, and which was justly looked upon as the rifle-shot’s blue ribbon. That he should ever have the honour of winning this prize had really never seriously entered his head. Dreams of the happiness such an event would afford him had certainly now and then crossed his thoughts, but he only looked on them as dreams, or building castles in the air, and he had come to Cambridge to meet his friends, to have a social jolly reunion with them, and he had only looked on the shooting for the Cup as part of the programme. To his surprise, fortune had smiled upon him, and he could now look on that beautiful classical piece of plate as a prize which he had fairly won. He was puzzled a good deal to account for this, but he presumed there was a deity who presided over rifle-shooting. He was not well posted in ancient mythology, but he believed there were various of the ancient gods who looked after the different interests of mankind, and he supposed the deity of riflemen had thrown this halo of glory on him before his sun finally set, as a reward for his long-continued exertions to make his countryman good rifle-shots, and the defenders of their common country. This Cup reminded him of another happy day, when a gallant boy of his had three years ago sat in the place of honour which he now occupied, as the first winner of the Cambridge Cup. He well knew what happiness it would give his dear boy, at that moment in a far distant part of the world, when he heard that his old father had been able to add this trophy to the family treasures of a similar character, and this enhanced in no small degree his pleasure at being the fortunate man of the meeting. He had every reason to hope that his son Hercules would be here next year, and once more contend with them for the

Cambridge Cup. (This announcement was received with very great and hearty cheering.) In conclusion, he believed the best, the kindest wish he could express for the health and the happiness of his friends around him was, that when, a good many years hence, they were within a few weeks of their sixty-sixth birthdays, they may be able to hold their rifles as steadily, and see the bull's-eye as clearly, as he had done during the last two days. The hearty cheers with which they had received the toast just now proposed by Lord Ducie satisfied him that they were pleased to see him there as the winner of their annual prize, and he would assure them that if they wished to see him happy, he was so, for this was just the happiest day of his long life."

Volunteer Service Gazette, 6 July 1867

Captain Ross on Duelling

"The extreme folly and extreme wickedness of duelling are now so apparent to the people of this country, that the practice may be said to have been extinguished by the weight of public opinion. Forty years ago, however, this was not the case, and lives were frequently sacrificed in consequence of a rash word uttered after drinking a quart or so of strong port-wine.

"As far as it was in my power to do so, I from the first set my face against duelling, and during my longish life I never sent or received a challenge, nor did I ever see a duel fought. I have, however, acted for other people no less than sixteen times, and I have in every game managed to get the difference made up in a satisfactory manner. In some cases it appeared at first almost hopeless, but by keeping cool, being patient, and appealing to the good feeling and good sense of the opposite second, I have at last always brought him to an amiable state of mind, and then it was comparatively easy to settle matters without resorting to the 'trial by battle.'

"The most difficult, and apparently most hopeless, affair I ever settled was one in which I was not asked to act as second, and in which I interfered entirely as a volunteer. About three pm., I was eating luncheon at Crockford's Club, when ----- came in, and, seeing me, said, 'I have a very disagreeable affair on hand this

afternoon. ----- is going out with -----; I am going out as -----'s friend.' I was horror-struck: the man for whom this gentleman was to act as friend(!) was a gallant officer in the Guards, and one of my dearest friends. I was not personally acquainted with his adversary, but I knew him to be one of the finest pistol-shots in the kingdom. I said, 'For God's sake get this matter made up! ----- is a dead man if he meets -----, and there is hardly any case which may not be settled without fighting.' 'No,' he replied, it is impossible to make it up; they must just meet, and exchange shots, but I won't agree to a second shot.' 'Second shot!' I said. 'No second shot will be required, that I can tell you beforehand. Who is -----'s second, and where does he live?'

"He gave me his name (an Irish peer, and, as it happily turned out, a right-hearted fellow), and Long's Hotel as his abode. This was a case requiring decision; there was no time for shilly-shallying; it was one of life and death.

"Without a moment's hesitation, I started for Long's Hotel - not five minutes walk from Crockford's. I had to collect my thoughts as well as I could before I met the Irish peer. How I should be received was a very doubtful matter - to be kicked downstairs was not an impossible result of unauthorized interference in such a matter; but I willingly took my chance of that little contre-temps, for much depended on my powers as an ambassador of peace. I sent up my card, and was received immediately by the peer, -----'s friend: the other principal was in the room, a doctor, and a case of duelling pistols. These were the dramatis personæ. I began by craving pardon for intruding at such a moment, and hoped he would allow me to throw myself on his good feeling and good temper. I said I had accidentally heard that two gallant officers, one of them a dear friend of my own, had unhappily had a difference, and that they were about to meet; that I was perfectly unauthorized to interfere, but that, as I knew most differences between gentleman could be arranged without resorting to such a serious step as fighting a duel, I could not refrain them calling on his lordship, in the hope that this case might also be amicably got over (at the moment I had not the slightest notion what they had quarrelled about), and that if he thought I could in any way be made useful as a mediator, I was ready to place myself at his disposal. I made a happy hit. His lordship shook

hands with me, and said that he was more grateful to me for calling than words could express; that it took quite a load off his mind; that, although we had never met, my name was as well known to him as his own; that he knew I would never ask a gentleman to say or do anything that was derogatory to his standing as a man of honour; and, to give me proof of his unlimited confidence in me, he would at once place the whole affair in my hands, and his friend should do whatever I said he ought to do. Here was a triumph of diplomacy and moral courage! I then had to ask for an explanation of the cause of quarrel. I posted off in a cab to my friend, and, after a few mutual explanations and concessions, settled everything before dinner; and I adjourned to Crockford's with a good appetite for my own dinner, and a bottle of Sillery champagne, to which I treated myself on that occasion.

“Like other men, I have had successes and disappointments; but what I can now look back to with unmixed satisfaction is, the having been successful in preventing so many duels. I have sometimes been asked whether, in my opinion, doing away with duelling has lowered the tone of society, and made men less courteous to each other in their conduct and language than was formerly the ease. I think I am probably as able as most men to give a fair answer to such a question, as I am old enough to recollect the state of society when duelling was constantly resorted to as the *ultima ratio*, and have lived long enough to see the result of its abolition. I have not the slightest hesitation in saying that a marked improvement in the conversation, the general conduct, and what I may call the amenities between gentlemen, has been the consequence of duelling ceasing to be considered as the only correct way of settling differences between them. Some forty or sixty years ago I have known the grossest insults to be offered to gentlemen (and without any ground for them), and when the aggressor offered satisfaction, or fought a duel with the injured party, he was considered quite whitewashed, and again received in society on the some footing as formerly. Happily, that is not the case now, and any one who grossly violates the acknowledged rules and courtesies of good society will find that he is universally shunned, and looked upon as a ‘snob’ (a new word, not found in Johnson’s Dictionary, but a very expressive one).

“I notice that people now are much more guarded in their language than they were in the days when swaggering and offering to fight a duel whitewashed them, and gave them license to bully, and offer fresh insults to others. No doubt there are people occasionally heard of who have not sufficient command over their tempers to enable them on all occasions to act, speak, or write like gentlemen; that cannot be helped; they belong to the genus ‘snob,’ and must be left in company with their progenitors.

“It was but the other day I read in the newspapers a letter addressed by a noisy demagogue to a respectable member of Parliament, and expressed in terms so coarse and ungentleman-like that some years ago it would certainly have led to an act of violence. No doubt it is somewhat trying to the temper to be insulted, but I dare say the gentleman to whom the letter was addressed felt much the same as I should if a drunken navy cursed me for not taking off my hat to him.

“Having all my life opposed duelling, and tried on all occasions to put a stop to duels, I am glad we can now look on the ‘trial by battle’ as a thing that has passed away.”

Sportascrapiana, edited by C.A. Wheeler
(Simpkin, Marshall & Co., London, 1868)



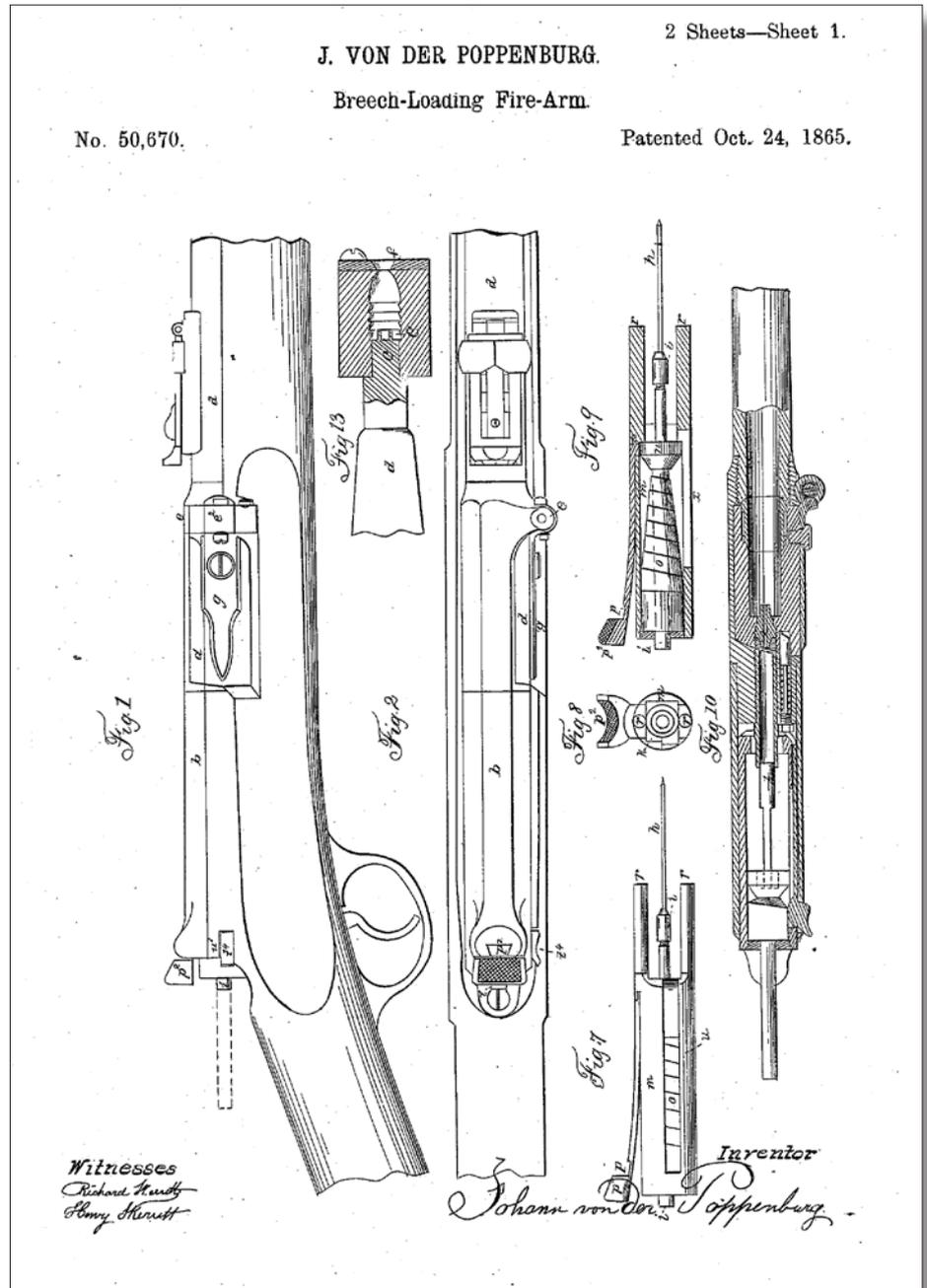
The 1866 Benson-Poppenburg Breech-loader

Matthew Moss

In early 1864 the Board of Ordnance began to explore retrofitting Britain's muzzle-loading Pattern 1853 Enfield Rifle Muskets with a breech-loading cartridge conversion. Along with this interim solution the Ordnance Department also began the search for a breech-loading rifle designed from the ground up. Dozens of designs were examined from engineers and gunsmiths from across Britain, Europe, and the United States. One of these came from Johann von der Poppenburg, a Birmingham based engineer. Poppenburg's rifle was tested along with 24 others during the initial phase of testing. The Ordnance Department's Breech-Loading Rifle Committee were largely unimpressed by the rifles submitted and selected only four to progress, Poppenburg's design was not included.

Poppenburg patented his first breech-loading design in February 1865 (#421) with an American patent (*right*) following in October (US #50,670). It was this system which was first submitted to the trials, the rifle while described as 'Poppenburg's principle' was made or at least submitted by Messers. Benson and Co., also of Birmingham.

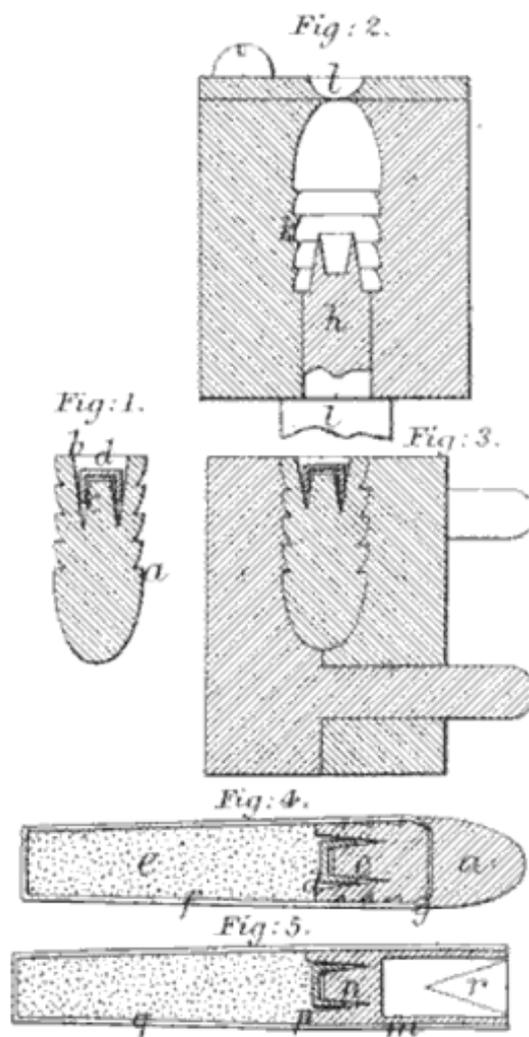
Poppenburg's patent describes a system that could be loaded with either loose powder and a projectile - with a percussion cap igniting the charge held in the 'charge-chamber' or with a paper cartridge which was detonated when pierced by a needle. It was the latter, more modern, option which was chosen for submission



to the British trials.

The submitted design used a needle fire action, which ignited a paper cartridge by piercing through the paper and powder to ignite a copper cap in the base of the projectile. Poppenburg patented this cartridge design on 3rd April 1865 (#932), it lapsed three years

Poppenburg's projectiles &c.



Poppenburg Needle Gun Cartridge
April 1865

(*Newton's London Journal of Arts and Sciences* 1866)

later and became void in April 1868. The action was hinged to the right, with a hollow breech chamber swinging out to allow a cartridge to be loaded into it. The estimated unit cost to produce these rifles, for quantities over 5,000 rifles, was £3 each. The needle fire action and hinged breech proved “too complicated, and liable to accident for a military arm” according to the Trials report.

Interestingly, in October 1866 Poppenburg also patented specific system for a breech-loading conversion (#2580). The system used a vertically hinged breech block which locked using a rack and pinion system attached to a lever. It does not appear that this system was tested by the Trials Committee. This action may have been developed following the failure of his more complex action and the adoption of the brass-cased .577 round. This patent lapsed and became void in October 1869.

The October 1866 patent (#2580), appears to be the last patented solely under Poppenburg's name. Subsequently patents were granted jointly between Poppenburg and John Solomons Benson. This may have been due to the cost of applying for and maintaining patents, which in the 1860s could cost over £45 for three years of protection. Both Benson and Poppenburg were based in Birmingham, Britain's leading centre for small arms manufacturing at the time. In a patent notice, dated 22nd December 1866 (#3382), Benson is listed as a merchant while Poppenburg is described as a mechanical engineer. It may be that Benson provided the financial backing for Poppenburg's breech-loading system, this was an arrangement that was common at the time.

In 1866-7 Benson and Poppenburg submitted a number of rifles for testing in the Prize Competition launched by the War Office to find a new breech-loading rifle. The system submitted was radically different to Poppenburg's earlier needle fire designs which used hinged breeches. The patent for the new system was granted jointly to Benson and Poppenburg on the 22nd December 1866 (#3382).

Benson and Poppenburg's new rifle had a breech which opened horizontally with a 'tubular breech-block' which slid to the rear when a hinged lever was lifted and pulled backwards. To open the breech the rifleman first depressed a small catch on the left side of the breech cover, once depressed the breech block could then be pulled back by the hinged lever. This movement also actuated the rifle's T-shaped semi-circle extractor allowing the rifleman to remove the spent case. A new cartridge could then be loaded and the breech closed and the striker was then pushed forward with the thumb to cock the weapon. Once the hinged lever was pushed forwards again the breech



block moved forward, closing the action, and locked with a pair of lugs cut into the receiver (described as the 'breech-shoe' in the patent) and at the rear by the catch.

Depressing the breech release button with the striker cocked will de-cock the action and in theory allow a round to be carried in the chamber. *The example in the accompanying photographs* may be a slightly more refined version of the rifle submitted as it differs from another rifle, said to be a trials gun, which more closely resembles the December 1866 patent.

At least four rifles (with some differences in design between them) were provided for testing, the War Office's April 1868 Report on Breech Loading Arms found that three of the rifles submitted were shorter than the required length while a fourth was too long – with the maximum overall length allowed being 51 inches. Examples of both full-length rifles, with 32 inch barrels, and carbine models with 23½ inch barrels exist (both of these lengths are significantly shorter than the Snider-Enfield's barrel length). The trials rifles appear to have been sighted out to 1,100 yards and were chambered in a .577 calibre cartridge (probably the Boxer cartridge selected officially in 1866). At least two probable trials example were also chambered in a .450 cartridge. From a survey of the remaining examples it seems that the serial numbers for the rifles range up to at least 239.

The Benson-Poppenburg was unsuccessful during the trials, being rejected from both the Prize Competition and the Breech Action Selection Trials. With the Committee's report stating that despite the rifles having "several good ideas embodied in their breech action", they "appear to have been hastily manufactured and the inventions are as yet in an incomplete state". The specific reasons given for this were that the rifles were of unsatisfactory overall lengths. It seems they were submitted in a rush, in an 'incomplete state', with the report also noting that the extractors on two of the rifles submitted destroyed cartridges during extraction, probably ripping the base from the case.

The Committee's report explained that its rejection from the separate Breech Action Selection Trials was due to issues: "if dirt or sand enters the shoe of this rifle it causes misfires, and even prevents the bolt from entering the aperture in the block." They also noted that "The working of the breech mechanism is slow."

The British Army's extensive trials eventually resulted in the selection of Jacob Snider's system, adopted in April 1866 to convert existing Pattern 1853s and the selection of Friedrich von Martini's action and Alexander Henry's barrel, which when combined as the Martini-Henry was formerly adopted in March 1871.

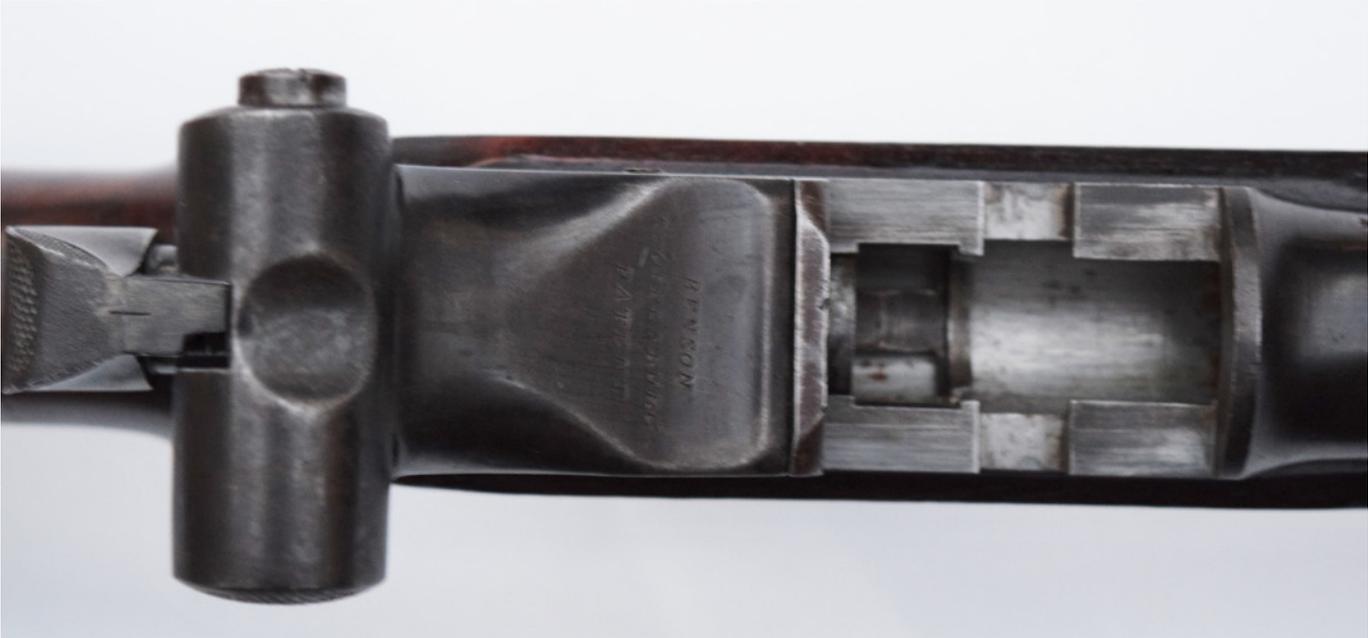
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- *Abridgments of the Specifications Relating to Fire-Arms and Other Weapons, Ammunition, and Accoutrements*, Commissioners of Patents, (1870)
- 'Poppenburg's Projectiles', *Newton's London Journal of Arts and Sciences*, (April 1865)

Various British Patents:

- 'Breech Actions, Hinged-Chamber', J. von der Poppenburg, UK Patent #421, 14th Feb. 1865
- 'Projectiles and cartridges for central-fire breech-loading fire-arms and ordnance', J. von der Poppenburg, UK Patent #932, 3rd Apr. 1865
- 'Breech Actions, Hinged Breech-Block', J. von der Poppenburg, UK Patent #2580, 6th Oct. 1866
- 'Breech Actions, Sliding Breech-Block', J.S. Benson & J. von der Poppenburg, UK Patent #3382, 22nd Dec. 1866
- 'Breech Actions, Hinged Breech-Block', J.S. Benson & J. von der Poppenburg, UK Patent #1950, 15th June, 1868
- 'Improvement in breech-loading fire-arms', J. von der Poppenburg, US Patent #50670, 24th Oct. 1865







Matthew Moss is a British military historian with degrees from the Universities of Liverpool and Chester. In 2013, he established www.historicalfirearms.info, a website that looks at the history, development and use of firearms, as well as wider military history. In 2017, he co-founded a new multi-media project, the Armourer's Bench (www.armourersbench.com). The project uses video, photos and thoroughly researched articles to showcase the history of some of the world's most interesting and important firearms. – The Benson-Poppenburg will feature in an Armourer's Bench video soon.

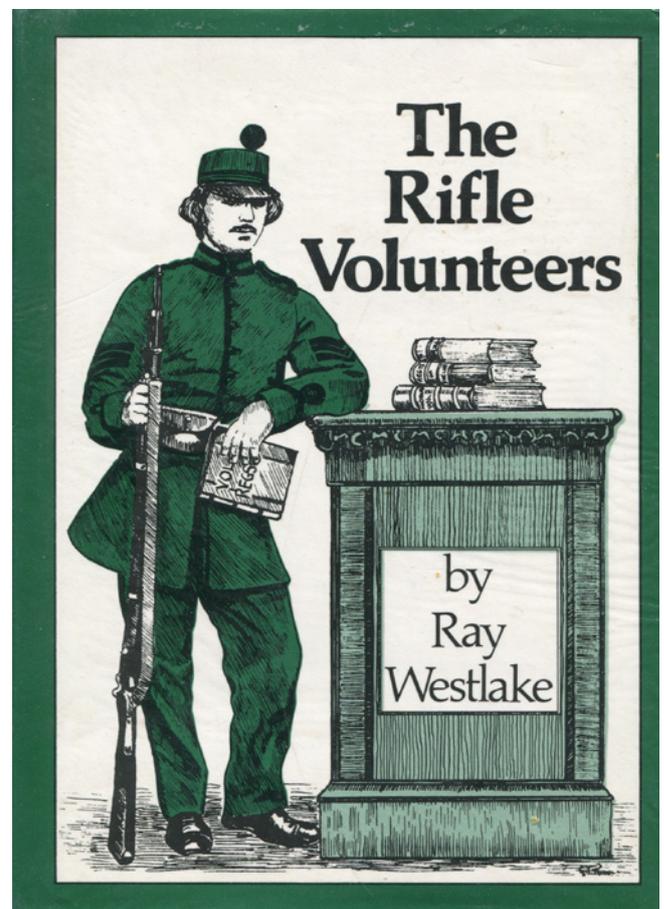
The Volunteers in Being

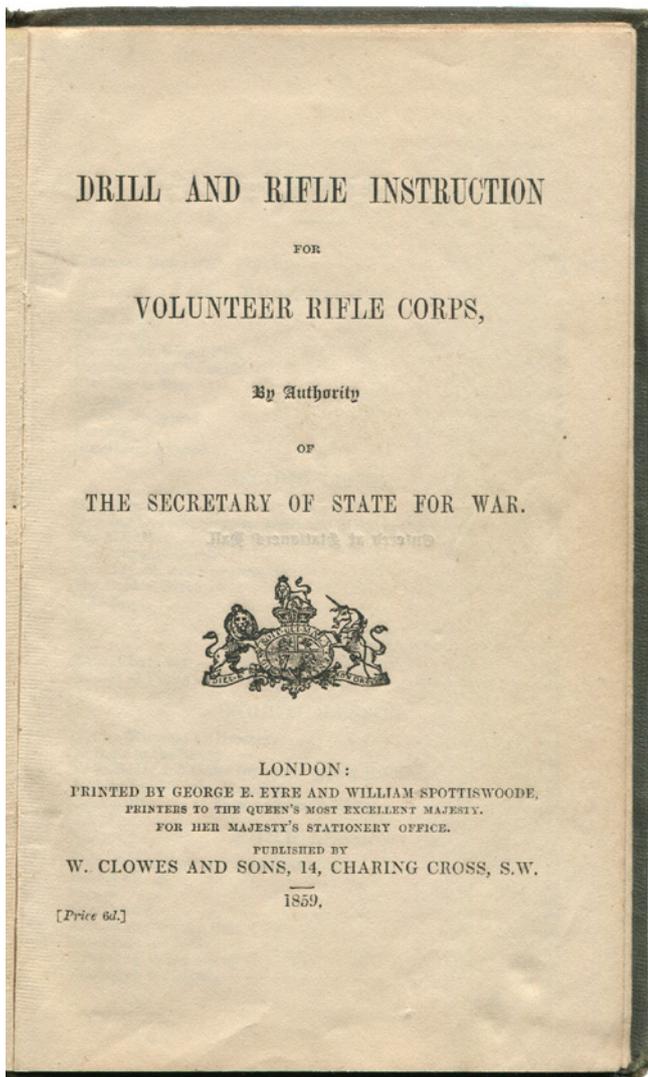
W.S. Curtis

In Parts One and Two of this article we looked at the pressures that brought about the Volunteer Revival as reflected in the books which influenced and encouraged this flowering of the patriotic spirit. May 12th 1859 was the date on which, despite the reservations of the Regular Army, the Government finally gave in and issued their Authority under the provisions of Chapter 54 of the still current Act of 1804 which had raised the Volunteers during the Napoleonic Wars. The authority was made in the form of a circular addressed to the Lords Lieutenant of Counties which summarised the provisions of the Act of 1804. The Act stated that Volunteers could be called out in the case of invasion or rebellion and that when under arms they should be subject to military law and not be able to quit their corps. At other times they could give 14 days notice of resignation. Officers' commissions would be signed by the Lords Lieutenant. Details of any plans to form Volunteer Corps were requested from the Counties.

A second circular was issued on May 25th which laid down what was expected by the Government and included such details as the drills, disciplinary procedures, establishment of rifle ranges and need for County Corps to be subdivided into companies. A third circular, on July 13th, laid down the ideal establishment for each corps and company. The number and ranks of its officers were established and authority given for the services of a paid Adjutant or permanent staff officer. These people were to be drawn from retired officers of the regular army or the Militia and criteria were laid down for the amount of Military Service that they were required to have completed before being eligible for consideration. For example in the case of Rifle Corps, the Regulation prescribed "*Four years' service in Her Majesty's Imperial or Indian Armies, or in that of the East India Company, or in the Royal Marines, or in the Embodied Militia; or three years' such service in the case of any Candidate who is in possession of a 1st class certificate from the School of Musketry.*" In some cases regular officers actually sent in their papers in order to take these appointments. Captain Heaton, the celebrated rifle shot, author and Adjutant of the Third Manchesters, was one such.

Large conurbations, such as Manchester, were able to raise so many men that more than one battalion could be formed. The shires, on the other hand, usually managed only companies spread around the county which could combine to form a single Corps or Battalion. The system of precedence was also covered by the circular of July 13th where the date of the formation of the corps for the most part governed its number. 95 numbers were allocated with Devon having the honour of carrying the number One. A full listing of these is given in Ray Westlake's excellent book *THE RIFLE VOLUNTEERS* published in 1982 by himself (ISBN 0 902633 79 1) where details of the individual corps and companies can be found. From a very early date Cadet Companies were raised and were affiliated to their respective county corps. The old Act of 1804 was revised and replaced by a new Volunteer Act (26





and 27 Victoria cap. 65) in 1863 and this lasted until the Volunteers were disbanded and converted into the Territorial Army in 1908.

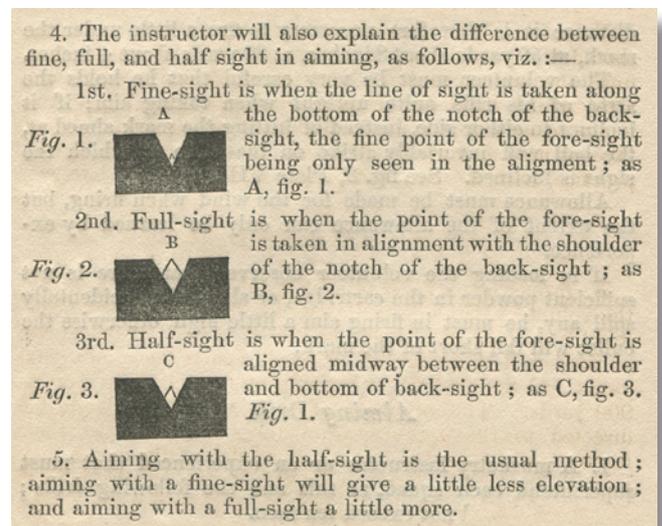
Before we examine a selection from the large mass of privately produced literature which appeared for the benefit of the new formations, we will look at the Official Government books. The communications from the Authorities were, at first, in the form of Circulars and Orders. As far as we can see, the first Official book to appear upon the scene was DRILL AND RIFLE INSTRUCTION FOR THE VOLUNTEER RIFLE CORPS BY AUTHORITY OF THE SECRETARY OF STATE FOR WAR. The First Edition is dated 1859 but does not bear any day or month. Later editions carry

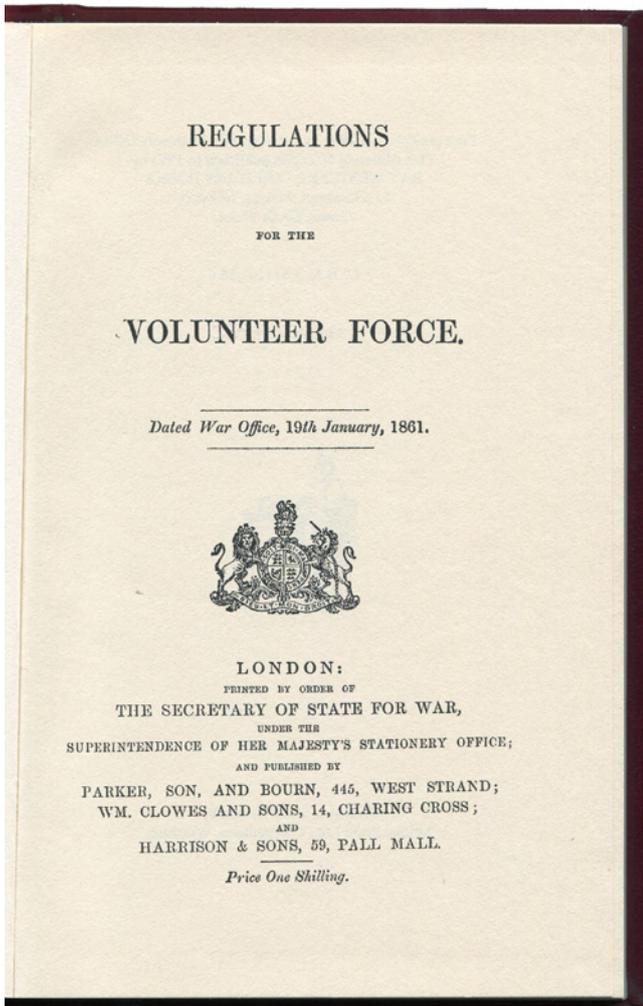
details of the print order which includes the contract date. This book ran to not less than 11 editions in the first 18 months of the Volunteers and we calculate that there must have been not less than 100,000 copies printed. Unlike all the other official manuals, this one was bound in green cloth and priced very reasonably at sixpence.

However, despite the popularity of this little book, which was designed for the citizen soldier as a very much abbreviated version of the regular army's REGULATIONS FOR CONDUCTING THE MUSKETRY INSTRUCTION OF THE ARMY, it was phased out by a new instruction at the beginning of 1861 which required that musketry instruction should be only from the official REGULATIONS.

The next book to appear was one which, in its Introductory Order by Earl De Grey and Ripon dated at the War Office, 19th January 1861, stated that it was to "supersede all Circulars and Orders hitherto issued relative to the Volunteer Force.". This was REGULATIONS FOR THE VOLUNTEER FORCE. It was bound in the regulation red cloth embossed in blind stamping with the Royal Arms and the title. The copy to hand has print contract number 2046 and is for 5,000 copies dated May 1861. It is presumably, therefore, not the first printing. There are 136 pages

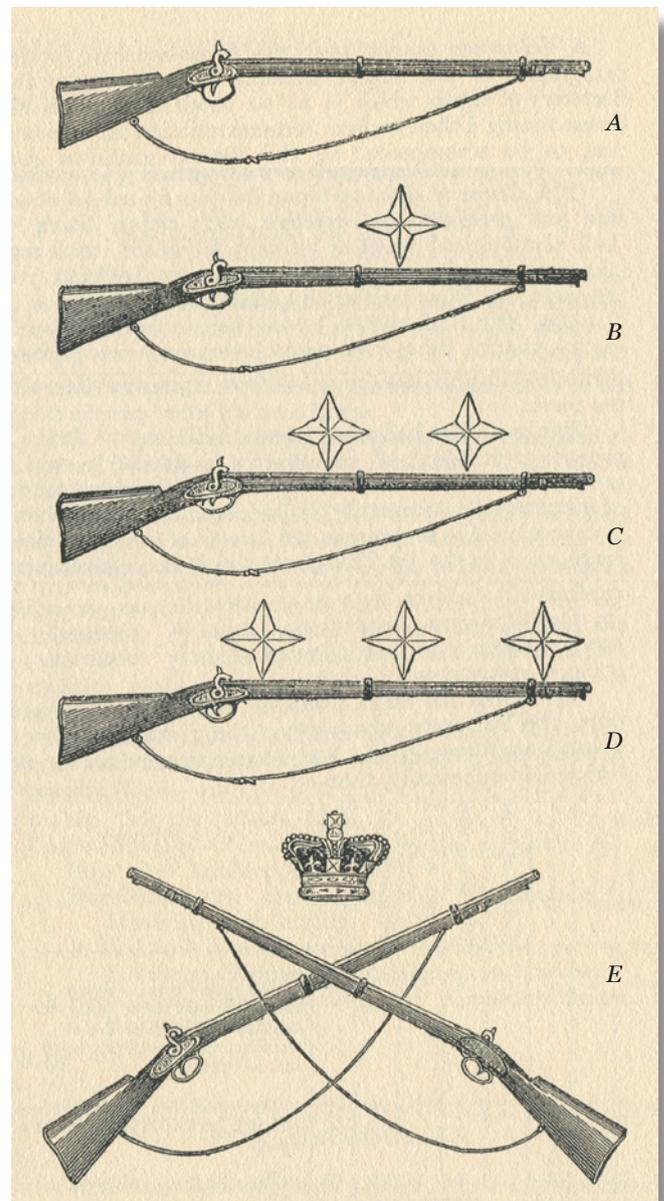
Below: AIMING DRILL from 'Drill and Rifle Instruction for the Volunteer Rifle Corps' By Authority of The Secretary of State for War (1859).





and a two page military book catalogue. This is a comprehensive set of Regulations governing every aspect of the Volunteer organisation and would have had a circulation limited for the most part to officers. The 100,000 green Musketry and Drill books would have been for nearly every member which is why they were priced so cheaply. The general regulation book was one shilling.

Over the years the Regulations grew and became more complicated and by 1878 they had become a book of 239 pages priced at "Half-a-crown" and bound in blue cloth carrying a gilt title "VOLUNTEER



Right: VOLUNTEER MARKSMANSHIP BADGES

(Volunteer Regulations 1861) These badges can often be seen on the sleeves of Volunteer tunics.

- A) 300 yards - to the best Volunteer in the 2nd Class with a score exceeding 15.
- B) 350-600 yards - to the best Volunteer in the 2nd Class with a score exceeding 12.
- C) 900 yards - to every Volunteer who gets seven or more points in the 1st Class.
- D) 650-900 yards - to the best Volunteer in the 1st Class with a score exceeding 7.
- E) The badge of a Volunteer Seargeant Instructor in Musketry holding the Hythe Certificate.

REGULATIONS 1878". The print order was for 9,000 copies. By 1896 there are 410 pages and the book is now paperback and reduced to one shilling. The print order was for 4,500 copies. Given the large number of these books that appeared over the years, it surprising that they are so scarce today. Care should be taken not to confuse the Volunteer Regulations with those for the Militia which was in existence at the same time.

Official training and instruction manuals for the Volunteers were, with the exception of the 1859 DRILL AND RIFLE INSTRUCTION, those applicable to the Regular Army's various specialist corps of Artillery, Engineers, Cavalry, etc. Before examining some of the privately written and produced books, we have noted a class of privately printed copies of extracts from the official manuals. One such is a small 13 page booklet bound in a purple cloth on board and embossed with the Royal Arms and the words "SOUTH NOTTINGHAMSHIRE YEOMANRY CAVALRY". It is entitled INSTRUCTIONS FOR THE SWORD EXERCISE FOR THE USE OF CAVALRY - Reprinted from the Rules and Regulations approved by His Royal Highness the DUKE OF CAMBRIDGE, General Commanding-in-Chief. The title page bears the Royal Arms and the imprint NOTTINGHAM: PRINTED BY WILKINSON & SOLLORY, 5, LONG ROW. - 1859.

The text deals with Cuts, Guards and Points. The original from which it was extracted was the CAVALRY SWORD, CARBINE, PISTOL, AND LANCE EXERCISE which had 120 pages.

The official manuals were for the most part much bigger and heavier than was necessary for a Volunteer whose interest and time could not be equated to one for whom the subject was a career. For example, the MANUAL OF ARTILLERY EXERCISES. - 1860 is an octavo book of 303 pages and weighs nearly 17 ounces. This was the correct authority for all Artillery Volunteers but for the average part time gunner there were specially produced abbreviated versions. The Royal Artillery had a tame publisher and bookseller right outside the back gate to Woolwich Barracks, in Artillery Place. This was John M. Boddy who described himself as a Military Bookseller, Printer, and Stationer. He was responsible for much of the specialist material published by the Master General and the R.A. Institution. A work of 1860 is the MANUAL OF DRILLS FOR HEAVY GUNS

FOR THE USE OF THE VOLUNTEER ARTILLERY. This is printed By Authority and was only 36 pages. The binding is blue paper covered boards with a red linen spine and hinges (blue and red the Gunner colours) and is printed with the same legend as the title page with the difference that date is shown as 1859. The drills relate to Garrison Artillery which was one of the main areas where it was expected that Volunteers would supplement the regular forces. The guns this book relates to were the 24-pounder, 32-pounder, 8 inch and 10 inch.

As the movement grew and the men became more ambitious there was early pressure for Volunteer Field Batteries and with it the need for simpler manuals. THE HANDY BOOK OF GUN DRILL AND PRACTICAL INSTRUCTOR of 1862 by Charles Hastings Collette of the 1st Middlesex Artillery Volunteers was one such. Weighing only 3 ounces it could be fitted into a tunic pocket. It was published by W. J. Johnson, 83, Fleet Street, who was the publisher of THE VOLUNTEER SERVICE GAZETTE. The author states, in his "Advertisement" as he calls the Introduction, that he has prepared the book for the private instruction of Artillery Volunteers because they do not have the time to study the official manuals which are, in any case, difficult to follow. After the general instructions in gun drill with considerable reference to Garrison Gun Drill, the book concentrates on the 18-Pounder Field Gun as the arm most likely to be encountered. The Volunteer Artillery was heavily involved with coastal defence and in the seaside counties their principal arms only a few years later were the 64-Pounder Rifled Muzzle Loader of 64 cwt. and 6.4 inch bore and the 40-Pounder Armstrong Rifled Breech Loader. These arms continued in this role right down to the end of the century.

To be continued.



Muzzle Loaders Association of Great Britain



The MLAGB was formed in 1952 and is the Governing Body for muzzle loading within the UK.

Its objectives are to encourage an interest in muzzle loading firearms, to promote, regulate and safeguard their use and to preserve their freedom of collection.

www.mlagb.com

Historical Breechloading Smallarms Association



The HBSA was founded in 1973. The fundamental aims of the HBSA are to encourage the Preservation of Historic and Heritage Breechloading firearms and to foster the research and study of all aspects of the subject, from the aesthetics of sporting guns and the engraver's art to the functional aspects of firearms used by the soldier, target shooter and the sporting shooter.

www.hbsa-uk.org

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Volunteer Camp at Wimbledon (D.B. Minshall collection)