IN THE GUNROOM

HENRY RIFLING

By Donald Dallas

It is not often that a gunmaker becomes a household name, particularly well known in the 19th century, yet still known by many today who have little interest in firearms. This was Alexander Henry, the Edinburgh gunmaker who contributed the barrel to the Martini-Henry .577/450 rifle of 1871 that was standard army issue in the third quarter of the 19th century. This was the era of Empire and the Martini-Henry was always mentioned in the exploits in far off countries on a map tinged with red.

Alexander Henry's father had been the superintendent in the carriage department of the Royal Horse Artillery in Leith Fort near Edinburgh in the early 19th century. Young Alexander would often accompany him and was impressed by the artillery pieces that the Fort was home to, this kindling his great interest in rifled projectiles.

Henry was apprenticed to the Edinburgh gunmaker Mortimer and by the 1840s he was manager of the firm. He concentrated upon rifle development whilst there but was frustrated by the poor results due to inadequate rifling. The main rifling system in this period was the two-groove rifle, a variation of the military Brunswick belted ball. In the 1840s and 1850s both John Dickson & Son and James Purdey developed very accurate two-groove rifles with little wings on the bullet to locate in two deep rifling grooves in the barrel, easy to load with little chance of the bullet stripping. Purdey coined the name "Express" to describe this rifle, a term still in use today to denote the power and flat trajectory of such a rifle.

However the two-groove was not perfect in many respects and in the early 1850s whilst at Mortimers, Henry invented a three-groove segmental cut rifling, similar to the two-groove but with three cuts and a three winged bullet with a very slow twist. It was very accurate and by the time Henry established his business at 12 South St Andrew Street in 1852, his three-groove rifle was highly regarded.

In this period the standard military rifle was the Pattern 1853 Enfield .577 rifle employing usually three grooves with a slow twist. During war time exigencies such as the Crimean War, the Birmingham and London makers could not meet the needs for rapid large scale production as inter changeability of parts was not standard.

In order to improve this, the government in 1854 asked the leading mechanical engineer of his day Joseph Whitworth to design and organise the necessary machinery for mass production. After exhaustive experiments to ensure the highest degree of accuracy and penetration, Whitworth recommended that the bore size should be reduced from .577 to .451 and the rate of twist increased. He also invented a hexagonal bore rifling with a mechanically fitting bullet to ensure positive spin. He patented this rifling in 1857 and it soon became known as Whitworth rifling. His .451 rifle was vastly superior to the .577 Enfield but it was not adopted by the British Army due to the far greater costs involved.

Henry continued to experiment with rifling and came to the conclusion that mechanically fitting bullets like the two-groove Dickson and Purdey, the Whitworth and his own three-groove rifling were not the way forward. He favoured a far simpler expanding bullet made out of soft lead designed to be gripped by every part of the bore. Such expanding bullets had been in common use but were usually only partially gripped by the bore.

On the 15th November 1860, Henry took out patent no. 2802 Rifled Firearms that created his famous Henry rifling. Henry rifling was a close adaptation of Whitworth's hexagonal rifling, but whereas Whitworth rifling was deep with a mechanically fitting bullet, Henry's was shallow and used a soft lead non mechanically fitting bullet that expanded easily into the shallow grooves. Most Henry rifling was seven grooves and he employed seven flat plane surfaces. His brilliance was, at the intersection of each angle, he created seven angular projections or "lands" projecting into the barrel. This meant that fourteen bearing surfaces, seven planes and seven lands gripped the bullet around its entire circumference. Upon firing, the soft lead expanded into every area of the rifling giving perfect grip and rotation and consequent excellent accuracy.

Although Henry mentioned in his patent expanding bullets only, he also supplied mechanically fitting bullets but they were for use in target competitions only.

Although Henry's rifling was originally designed for muzzle-loaders, with a slight variation it could be used in breech-loaders hence its use continued for the rest of the 19th century. He soon settled on seven grooves with a 1 in 30" twist or later a 1 in 22" twist and the accuracy of rifles built with Henry rifling soon became legendary.

In order to show the very small amount of expansion necessary, a bullet could be inserted into the barrel and when the barrel was held up to the light, scarcely the smallest ray of light could be seen between the bullet and the barrel. Henry rifling was very accurate due to this small expansion taking place in the barrel and since a large charge could be used as the bullet was so well supported, a flat trajectory resulted.

The majority of Henry muzzle-loading rifles were in .451 bore, the reason being that this was the same size as the Whitworth now in common usage in competitions. This was the era of the Volunteer Movement with rifle competitions held regularly the length and breadth of the land and time and time again, the Henry rifle came out on top. To illustrate this, the Volunteer Service Gazette of 1863 listed 1730 small bore rifles present at the Wimbledon Meeting of 1862, 591 were Henrys, 582 Whitworths, 291 Turners, 166 Kerrs and the rest by other makers.

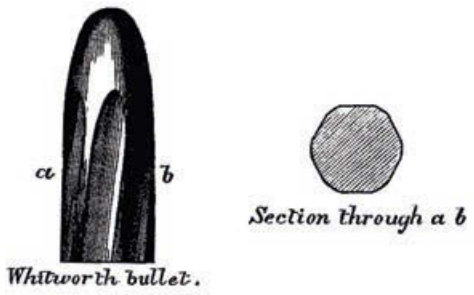
The sales of .451 Henry rifles were massive in the 1860s. Until around 1860, Henry sold on average 30-40 firearms per year, this leaping to an incredible 200 firearms (primarily .451 rifles) per year in the 1860s. Henry rifling became known the all over the land due to the Volunteer competitions and he was an astute promoter of his rifling, regularly giving his rifles as prizes in competition.

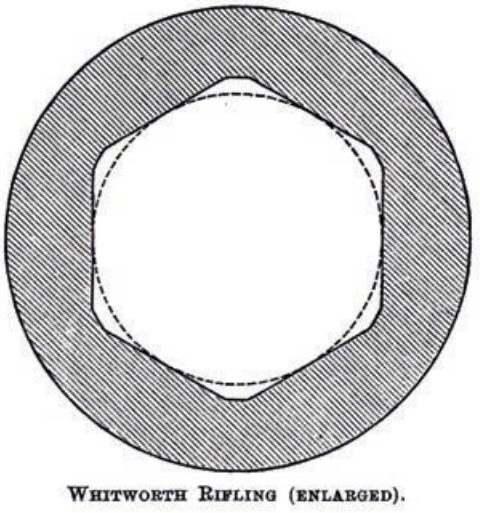
Whitworth rifling with its deep cuts and mechanically fitting bullet could not be used in breech-loaders but Henry rifling could and during the breech-loading era, the majority of single and double rifles used Henry rifling. The Henry records are full of Henry barrels being fitted to other makers rifles and he supplied barrelled actions to many in the trade, primarily Stephen Grant. Henry's own favoured calibre was the .450 3 ¼" Express straight round that could be used both at home and abroad.

In the 1860s the government conducted a series of trials to find a replacement for the interim .577 Snider rifle. Henry played a major role in these trials and although his breech mechanism was not accepted, his barrel was. Allied to the Martini action, the Martini-Henry rifle was adopted by the British Army in 1871, surely the supreme accolade for Henry rifling.

This rifle continued as the standard service weapon until it was replaced by the .303 Lee Metford in 1888. By this time the new nitro powders had made their appearance and their greater power over black powder rendered Henry's soft lead expanding bullet obsolete.

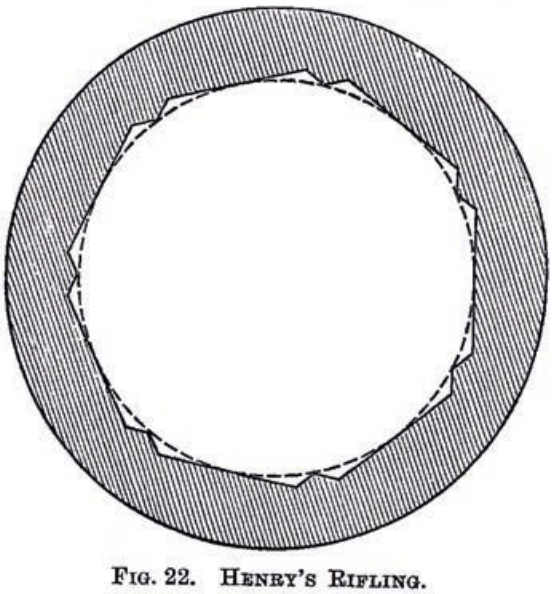
Lot 505 shows a typical Henry .451 rifle with Henry rifling. No 1088 was completed in 1864 as a best match rifle and for its day was superbly accurate.





Whitworth hexagonal rifling.

The Martini-Henry rifle.



Henry rifling showing the seven lands projecting into the bore.