



# THE JACOB RIFLE AND ITS EXPLODING PROJECTILE

An Approach to Evaluating Historically Attributed Firearms and a Request for ASAC Help

By Bob Carlson



Figure 1: The Jacob rifle with bayonet, by Swinburn & Son.

One of the most intriguing, unusual firearms, perhaps worthy of inclusion in Winant's "Firearms Curiosa", is the Jacob rifle! Besides having double 24-inch barrels, as well as a single barreled variant, it fired both solid and explosive bullets, designed to blow up mutinous Indian artillery caissons at long range, perhaps up to 1,400 yards (or as some feel, to the 2,000 yards to which its 5-inch-long ladder sight is graduated)! The appearance of a twenty-four-inch double barreled, deeply rifled firearm mounted with a huge bayonet with its 30-inch blade and Scottish-highland type cut-out basket guard, is bizarre and incongruous indeed (Figure 1).

## The "Perfected" Jacob Rifle

The final design of this very unusual and innovative English rifle was completed by the quixotic General (then Major) John Jacob (Figure 2) in 1857, by the time of the Indian Mutiny to arm his special battalion of native Indian riflemen, the "Jacob Rifles" (eventually the 36th Jacob's Horse). Englishman John Jacob, like Sir Joseph Whitworth, was renowned as a mathematician and engineer as well as a courageous soldier. In 1847, he brought order to the "Upper Scinde" desert area and established Jacobabad.

Inspired indirectly by the Brunswick rifle, as Major of the Scinde Irregular Horse in 1856, he published his "Memoranda on Rifle Muskets for the Army" in his Record Books of the Scinde Irregular Horse, and in his booklet on "rifle practice" in London he describes a series of trials over ten years in which he discovered that the two-grooved Brunswick was inadequate. He first made a

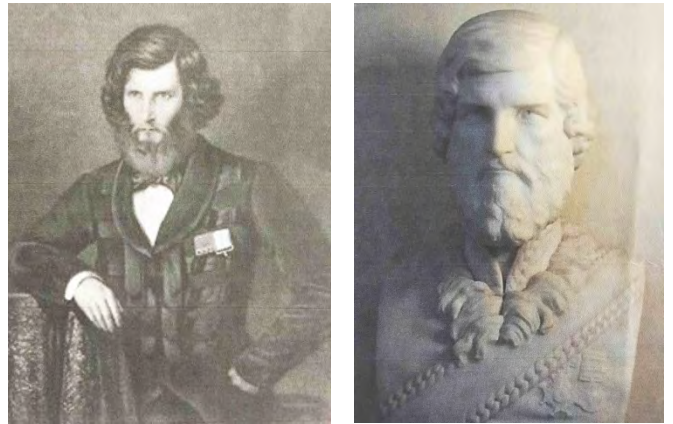


Figure 2. Engraving of Brig. General John Jacob by Thomas Lewis Atkinson, 1859 (Left). This marble bust resides at Taunton Shrine Hall (right). The pedestal reads: Born at Somerset, January 11, 1812, he was dauntless, indefatigable, and unselfish, a born General, a great administrator of original, organizing mind. He died at his post, Jacobabad, on the frontier of British India, 15 December, 1858, an irreparable loss to his country and his friends.

single-barrel rifle using a double belted ball. Eventually, in 1854, he turned to a conical bullet cast with four studs to fit the deep grooves of its rifling (Figure 3), with an explosive variant utilizing a copper tube filled with fulminate of mercury to form "the most



Figure 3. The deep 4-groove rifling (3/4 turn in 24 inches), with its lands of equal width to the grooves, with bullets cast with 4 lugs to engage the rifling.



Figure 4. The Jacob rifle's rear sight has 3 leafs graduated from 100-200-300 yards, plus a 5 inch ladder sight to 2,000 yards!

formidable missile ever invented by man".<sup>1</sup> At the culmination of 25 years of devotion to rifle design, utilizing his firing range over 2,000 yards, with targets set from 100 to 2,000 yards, he decided on his "Jacob's Pattern Rifle" :

*"Double, 32 gauge, four grooved with deep grooves (of breadth equal to that of the lands), to take four-fifths of a turn in the length of the barrel; barrels of the best that can be made, 24 inches long, weight of the barrels alone about six pounds, not less; the ends of the lands to be rounded off at the muzzle; patent breech, no side-vents; first sight exactly parallel to the bore, the muzzle sight being raised if necessary for this purpose; folding sight attached to the barrel, 20 inches from the muzzle, 5 inches long, secured by spring below; protected by projecting wings lying flat on the barrel, the slide of this sight to be well secured by springs at its back..."*<sup>2</sup>

Using the rifle so described by Jacob, on 5 September 1856 a box ten feet square containing 500 pounds of powder (simulating an artillery caisson) was exploded at 1,800 yards firing from the shoulder with the shooter standing.

Over the next two years, he refined his concept rifle and bullet, made in different lengths and calibers by John Manton, Witton & Daw and Swinburn & Son. Using a double-barreled rifle in 1856, he demonstrated exploding artillery caissons at long ranges. In 1858, he started his First Regiment of Jacob's Rifles and specifically described the final form of his forty-inch long rifle weighing 9.5 pounds, with "double 24-inch barrels of 32 bore, the four



Figure 5. Concave tip of the ram rod for seating bullets with an explosive copper tip.



grooves making 4/5 turn,”<sup>1</sup> made by Swinburn & Son. The three folding leaf sights were graduated from 100 to 300 yards, with a five-inch-long vertical ladder sight with slide bar to 2,000 yards (Figure 4). When not in use, it folded down along the barrel and was protected by the shoulder of the barrel band. The barrels were fitted with a wide, flat full-length rib and the bayonet lug affixed to the side of the right barrel. The ramrod has a large head and a medial swell and a removable brass tip and mounts through a single large thimble. The concave brass tip of the ram rod (Figure 5) minimizes the probability of exploding the explosive Jacob round, but I imagine that the seating of these bullets still must be done with care. The back-action lock has two robust military hammers and is stamped “Swinburn & Son 1860” (Figure 6).

The steel trigger guard, enclosing the two triggers, extends to a checkered spur-forming grip. The dense European walnut stock measures 14.5 inches with a steel butt plate. A spring-loaded circular patch box is mounted on the right side and engraved “Jacob’s Rifles” (Figure 7). The Jacob bayonet, not thought to have been used by the Confederacy, has a 30-inch blade with an elaborate hilt with a “Scottish Highland”-type cut-out guard design (Figure 8). This gives the Jacob rifle with its 24-inch double barrels a very “unbalanced” look with the saber bayonet mounted! The grips are checkered leather riveted to the tang in the manner of the Enfield P’53 sword bayonet. The quillion has the unusual double holes for the two barrels. The blade is double-edged with two fullers on each side, starting 4.5 inches from the shoulder and running for

16.5 inches. There is even a slot in the guard near the pommel for a sword knot!

### Various calibers of Jacob Rifles

Whereas the Jacob rifle shown earlier (Figure 1, sn550) is caliber 32 bore (.524” caliber bullet and .584” width of the lugs), with a 1747 grain bullet, Jacob rifles were produced in many calibers as evidenced by these bullet molds. The first, a Daw type in bronze with its integral bullet release pin, walnut handle and steel insert to form the lugs, is .604” to the lugs and .564” to the bullet body (Figure 9). The bronze mold with ebony handle for the long Jacob bullet is 20 bore to the lugs with the bullet body .535” caliber (Figure 10). The brass Greenfield Jacob bullet mold with iron sprue cutter is marked “GREENFIELD/LONDON” and cast a .518” bullet body with .583” caliber lugs (Figure 11). The iron William Davis mold, marked “WD” and “25”, cast a .566” caliber bullet with 20 bore (.629”) to the lugs (Figure 12). Sporting rifles with caliber as large as 8 bore have been reported for use against thick-skinned game. The rifles were provided with one mold for solid bullets, but two molds were required for the Jacob shell, in addition to the copper inserts containing fulminate of mercury.

### Explosive Jacob Projectiles

Jacob’s severely pointed, conical projectiles, both solid and explosive, had four lugs to engage the deep 4-groove rifling (see Figure 3). Elongated to 2.5 times its diameter, the bullets also



Figure 6. The back-action locks have robust military hammers and are marked “SWINBURN & SON/1860”.



Figure 7. The spring-loaded patch box in the right buttstock is marked “JACOB’S RIFLES”.



Figure 8. The Jacob rifle with its mounted bayonet, having a 30 inch blade and a “Scottish cut-out like hilt”, has an incongruous, unbalanced appearance.



Figure 9. Daw-style Jacob bullet mold casting a .563 inch caliber bullet (.604 inches to the lugs).



Figure 10. Jacob bullet mold for a long bullet casting a .534 inch (.54 caliber) bullet, (20 BORE to the lugs).

eliminated the hollow base and were now flattened. With 68 grains of powder and a heavy bullet, the recoil was described as “by no means pleasant”. Originally conceived by Capt. Norton, 36th Regiment of Foot, Jacob’s explosive bullets, manufactured by Eley Bros. of London, had an insert of fulminate of mercury<sup>3</sup> which exploded on impact at up to 1,400 or more yards (Figure 13). Intended to be fired at artillery caissons, Jacob believed “it would revolutionize the art of war. Two good riflemen so armed could annihilate the best battery of field artillery in ten minutes.” The explosive copper tubes came in a tin suitably packed to protect them from shock (Figure 14). Developed later, in November 1861, other explosive projectiles included Gardiner bullets, manufactured at Harpers Ferry, with some captured by Confederates who then used them rarely. In Great Britain, William Metford invented an explosive bullet eventually temporarily adopted by the government, but explosive missiles less than 140 ounces were outlawed by the Convention of St. Petersburg in 1868, and declared obsolete in March, 1869.

I have always felt, as Bill Adams believes, that whereas the Yankee Gardiner bullets may have caused severe wounds as they incorporated a time fuse, that percussion and contact detonated bullets probably did not explode in many soldiers’ bodies. Most of

the small number of explosive bullets fired by Confederates were captured Yankee ordnance. The Jacob bullets, which explode on contact, were essentially designed to destroy caissons. Very importantly, human soft tissues are too soft to cause impact detonated bullets to explode unless the bullet struck bone or a piece of equipment. Even the fused bullet might pass through the soldier before exploding, or soldiers might be wounded by fragments of bullets which exploded near them. Paul Davies, firing a mini-Jacob style bullet in a rifle musket at chipboard stakes, found that the explosion actually occurred behind the stake as the bullet passed through. He stated that 2-4 inches of wood was actually required for the bullets to explode inside the target to cause increased damage. Bill Adams found that Jacob-style exploding bullets fired through a railroad tie caused minimal damage at the rear of the wooden tie. Damage to a caisson, of course, would be extensive due to ignition of the powder bags inside. There was an isolated report of a Union soldier killed when his cartridge box filled with Gardiner cartridges was struck by a bullet. It may be that no exploding Jacob bullets were actually fired at individual soldiers in the civil war. The Confederates used a few Jacob rifles, but all of the Jacob bullets recovered were solid lead projectiles, used for sharpshooting and some for exploding caissons.<sup>4</sup>





Figure 11, Greenfield Jacob bullet mold casting a .5128 inch diameter bullet (.583 inches to the lugs).

### Jacob Rifles in the War Between the States

While the Confederates did field a few Jacob rifles, including Capt. Farley of Stuart's cavalry, and some Jacob bullets (solid) have been dug, very few were used in the war. John Esten Cooke, an ordnance officer, described Captain Farley using a Jacob rifle with "exploding bullets". Farley claimed to have fired 80 rounds:

*I had my double-barreled English rifle, with the explosive balls, you know-and I had been looking for a caisson to blow up. I could not get a shot at one, however, and I determined to use it like an ordinary rifle. I had eighty rounds...and I used them all up that day before I got through. When the officer came out to reconnoiter us, I leaned against the tree and I took a good look at him. It was growing dark and I didn't want to make a mistake and shoot our own men. I could see from his dress, especially his cap...that he was a Yankee, so I leveled my gun, took good aim at him and fired. He kneeled over*

*and fell... We gradually advanced...and passed the place where I shot the officer. He was lying on his face, shot through the body, and was then dying.*"<sup>5</sup>

This occurred at Brandy Station, where conventional Jacob bullets have been dug by Todd Harrington.

There is an intriguing account by George Hughes Hepworth, in "The Whip, Howe and Sword: Or the Gulf Department in '63, which seems to describe the Jacob rifle very accurately:

The rebels, too, were good shots. There was one man who was a source of great annoyance to us, and many a good fellow will testify to his existence by showing a very peculiar and ugly wound in leg or arm. He used a double-barreled shotgun, of English make, with a bore large enough to admit a ball weighing an ounce and a half... he disabled men standing more than ¾ mile off.<sup>6</sup>



Figure 12. William Davis Jacob bullet mold casting a .566 inch diameter bullet (.629 inches to the lugs).



Figure 13. Jacob explosive bullet with copper tubes of fulminate of mercury. To detonate on contact to explode caissons, as opposed to the timed fuse of a Gardiner bullet.

This is interesting in that it was described as “double-barreled”, was accurate at great distance and caused wounds different enough to be remarked upon, and the bullets were described as producing a “hum” (as described by Garry James when shooting his own Jacob lugged bullets).

Fred Ray reports an account of the chaplain of Berdan’s USSS’s, Lorenzo Barber, using a Jacob rifle with one barrel loaded with buckshot and the other with a solid projectile<sup>7</sup>.

### Conclusion

This Jacob rifle was indeed a peculiar appearing firearm, with its “unbalanced” appearance having double 24-inch barrels and mounting a huge sword bayonet with its 30-inch blade, but was an extremely accurate gun at long range due to its conical long bullet with its four lugs to engage its deep rifling. The use of the exploding bullet, although infrequently used, adds to its unique nature. Its rare use in the American Civil War adds to the interest in this firearm.

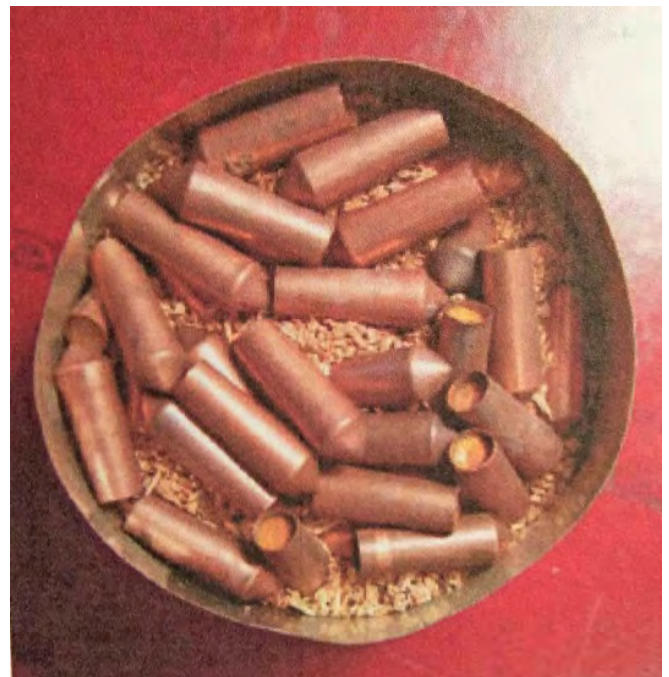


Figure 14. The explosive copper tubes were contained in tins suitably packed to protect them from shock.

## Endnotes

- 1 Blackmore, Howard L., *British Military Firearms, 1650-1850*, London: Herbert Jenkins, 1961, P. 203.
- 2 *The Crack Shot or Young Rifleman's Complete Guide*, 1875, p. 187-188.
- 3 Lewis, Berkeley L., *Small Arms and Ammunition in the United States Service, 1776-1865*, 1956, plate 296.
- 4 Personal communication with Bill Adams, Scotland, CT.
- 5 Captain Farley, Stuart's Cavalry, John Esten Cooke's "Outlines from the Outpost".
- 6 Hepworth, George Hughes, *The Whip, Hoe and Sword, or The Gulf Department in '63*. 1864.
- 7 Ray, Fred L., *Shock Troops of the Confederacy: The Sharpshooter Battalions of the Army of Northern Virginia*. CFS Press, Ashville, NC, 2006.

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