Authentic Civil War Paper Cartridges for Reenactors

www.cartridgetubes.com *Brett Gibbons – (Second revision, July, 2009)*

Introduction to Authentic Cartridges for Reenactors. Like most reenactors, I strive to create the most authentic impression that time, research, and money allow. After several years of Civil War reenacting in a couple different units, each progressively more "authentic" than the previous one, I've noticed that reenactors (both "mainstreamer and hard-core") spend a lot of time, money, and energy making certain parts of their impressions painstakingly accurate. The most obvious examples that comes to mind are "de-farbed" muskets and bayonets, leather gear with accurate manufacturer's stamps, period buttons, etc. While I enthusiastically approve of using the most authentic weapons and equipment possible and commend those who take the effort to rise above the sutler row "Paki Depot" garbage, I have observed that so many "authentic" reenactors bring cartridges onto the field that are, in a word, farby. Many reenactors I know have spent good money having "Made in Italy" burnished off their musket barrels (a detail only noticeable with a close examination) but use bright white blank tube cartridges ("paper ladies") rolled from computer printer paper (or, worse, the Sunday comics. "Give 'em Garfield, boys!").

Perhaps the most garishly bad demonstration of un-authentic cartridges was at one living history event, where a reenactor, complete in hand-stitched jeanwool and with a beautiful de-farbed Enfield rifle plucked out a squat little white blank cartridge from his authentically-stamped leather cartridge box, held it aloft before the crowd, and proceeded to explain that "If this was an actual cartridge, there would be a bullet here and it'd be tied off here".

If you're a reenactor yourself, I am sure similar instances come to your mind. Fortunately, a small (but growing) number of reenactors have, even at fairly mainstream events, begun improving their ammunition. Unfortunately, while these cartridges usually look *better* than the white printer-paper blank tubes others use, only a few can truly be called authentic. To cut right to the chase, a brown paper tube choked and tied at one end with a couple cotton balls jammed into the nose and then filled with powder is *not* an authentic cartridge. Granted, it's a far sight better than what most mainstreamer reenactors are using, but that's not really saying much. The reenactor who is dedicated enough to research authentic accoutrements, buy hand-made kepis with painted oilcloth visors, and de-farb his musket owes it to himself and his otherwise accurate impression to use ammunition of similarly high standards of authenticity.

For the Civil War infantryman, small arms ammunition were among the tools of his trade, absolutely essential to his job as a soldier. It is for no small reason that the United States and British governments in the 1850s and 1860s meticulously studied bullet and cartridge types to develop rifle-musket ammunition. There is a misconception that these cartridges were *simple*, because they were intended for use in what we now consider to be primitive firearms. On the contrary, small arms ammunition in the Civil War was made (when circumstances allowed) to exacting specifications, and the Enfield cartridge in particular was deliberately complex. This ammunition had to be made with precision, within tolerances of a hundredth of an inch, but with paper, string, lead, and black powder. Ultimately, these cartridges represented the culmination of four hundred years' development of the muzzle-loading firearm, and both the cartridges themselves and the firearms that used them went from ultra-modern to hopelessly obsolete within the span of two decades. Tying off the nose of a paper tube, stuffing it with cotton balls, and calling this crude replication an "authentic cartridge" is not simply unauthentic, but a telling statement on just how ignorant we 21st Century reenacting moderns are of the complexity of Civil War era rifle-musket ammunition.

Enfield paper cartridges

The P1853 Enfield rifle-musket cartridge is entirely cylindrical and is distinguished from most other cartridge types by the bullet end having been lubricated on the paper exterior. This facilitated the loading of the bullet while still wrapped in the lubricated paper, and meant that the bullet itself had to be undersized more so than usual to fit the bore of the musket.

All Enfield cartridges made by hand used three or four pieces of paper. Not all were made by hand; beginning in 1858 the British began manufacturing a limited number of Enfield cartridges using a machine to form the paper cylinders (called "bags") directly from paper pulp with a vacuum mold. This technique had limited success, and period sources remark with frustration that the promising new technology was still not functioning like they had hoped as late as the mid-1860s. Most British cartridges, and all Enfield cartridges made in the Americas, were accordingly made by hand.

Officially, "by the book", P/53 pattern cartridges were to be made from two trapezoidal envelopes of "White Fine" paper and a rectangular powder case of stiffer "Cartridge Paper". The White Fine paper, often abbreviated as "WF" paper, was strong and thin and has been compared by period sources to the fine newsprint used by the larger and more successful periodicals of the day. Cartridge Paper was heavier and stiff, of approximately the same consistency as construction paper, and it gave the cartridge strength and form, preserving the cartridge shape and also protecting the gunpowder. British regulations demanded consistent quality in the paper used for

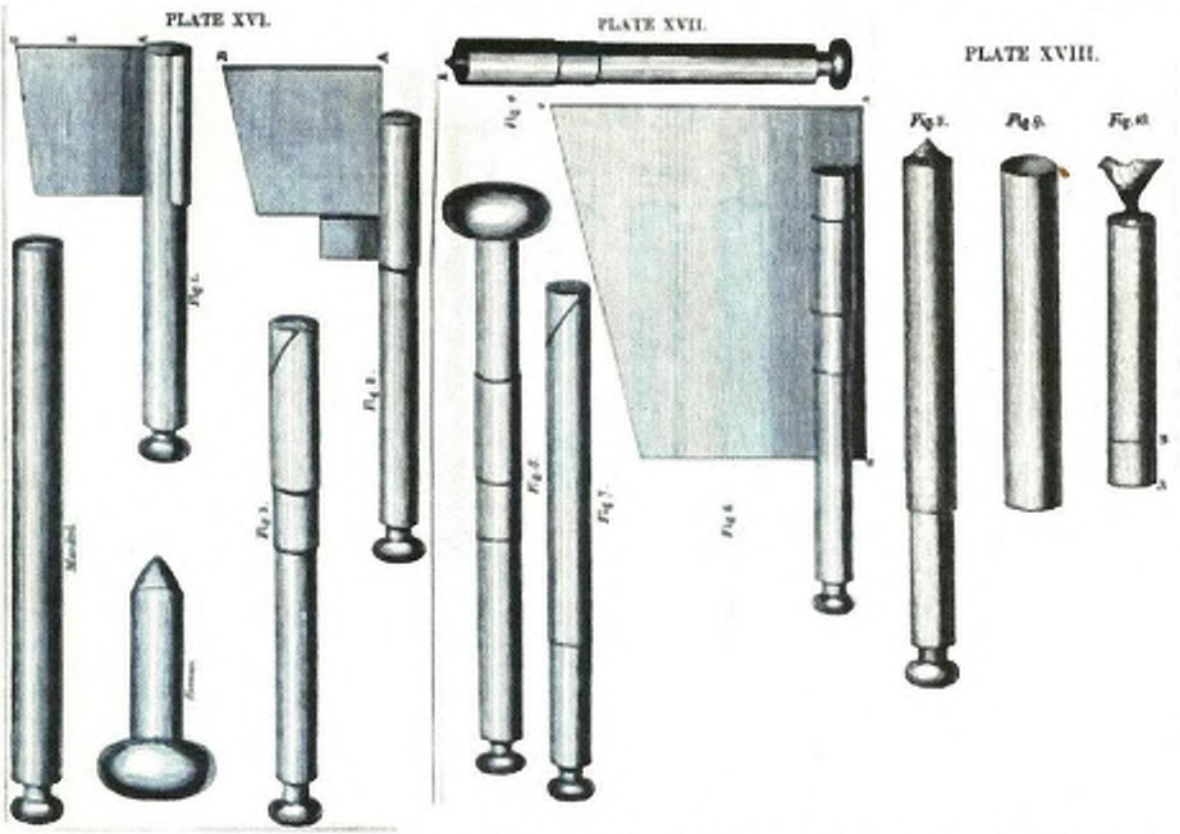

Fig. 1. *Step by step instructions for fashioning P/53 Enfield cartridges from the 1855 edition of "A Companion to the New Rifle Musket". Note the small inner envelope and the large outer wrapper.*

making cartridges, as paper that was too thick would make for difficult loading, while paper too thin or too weak would leave too much windage and result in a flimsy cartridge. Of course, the British had the advantage of being at peace, and there was no imminent demand for millions of cartridges to feed the raging war. As a result, British-made Enfield ammunition was of exceptional quality. Much of the British ammunition smuggled through the blockade was in its original pristine condition, but unfortunately for the Confederates a great deal of ammunition came spoiled, exposed to moisture, or falling apart. Because the British government demanded such high standards, inferior ammunition that was rejected for whatever reason by the British Army found a ready buyer in the Confederacy.

When first adopted as the official service cartridge for the new P/53 Enfield rifle, the round was fashioned by rolling up the stiff Cartridge Paper around a forming dowel along with the inner envelope (alternatively called the "little trapezium"), with the excessive length of the inner envelope being used to seal shut the short, stuff tube that formed the "powder case". This stiff internal tube gave the shape and strength to the entire cartridge. Figure 1 is from the 1855 edition of *A Companion to the New Rifle Musket,* a popular work that praised the P/53 as "one of the most perfect weapons" that scientific technology had ever produced. Note the extremely small size of the inner envelope, which did not project beyond the open end of the stiff Cartridge Paper of the powder case. The forming dowel upon which the powder case was made was concave at the end, corresponding exactly to the point of the .568-caliber Pritchett ball used, and a second tool was used to press the powder case so that it was formed to the same shape of this cavity. The nose of the Pritchett ball fit snugly into the precisely-formed bottom of the powder case, and the bullet and the case were rolled up together tightly inside the outer, or larger, envelope. At the bullet end the large envelope was choked and tied off with string, and after the cartridge was filled with powder, the excess amount of the large envelope that extended beyond the edge of the powder case was "twisted off". The twisted tail was pressed gently down into the powder case until firm atop the powder inside. Finally, the bullet end of the cartridge was dipped into a mixture of beeswax and tallow (usually 5 or 6 parts wax per 1 part tallow) up to the point where the bullet shoulder met the bottom of the powder case (about 3/4ths of an inch). This ensured that, when loaded, there was lubrication at all areas where the paper-wrapped bullet touched the rifle barrel.

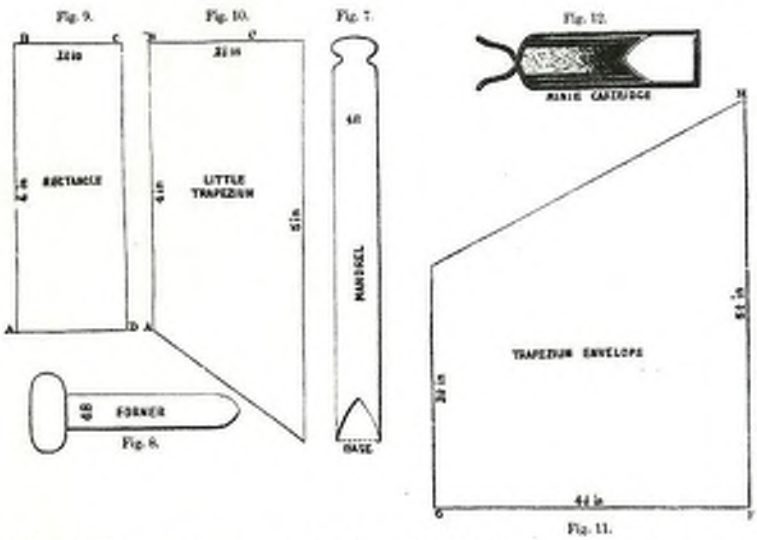

Fig. 2. *Early pattern cartridge from the 1855 "Instruction of Musketry"*

At every stage of manufacture the British-made Enfield cartridge was measured and inspected. The Pritchett bullets were run through strict sizing gauges. Likewise the completed cartridges were passed through sizing gauges and weighed. If a cartridge did not fit within the closely prescribed tolerances, the *entire lot* was rejected. To prevent paper from clinging to the bullet when it was fired (this ruined any accuracy), three slits were cut into the outer envelope where it wrapped around the bullet to guarantee separation. I have personally seen many British-made Pritchett bullets with one, two, or three vertical slices from the base to the bullet "shoulder", very strongly suggesting that the

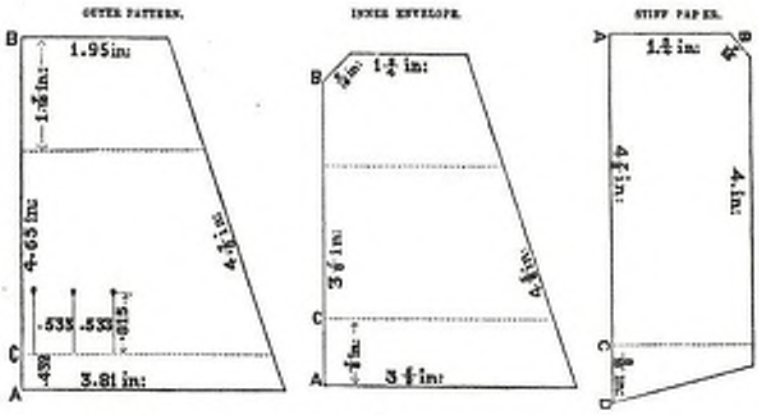

Fig. 3. *Late pattern P/53 Enfield cartridge showing larger inner envelope and smaller outer envelope. From "Hand-Book for Hythe", 1860.*

slits in the outer envelope paper were at least occasionally done after the cartridge was assembled.

Nearly identical methods are prescribed by the 1855 *Instruction of Musketry* textbook that was the official standard of the British military (Figure 2). This was the service cartridge that British soldiers brought into action in the Crimea, where rigorous duty on the battlefield tested the design and concept of the Enfield cartridge under conditions that could never be recreated at the proving-grounds at Hythe. Wartime service revealed several serious deficiencies with the cartridge, the most profound being the size of the bullet itself. At .568-caliber the Pritchett ball, when enveloped in several folds of the outer envelope of the cartridges, fit rather tight in the rifle bore. After a couple shots, the fouling made loading increasingly difficult. The cartridge design was also troublesome, because the paper could became loose and often the entire outer envelope began to unravel around the powder case and the bullet, especially after being roughly transported thousands of miles and *then* issued to soldiers in wartime conditions.

The Enfield round faced another challenge in India during the Sepoy Rebellion of 1857, which was caused by the very cartridge itself. When native sepoys were to be issued the new Enfield rifles to replace their old Brown Bess muskets, a rumor was instigated by certain individuals with rebellious agendas that the loading process for the new gun required the soldier to put a cartridge into his mouth that was coated either in pork or beef tallow (unclean to Muslims and Hindus respectively). Unfortunately for the sepoys who mutinied, they didn't wait long enough to receive the new Enfield rifles. They went into battle with their old smoothbores and fought against regular British troops armed with the P/53 Enfield, and they were duly cut down *en masse*.

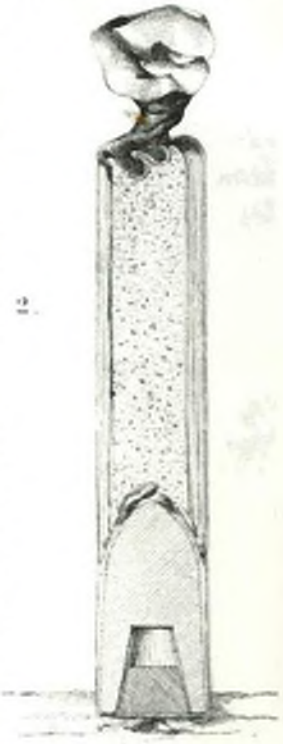

Fig. 4. *1859 P/53 Enfield cartridge, showing twist (note the thickness)*

Between 1857 and 1859 the Enfield cartridge was entirely redesigned as a result of the lessons learned in the Crimea and India. The .568-caliber ball was determined to be too large in the best of conditions, and service in India revealed (ironically) that the very tallow content in the lubrication that sparked the mutiny caused "the incrustation of a white deposit" on the bullet, increasing the diameter and making loading even more difficult. Captain Edward Boxer, who is better known as the inventor of the Boxer priming system used on almost every modern centerfire cartridge, raised considerable public controversy by advocating the reduction of the bullet size from .568 to .550-caliber, and the elimination of tallow from the lubrication mix. Editorials in British periodicals claimed the changes would make the Enfield rifle useless, and "tests" were done that supposedly proved the .55-caliber bullet was no more accurate than the old smoothbore. Boxer ultimately got his way, in spite of the controversy, and these changes were officially adopted on February 21, 1859.

1st. The bullet to be ·55 in diameter and 1·09 in. in length, instead of ·568 in. in diameter and 1·05 in length.

2nd. The lubricating mixture to be beeswax, instead of beeswax and tallow.

3rd. The outer envelope or paper which contains the bullet to be fastened to the inner envelope or bag which contains the powder by a strip of gummed paper, instead of the two being twisted together beyond the stiff cylinder of the powder bag, to facilitate tearing off the end of the cartridge.

Fig. 5. *Changes specified in 1859 for the Enfield cartridge.*

The new cartridge also featured a much larger inner envelope, which projected about an inch beyond the open end of the stiff Cartridge Paper. When the cartridge was filled, the excess length of the inner envelope *and* the outer envelope were twisted together, sealing the cartridge. This helped prevent the unraveling of the outer envelope (but not entirely) and formed a second layer of protection for the powder in the powder case. Figure 3 is an example of such a cartridge. Although officially adopted, with manuals and handbooks being updated, this pattern did not last long. The double-thickness of the twisted folds made it harder to tear off, and this was considered to be a severe impediment. As usual, the solution was adding another complexity to an already elaborate and complex cartridge. The inner envelope remained the same larger size, projecting beyond the rim of the powder case, but the outer envelope was shortened so that the top rim was about a half inch shorter than the length of the powder case. To keep the powder case from separating from the outer envelope, it was glued to the outer wrapper with a gummed strip of paper, a half inch thick and two and a half inches long. This was to be the final improvement of the Enfield paper cartridge by the British. The addition of the gummed band was officially made in April of 1859.

Fig. 6. *A British-made Eley Brothers cartridge of the post-1859 variation. The gummed band has fallen off, showing the seam between inner and outer envelopes.*

Most of the imported Enfield cartridges used during the American Civil War would have been the post-1859 variant with the gummed paper band. Although the Union never manufactured their own Enfield-style cartridges, many of those made by the Confederates also were of the late pattern using a gummed band. There are many exceptions, however, as numerous surviving Confederate-made Enfield cartridges are of the old pattern with large outer envelope and no band.

Because the Enfield bullet was always smaller than the .58 bore of the American rifle-musket models, an Enfield cartridge with either a .55 or .568 was something of a "universal" round. In February of 1864 the Confederate government made the Enfield-type cartridge the standard, and specified that all ammunition would henceforth be made in the Enfield pattern.[1] Prior to this standardization, the Confederates were manufacturing several different types of ammunition, causing no end of problems on the field. One report from the chief of ordnance from Cleburne's Division of the Army of Tennessee in October, 1863 complained of arms fouling rapidly in combat and being discarded. One of the possible remedies suggested was investigating "whether the English system of having balls sufficiently small to be used with thick paper around them be not better than our plan of using the ball without paper".[2] Another report from the ordnance chief from Breckenridge's Division of the same army, also in October 1863, also complained of fouling arms,

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[1] The order for Confederate cartridges to be made in the English pattern, and instructions issued in a circular to Confederate troops to ensure proper loading for the Enfield round, can be seen here: http://www.researchpress.co.uk/firearms/british/enfield/cartridge09.htm

[2] *Official Records, The War of the Rebellion*, Series I, Volume XXX, Part II

but remarked that, "In all cases where I had issued the English cartridge (some of which I have got on hand) no such consequences were reported to me, nor have I heard of a single instance during my experience as ordnance officer, nearly eighteen months."[3] When Grant's cavalry raided the vicinity of Corinth, Mississippi in May of 1862, they destroyed "600,000 rounds of fixed ammunition, each cartridge having the crown of England stamped upon it."[4] These accounts are mentioned here because they document the growing preference of the Confederates for the "English system" cartridge, as well as the prevalence of the Enfield cartridge in Confederate service both east and west.

The Confederate reenactor might authentically use Enfield cartridges of either British or Confederate manufacture for the Enfield rifle as well as 1855, 1861, or 1863 U.S. rifles or the C.S. Richmond or any other rifle or carbine of similar caliber. Depending on your impression, the later in the war you get the more likely the Confederate soldier would be issued Enfield cartridges regardless of what type of rifle he is carrying. Federal soldiers remarked that they found "English cartridges with box-wood culots [plugs]" on Confederate dead at Sharpsburg (September, 1862), giving good evidence for using British-manufactured ammunition by the Southern AoNV reenactor relatively early in the war. Confederate-made Enfield bullets did not have the wooden plug in the base that facilitated the expansion of the ball in the British version.[5]

British-made Enfield cartridges were certainly used, and their use is documented, but they were three inches long and therefore would not fit in the bottom sections of the American cartridge box tins. Hundreds of thousands of British cartridges were "broken apart" at Confederate arsenals, with the powder and bullets recycled into new paper cartridges of a shorter length. The Augusta Arsenal continued re-rolling the long Enfield cartridges to shorter lengths until surprisingly late in the war, a testament to the remarkable efforts of the Confederate munitions producers.[6]

> **The rebels used English bullets almost entirely. I picked up a rebel cartridge, and on examining the cartridges found the makers' stamp on them; it was "E. & A. Ludlow, Birmingham, England." The balls are very pretty, being similar to the Minie ball, except at the base they are hollow for half an inch, in which is placed a wooden plug, so that at the explosion the wooden plug being driven into the ball, expands it, and prevents windage.**

The account above is a remarkably accurate description of British-made Enfield ammunition that was found on the battlefield at Murfreesboro (31 December 1862 - 2 January, 1863).[7] I have reproduced it here because it not only identifies positively the use of Enfield ammunition at that battle and theater, but specifically unaltered English-made cartridges. Most ordnance records did

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[3] Ibid.

[4] *The Military and Naval History of the Rebellion*, W. J. Tenney, 1865

[5] *History of the First-Tenth-Twenty Ninth Maine Regiment*, Maj. J. M. Gould, 1871

[6] *Never for Want of Powder*, C. L. Bragg, 2007. This is an excellent work about the Confederate powder works at Augusta, Georgia and the incredible production of artillery and small arms ammunition there.

[7] Image of page 236 from *Memorial of the patriotism of Schuylkill County in the American slaveholder rebellion*, compiled by Francis B. Wallace, 1865.

Fig. 7. *British-made cartridge by E. & A. Ludlow, of the type mentioned above.*

not specify between Enfield ammunition from England or manufactured by the Confederates, which makes it difficult to determine if these were made in England, or made by the Confederates, or refurbished British ammunition. This detailed mention, however, proves that unaltered British-made cartridges, of the post-1859 variety with the gummed band uniting the outer envelope with the inner powder cylinder, were in widespread use by Confederate soldiers, in the west. It cannot be arsenal-refurbished ammunition because the gummed strip holding the cartridge together is the part that bears the "E. & A. Ludlow" inscription, and this would surely have been discarded, along with the rest of the paper, if the round was ever broken apart at the arsenal.

Having made and documented the case for using authentic Enfield ammunition, I hope Confederate reenactors will acknowledge the "reenactorism" of using only Minie-style cartridges and start adopting the Enfield round regardless of what rifle-musket is used. This is an issue I consider at the very end of this article.

For Union reenactors with Enfield rifles, the Federal regulations were insistent that the bullet be removed from the cartridge paper before being loaded. This meant that Federal troops rarely if ever used the Enfield cartridge as intended, and would have rarely even used Enfield-type cartridges at all. It would be questionably authentic for a Federal reenactor to be using Enfield cartridges; a better choice is to use the ordinary .58-caliber rifle cartridge intended for the M1855 and M1861 Springfield rifle, even if you are using an Enfield. Because of the large numbers of intercepted or captured Enfields entering Federal service, the U.S. Ordnance Department produced a common cartridge with a .575-inch bullet that was serviceable in the Enfield as well as .58-caliber rifles. Having said that, Enfield ammunition *was* used on documented occasions by Federal troops when their own ammunition had been exhausted and the only available source was the cartridge boxes of fallen Confederates. When Federal troops expended all their ammunition at Shiloh, in April of 1862, the ground was "covered thickly" by Confederate dead and wounded. It was remarked that the Rebels were "armed with the Enfield rifle, their ammunition being of English make and of excellent quality, it could be used in our muskets."[8]

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[8] *Official Records, The War of the Rebellion*, Series I, Volume X, Part I, page 145

U.S. .58-caliber paper cartridges

The M1855 rifle-musket is perhaps most remarkable for employing a tape primer system, but the three-piece paper cartridge was also new for an American military rifle. Previous rifles like the M1841 Mississippi rifle used an unusual cartridge with a linen-wrapped bullet, while the M1842 smoothbore cartridge was a choked and tied single paper tube formed from one piece of paper. Influenced no doubt by the new P/53 Enfield cartridge and other complex cartridges being introduced in Europe, the new round adopted in 1855 for the American rifle-musket was formed from three separate pieces of paper. Much like the Enfield cartridge it included a large outer envelope and a smaller internal powder cylinder, but the cylinder was tied off at the bullet end. The tail was folded over the body of the cartridge to seal in the powder, and not twisted off like the Enfield round.

When the M1855 rifle was first adopted this new cartridge was developed unlike any used before in the United States. In 1854 a report was submitted to the Ordnance Department on experiments conducted at U.S. arsenals which tested various methods of loading and firing a rifled bullet from a muzzleloading rifle-musket. These reports were published by the Ordnance Department in 1856. Colonel Ben Huger, who would go on to command a division in the Army of Northern Virginia, determined after much experimentation that the optimal cartridge for a rifle-musket should be bitten, the powder poured, and then a naked Minie ball be removed from the paper and rammed home. Several pages of data tables from firing at various ranges with various types of rifle cartridges were included, and there was little good to say about the Enfield variant. Ultimately the Harpers Ferry experiments concluded that a naked Minie ball, without a patch of any kind, in a reduced caliber (.58 instead of .69) produced the most consistent accuracy and ease of loading. Jefferson Davis, the Secretary of War, approved the new rifle specifications in July, 1855.

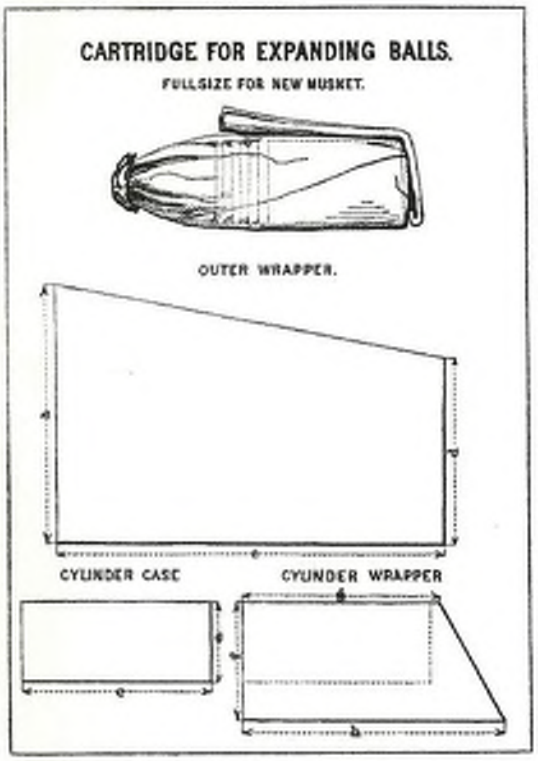


Fig. 8. *From an official U.S. Ordnance Department report, 1856.*

The Enfield-type cartridge was rejected on two chief points: first, the "reversed" position of the ball in the cartridge, and second, the necessity of a paper patch. The reports complain of patched Pritchett-type bullets fitting very tight in the bore and being useless after two or three rounds had fouled the barrel. (One has to wonder if the tests were being done with Pritchett bullets of the proper size, and with the cartridges adequately lubricated and passed through a sizing gauge.) The reversed bullet and paper around the bullet were described as "important defects", which the newly adopted M1855 rifle cartridge obviated.

Yet the new cartridge borrowed the exact three pieces of paper used in the Enfield cartridge construction, although the reports strongly assert that this was a vast improvement over the British rifle-musket cartridge. From 1855 to 1861 the official American service cartridge was formed in this way. The heavy rectangle for the "Cylinder Case" made from stiff "rocket paper" was rolled up around the forming dowel, the excess length of the "Cylinder wrapper" being folded over and pasted shut, to ensure no powder would leak. The paste was allowed to dry, then the "Outer wrapper" was rolled "snugly" around the powder case, a .58 Minie ball was inserted into the open end

and, while still on the forming dowel, choked and tied off with "two half hitches" of heavy thread. Next the powder was poured into the powder case, then the tail was pinched and folded in the "usual way".

For the small peacetime U.S. military this cartridge served well. Complicated and tedious to make, particularly on account of having to paste the powder case end closed, it wasn't well suited for wartime mass production. Southern states began seceding in late 1860 and Fort Sumter was bombarded in April of 1861. The War was expected by both sides to be over quickly but after First Manassas in July it was clear that this thing might last longer than expected. The U.S. Ordnance Department shifted to a wartime footing and, in the September 1861 edition of the Ordnance Manual, established a new and easier method for making musket cartridges. A rapidly-expanding Army needed tens of millions of cartridges and new M1861 Springfields were being issued as quickly as the arsenals could manufacture them (and contract builders could deliver them). Multiple pieces of paper of different dimensions and paper types being delicately pasted together would not do.

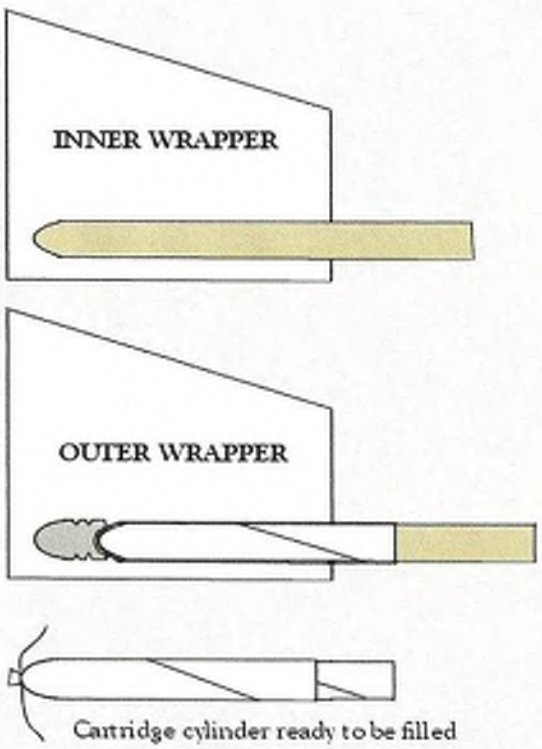


Fig. 9. *The new simplified method of making cartridges as described by the 1861 U.S. Ordnance Manual. Drawing by the author.*

The new method in 1861 eschewed the "rocket paper" and used just one kind of paper, the exact properties of which weren't essential. Two papers were used, the inner wrapper and outer wrapper, both of identical dimensions cut *en masse* from reams. The boys and (later) women employed to form the cartridges would take a trapezoidal piece of paper, roll it up around the forming dowel, and choke and tie it off with two half-hitches to form the inner cylinder. A lubricated .58 Minie ball went over the tied-off nose of the inner cylinder and the whole thing was rolled up in the outer wrapper, which formed the outer cylinder. It too was choked and tied and the forming dowel was removed; the cartridge was now ready to be filled with powder, folded, and packaged. Compared to the 1855 cartridge, this was the acme of simplicity. The Ordnance Manual specified that one boy could make 800 cartridges in a 12-hour workday.

Although faster and easier to make, the new cartridge was not as strong as the elaborate 1855 type and was more difficult to quickly load. With the old 1855 cartridge the soldier, after he had bitten and poured the powder, would lightly strike the cartridge body over the muzzle of his rifle to help break away the bullet from the stiff powder case cylinder. Once separated, the bullet was inserted

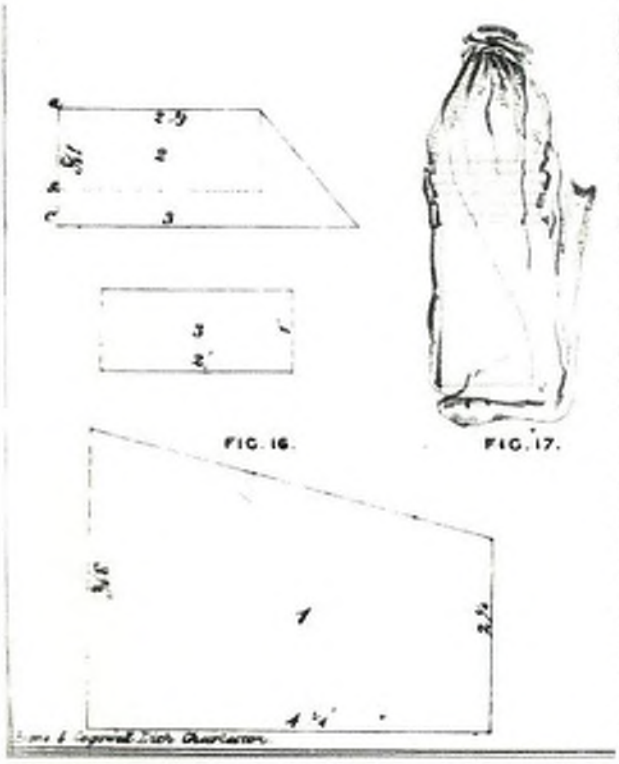


Fig. 10. *From Gilham's 1862 "Manual of Instruction"*

into the muzzle and rammed home.[9] The post-1861 simplified cartridge was loaded in the same way but separating the bullet from the paper was harder to do and usually required some help from both hands. It was also more susceptible to becoming "lumpy" or misshapen, because it lacked the stiff powder case that helped preserve the cartridge's integrity.

The clear majority of the cartridges produced officially in U.S. arsenals throughout the War were made in this newer, simplified fashion. That being said, manuals and period authorities long after 1861 continued to describe the 1855 method, especially those on the Confederate side. An ordnance text book for the U.S. Naval Academy from 1862 taught future naval officers that rifle cartridges ought to be made in the old method, right down to pasting shut the powder cylinder. In 1864 the Inspector General of the U.S. Army, Col. Henry Lee Scott, published his comprehensive *Military Dictionary* that described the making of cartridges. The instructions for making cartridges in his *Dictionary* might well have been copied word for word from 1855, as it retained the three papers, stiff powder cylinder, and pasting shut of the powder case.

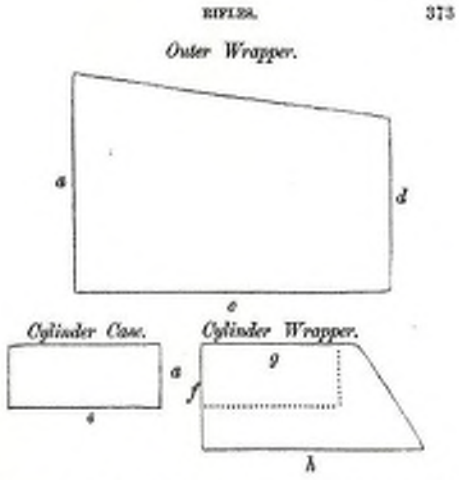


Fig. 11. *Old 1855 method described in 1862 U.S. Navy textbook*

On the Confederate side there are fewer relevant sources. Most reenactors are familiar with Gilham's drill manual, which ventured beyond drill to describe, among other things, the manufacture of rifle ammunition. In the 1861 (U.S.) and 1862 (Confederate) manual editions Major Gilham keeps the old 1855 method for making cartridges, complete with pasted-shut powder cases. This was, after all, the pattern of cartridge that Jefferson Davis himself had approved while he was Secretary of War. Physical evidence exists in the form of surviving cartridges that Confederate arsenals clung to the older, more complicated method of manufacturing .58-caliber rounds throughout much of the war, if not the entire duration.

As Union soldiers were issued only .58-caliber

[9] This method of loading was first recommended by the U.S. Ordnance Department along with the Model 1855 rifle-musket, and was approved by then-Secretary of War Jefferson Davis.

Minie ammunition, even those armed with Enfield rifles, this is the *only* ammunition type that the Federal reenactor with a .58 or .577 rifle can safely use. The only exceptions – and these were scarce – occurred when Federal infantry scavenged from Confederate cartridge boxes after exhausting their own cartridges. One documented instance of this is provided in the discussion of Enfield ammunition above.

Having said that, which pattern of cartridge is most appropriate, the older 1855 round with three pieces and the pasted-shut powder case, or the simplified post-1861 round with two choked cylinders? By appearance, the two kinds were not much different, although the 1861 pattern is easily identified because of the long inner cylinder projecting beyond the outer wrapper in the folded tail. The 1861 pattern also appeared more "lumpy", because it lacked the stiff powder case to give form to the cartridge. Of course, ordnance records did not specify what pattern cartridges were when they were issued, calling both ".58 Minie". Surviving cartridges of both variations exist, but are almost impossible to date accurately.

Either one would be acceptable, but the later into the war you get the more common the official post-1861 Federal arsenal cartridge would become. Even though the government standards called for the simplified cartridge, surviving packages from the St. Louis Arsenal reveal that they continued making ammunition in the 1855 pattern until at least mid-war. Other Federal arsenal ammunition was also from the 1855 pattern, and a disproportionately large number of surviving rounds are the older style. It is authentically *safe* to use the 1855 pattern up to an 1862 impression, and the 1861 pattern thereafter. Unless your impression includes ammunition supplied by the St. Louis Arsenal, stick to the 1861 pattern after 1862.

Fig. 12. *Confederate .58-cal cartridge, date unknown. Note the internal powder cylinder and the pasted end of the powder case.*

The Confederate reenactor has something of a tougher choice to make. Several major Confederate arsenals are known to have manufactured .58-caliber ammunition of the old 1855 pattern. One surviving cartridge believed to be from the Lynchburg Arsenal is clearly an 1855, with the powder case visible through a break in the cartridge wrapper. Other original Confederate .58's are also of the old pattern. Which to use? Early war impressions would be well served with either a Confederate 1855 pattern .58 cartridge, "captured" Federal 1855 or 1861 cartridges, or Confederate or British manufactured Enfield rounds. Mid to late war impressions should slowly move away from the .58 cartridge altogether and use more and more of the Enfield variants. After February 1864, when the Confederates switched entirely to Enfield cartridges for all .58, .557, and .54 caliber rifle-muskets, avoid the .58 style cartridges altogether. The use of captured Federal ammunition was less common than one would think, and Confederate arsenals kept producing large volumes of high quality ammunition up until the final days of the war.

Why Bother with Authentic Cartridges?

The average reenactor is probably going to use ordinary cartridge tubes closed on one end and folded over on the other for use on the reenactment battlefield. There is a misconception that using period ammunition in the field is too much work for the mainstream hobbyist. Yet even the average mainstreamer ought to be prepared to demonstrate what an actual paper cartridge looked like, and how it was used, for the public and especially in living history presentations. If nothing more, the average reenactor should *know* about how paper cartridges were historically made and where they were used.

A smaller but significant percentage of reenactors self-identify as authentics, who make it a point to improve, as much as possible, the Civil War soldier impression. These are the reenactors who take it to the fullest level and insist on only the most period accurate weapons, uniforms, and accoutrements. If you're a reenactor whose goal is authenticity, and you have carefully documented every stitch and button of your kit, a perfectly good impression can be spoiled by just one farby cartridge.

Perhaps the best argument for reenactors using authentic cartridges, at least for living history demonstrations and for showing off to the public, is that they are simple and easy to add to your impression. Forty realistic rounds of ammunition in your cartridge box brings you closer to the experience of those whom we seek to recreate.

Authentic ammunition is also simply practical. Make correctly, authentic cartridges are far less susceptible to absorbing moisture and won't fall apart unless put through a lot of abuse. They are also safer; a properly made cartridge, with a powder cylinder, is emptied of powder the moment it's tipped over the muzzle. The powder just slides out, as if from a brass measure. With a more traditional, narrower "reenactor tube" blank cartridge, it often takes some squeezing and rolling with the fingers to get the powder to leave the tube and go down the barrel. Among the reenactors I know, both authentics and mainstreamers, that have used authentically made ammunition cannot imagine using anything else.

Reenactor-Made "Authentic Cartridges"

At a recent event I gleaned the battlefield for spent cartridge papers whose makers had, at the very least, put some measure of effort into making ammunition that looks better than the common "paper lady" tubes. A few examples are shown below. With the exception of cartridge #5 (which I included because it is a perfect illustration of the patently ridiculous and dangerous powder-leaking monstrosities that some reenactors are carrying onto the field), all of them have been tied off at the bullet end and all of them are simply single tubes stuffed with tissue or cotton wadding to simulate the bullet. None of them included a powder case. Some are almost passable... while others leave me grieving.

"Authentic" Reenactor-made blank cartridges.

1. Cotton-ball stuffed, and "tied off" with about eight (or more) loops, like a spool.

2. Kraft paper tied off with Nylon kite string.

3. A .69-caliber with cotton balls, not bad, but missing powder case.

4. An attempt at an Enfield cartridge? Choked flat on the "bullet" end, but with no powder case.

5. Don't ask. I've no idea how this thing even held powder. Pencil-thin.

6 & 7. My favorites. Why even bother tying off your cartridges if they end up looking like this?

8. One of the better ones, but still just a single tube with cotton balls stuffed in one end.

9. Not bad for just a single tube stuffed with tissue paper.

10. You can unwind the thread on the nose of this cartridge and fly a kite with it.

"Far be it from me" to criticize, but simply tying off one end of the cartridge tube and stuffing cotton into it does not an authentic cartridge make! Yes, making authentic cartridges takes longer, but have we de-farbed our muskets and bought hand-stitched vegetable-dyed uniforms only to fall critically short of these high standards of authenticity with our ammunition? Do we tolerate farby cartridges simply because they are consumables? The authentic cartridge sets the authentic reenactor apart from the Saturday and Sunday mainstream powder-burner. Perhaps most pragmatically, making a really good-looking cartridge using the authentic pattern and construction doesn't take *much* longer than what it does to make a *lousy* looking halfway authentic cartridge like those pictured above.

Whether you only spend the time to make a few authentic cartridges for demonstration purposes and living history, or go hard-core and only use authentic ammunition with your impression, the hobby will be the better for it.

MAKING CARTRIDGES

By Patrick Reardon

After receiving some kind compliments at Avoncroft on the quality of my cartridges I was persuaded by KC to write some notes about the techniques I use.

Firstly let me make one point very clear. Whilst I have studied the War with obsessional interest for most of my life, I am the freshest of fresh fish when it comes to living history. Avoncroft this May was my first ever event. It had taken several years of being a reenactment 'groupie' before I plucked up courage and put aside my feelings of extreme self consciousness. However having taken the decision to enlist I was determined to make every effort to achieve as accurate and authentic an impression as my enthusiasm and the guidance of experienced friends could create.

In the matter of infantry arms and accoutrements I am fortunate in having a reasonably extensive collection of original pieces against which I can judge the fidelity of currently available reproductions. I am striving to ensure that the muskets I use are as close in appearance to the originals as it is possible to get. This can be a frustrating (and expensive!) business as, when one compares an original to a reproduction, the inaccuracies in the latter are all too apparent. However that is not the subject of this note, except to say that accuracy in the appearance of arms and indeed all kit, should be matched by the accurate appearance of a cartridge.

In the context of my aspiration for accuracy, before attempting to make my first cartridges I set about reading and re-reading anything I could find on the subject. Without a doubt the two best sources I discovered are the following:

> **"ROUND BALL TO RIMFIRE, A HISTORY OF CIVIL WAR SMALL ARMS AMMUNITION"** PART 1 DEAN S THOMAS PUBLISHED BY: THOMAS PUBLICATIONS, P.O. BOX 3031, GETTYSBURG, PA. 17325
>
> **"THE COLUMBIA RIFLES RESEARCH COMPENDIUM"** 1ST EDITION APRIL 2001 $25.00. PUBLISHED BY THE COLUMBIA RIFLES. AVAILABLE FROM ANDY METHENY, PRODUCTION EDITOR, 367 BURROUGH ROAD, B0XBOROUGH, MASS 01719 (978) 263 1753. Email: aimentheny@aol.com

For those who have an interest in Civil War arms and their use, 'FROM ROUND BALL TO RIMFIRE (reference below as FRBTR) is essential reading. The amount of information the author has collected is astounding and I unhesitatingly recommend it. It is difficult, if not impossible, to acquire original live rounds in the UK and therefore the photographs and drawings in this book are an invaluable guide to those wishing to make or improve their ammunition.

'THE COLUMBIA RIFLES RESEARCH COMPENDIUM' (referred to below as CRRC) is an extraordinary collection of articles on all aspects of the life and equipment of a Federal soldier. I cannot praise too highly the dedication of those responsible for this volume. The article in CRRC of relevance to these notes is "Cartridges for the .58 Springfield Riflle Musket" by Jeff Henion.

Before getting into the substance of this note I should state that what I do is to attempt to simulate, as simply as I can, the external appearance of the original cartridge I am copying. Most of my technique follows original methods of manufacture, but I do vary these slightly as you will see.

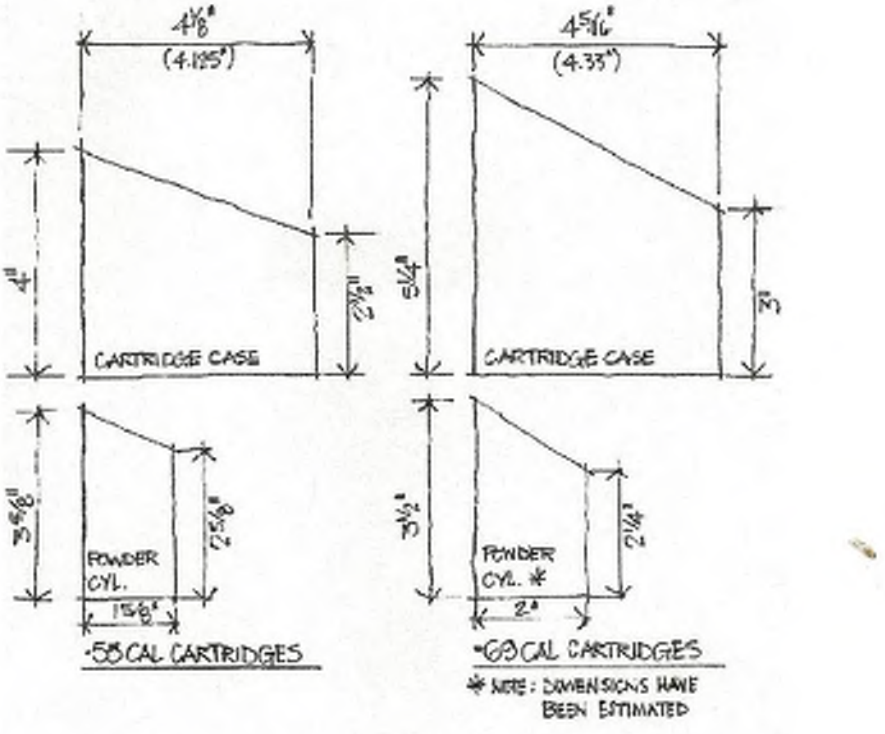
MATERIALS & TOOLS

I list below the various elements which are required.

1) **Wooden dowels around which to wrap the cartridge case, powder cylinder and percussion cap tube:** Three dowels are required if you use both a .69 cal. and a .58 cal. musket. One needs a wood dowel approx. 8" long turned to a diameter of .57"' for a .58 cal cartridge and a similar length turned to .65" dia. for a .69 cal. For the latter a piece of

5/8" dowel (.625") would suffice. Each of the dowels should have one end perfectly flat. The nose of the .58 type should be formed into the cone shape of the minie ball nose. The nose of the.69 example should be turned into a hemisphere to represent half of the round ball. The dowel, of similar length, for the percussion cap tube is simply a section of readily available 1/2" timber dowel, flat at both ends.

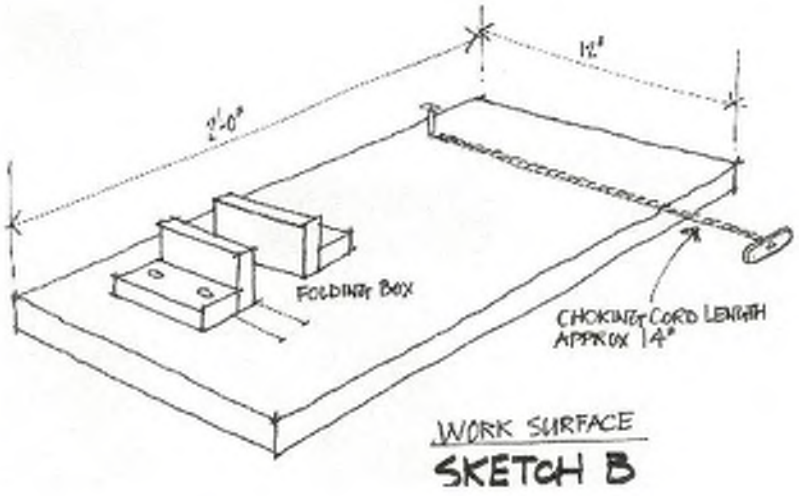
2) **Templates to aid in cutting the trapezoidal paper shapes required:** The diagrams below illustrate the range of trapezoids required for both types of cartridge. I've found the best material for these is white rigid polystyrene sheet, lmm thick. This is available from model shops particularly those specializing in model railways. Draw the shapes on the plastic, score the fines thus drawn with a craft knife and break on the score lines. With this material it is not necessary to cut completely through the thickness.



CARTRIDGE TRAPEZOIDS
SKETCH A

3) **Paper:** The best paper I've found to date is available from the Paperchase chain of shops. They have a reasonably wide geographic spread of branches. Call 020 7467 6200 (head office) for details. The paper I use is called "Recycled Paper" and is available in four colours, Plain Kraft (light brown), White Brushwork, Grey Brushwork and Buff. Each sheet measures approx. 25" x 20" and costs 25p. I prefer Plain Kraft as it is a lighter weight than the other three (90gsm vs. 100gsm). Therefore it is slightly easier to fold. The three colours of heavier paper I now tend to use as cartridge packet wrappers with the colours differentiating the calibre of cartridges contained within. For the powder cylinder paper I use the thinnest brown wrapping paper I can find.

4) **Work Surface:** I do not have access to a smooth, flat worktable hence I use a work surface placed on the kitchen table. A sketch of mine is show below. It's just a sheet of 18mm MDF with the choking cord and folding box fixed to the surface. The choking cord is two lengths of linen thread twisted together secured at one end to a nail or screw and with a toggle at the other. I use a piece of old toothbrush handle for this. I show a sketch of the folding box later.



5) **Twine and String:** I have experimented with many types of twine. Currently I favour a linen thread, in dark brown or natural, or 3-ply crochet cotton. This comes in a pale cream colour which suffices for natural thread. Both are readily available from haberdashers. For tying the cartridge packages I use a natural hemp twine or string. The photographs in FRBTR are invaluable for gauging appropriate thicknesses.

6) **Tools:** Cutting mat, craft knife with a supply of sharp blades, a long steel straight edge, a pencil, scissors, toilet tissue for wadding to form the 'balls' and tweezers (! to be explained below!)

7) **Powder Measure:** I use a large powder flask with a series of inter-changeable chargers. My flask I believe it is called The "Zouave" model, is obtainable from Peter Dyson (see below). The chargers, from the same source, are 54 grains, 60 grains and 66 grains. These simply screw in to the top of the flask.

Peter Dyson & Son Ltd, 3 Cuckoo Lane, Honley, Holmfirth, Yorks HD9 6AS. Tel: 01484 661062 Fax: 01484 663709 Email: info@peterdyson.co.uk Web: www.peterdyson.co.uk

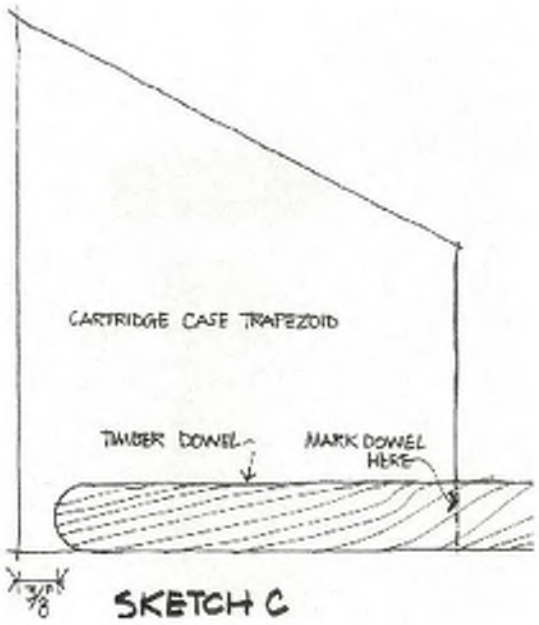
The particular type of cartridge I make is based on what has been called the St. Louis Arsenal method. I've found this method to be the simplest and I again urge you to read Henion's article in CRRC.

.69 cal Round Ball Cartridges

- Take a sheet of paper and draw a series of parallel lines 4 5/16" apart, i.e. equal to the base dimension of the cartridge tube template. Cut the paper into strips and then, by using the template, cut the trapezoidal forms. Several strips can be superimposed and cut in one operation.

- Similarly prepare the trapezoids for the powder cases.

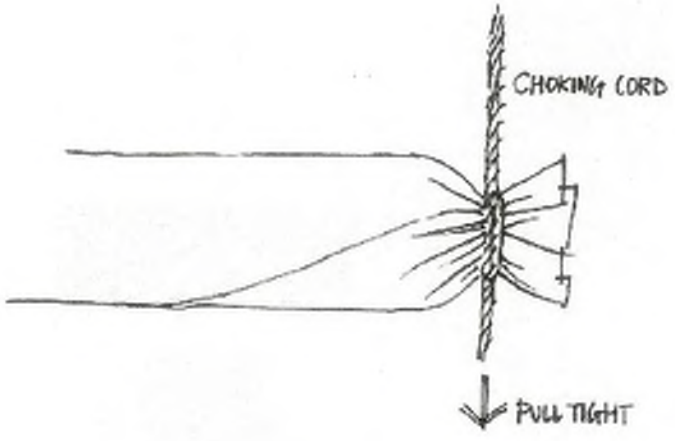
- Place the cartridge paper in front of you with its long side to the left (the sloping edge therefore falling to the right). Lay the dowel on the bottom of the paper (edge closest to you) and ensure that the dowel is parallel to this edge. Set the dowel, with its hemispherical nose to the left, in about 3/8" (10mm) from the lefthand edge of the paper. You may wish to make a mark on the dowel coincident with the righthand edge of the paper. This will ensure a consistent lateral position of the dowel on the paper.



SKETCH C

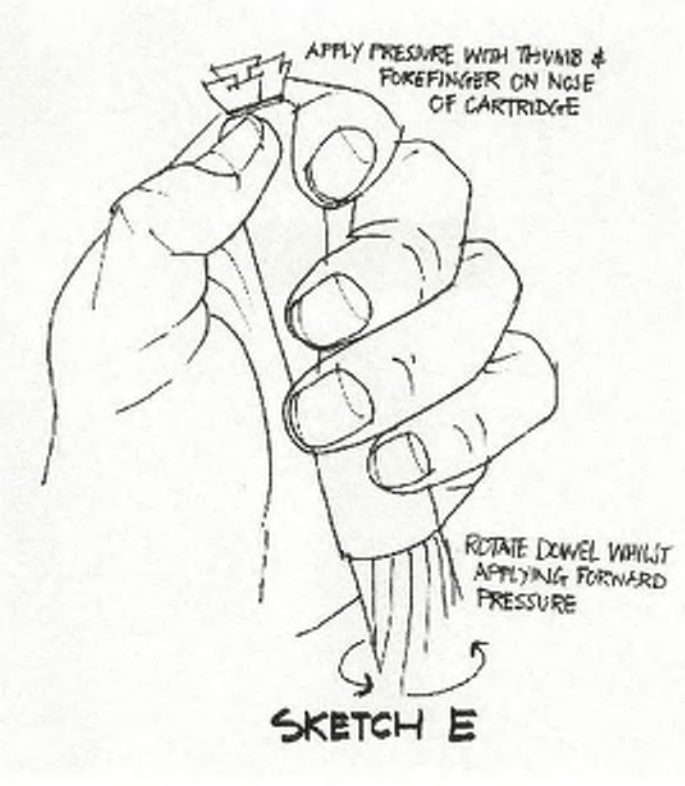
- Starting at the bottom roll the paper tightly around the dowel to form a tube.

- Holding the rolled paper snugly round the dowel bring the nose end of the paper to the right and take one turn of the choking cord around the paper's end. The position of the cord should be about 3/8" in from the end of the paper, ie. the same distance as the nose of the dowel is recessed into the tube. With the paper-wrapped dowel held firmly to the work surface pull the choking cord tight thus choking the paper down over the hemispherical end of the dowel. Pull the cord down as tight as you can without shearing the paper off.



SKETCH D

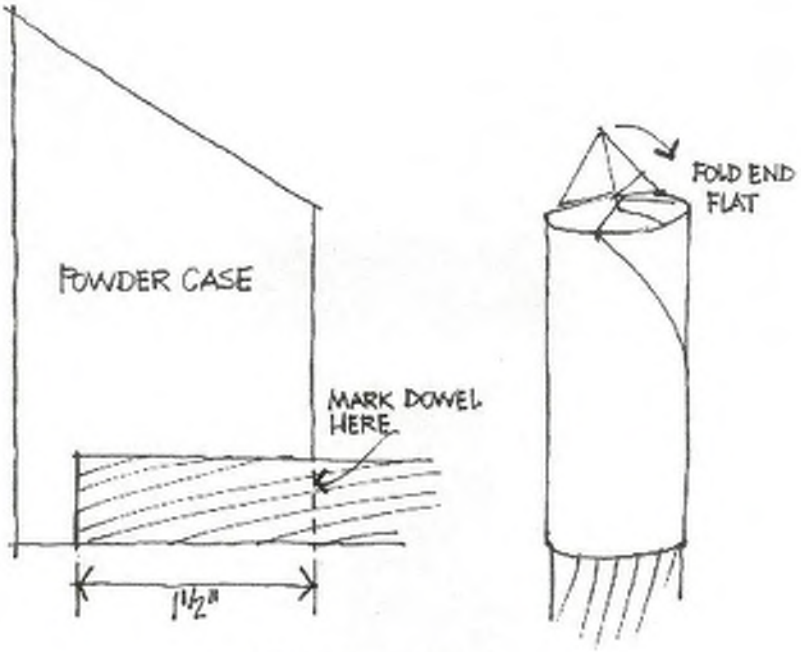
- Release the choking cord, but retain the dowel within the cartridge case. The paper will remain choked. Take a length of thread approx. 14" long and, with two equal tails, take one turn around the choked end, pull as tight as you can and tie in a single knot. This completes the choking process. Still with the dowel in place, hold the assembly in the left hand as shown in the sketch. Hold the nose firmly between the thumb and forefinger and rotate the dowel whilst applying forward pressure. This action tends to form the nose of the cartridge into a true hemispherical form which the initial choking process does not do completely. Once the hemisphere is formed and with the dowel still in place press the choked paper end back over the nose of the cartridge. Remove the dowel.



SKETCH E

- Using toilet tissue as wadding, create the 'ball' in the cartridge. It is difficult to specify the exact amount to achieve this. Suffice it to say that when compressed in the nose of the cartridge it should be equal in dimension to the diameter of the ball, ie ..65". The wadding is pushed into the tube with the flat end of the dowel and to do this the cartridge is held in the same position in the left hand as for forming the hemispherical end. The wadding should be tightly compressed, but not so much so that the compression distorts the nose of the cartridge.

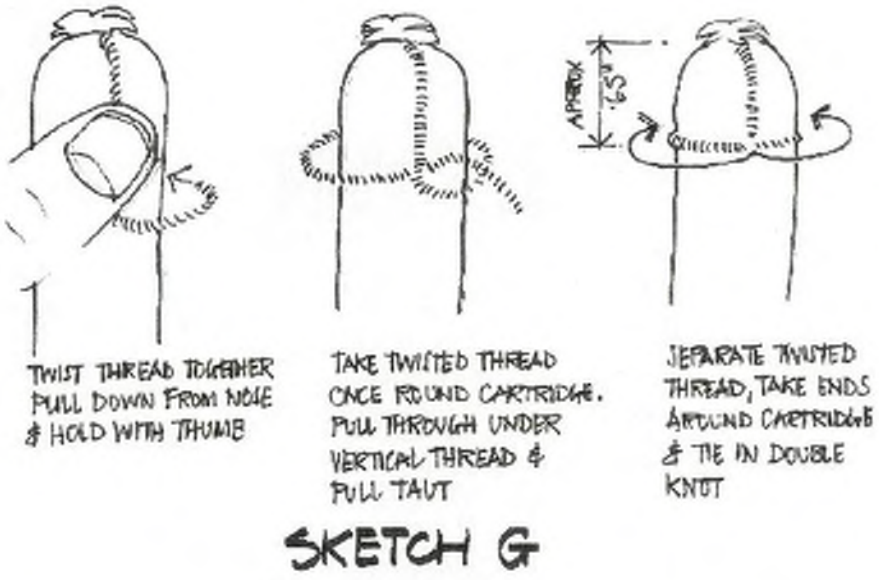
- With the same dowel form the powder cylinder as shown in the sketch below. The cylinder is formed with the flat end of the dowel to the left. When formed, the cylinder should be deep enough to accommodate the . 69 cal smoothbore service load of 110 grains. I've found that a depth of 1 1/2" is adequate for this, but experiment if you wish. Once you have found a satisfactory depth, mark the dowel so as to ensure consistency. Having formed the cylinder, invert the dowel and, with pressure, rotate the closed end on the work surface. This compresses the folds. This complete you may notice small 'ears' projecting beyond the circumference of the cylinder at the folded end. Push these in and over the end, as to leave them projecting may cause them to tear the cartridge tube when the powder cylinder is inserted.



SKETCH F

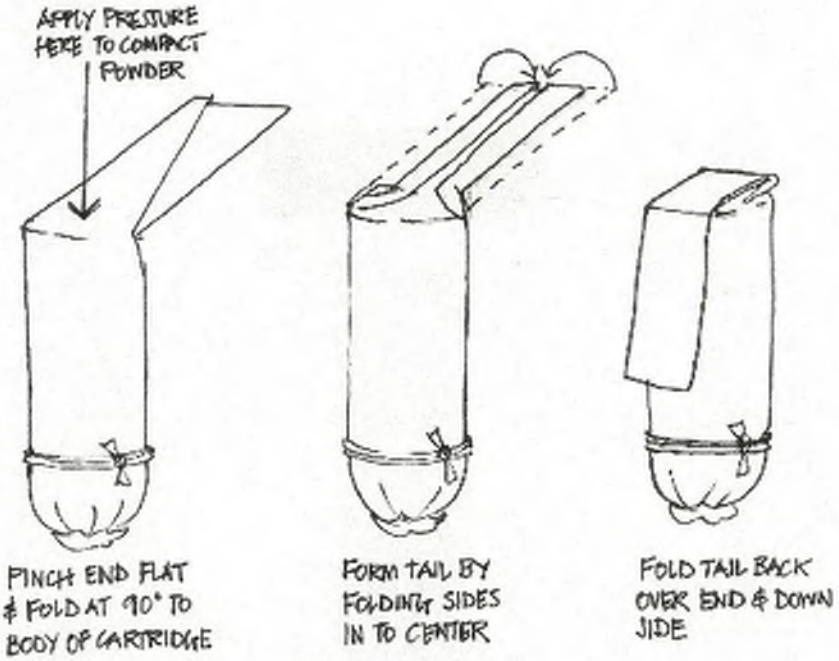
- With the powder cylinder on the dowel carefully insert the closed end into the cartridge tube, just a little will do. Then, whilst holding the dowel steady, gently push the tube down over the cyli nder. This removes the danger of pushing the dowel through the folded end of the cylinder if the fit should be too tight. If, in spite of your best efforts, the dowel does penetrate the folded end of the cylinder and this happens when the cylinder is fully inserted, the tweezers mentioned earlier come into play. Nip the end of the damaged cylinder with these, gently withdraw it and start again.

- Retaining the dowel within the assembly, take the two ends of the closing thread and twist these tightly together. With the thumb. hold the twisted thread against the cartridge and take one turn a round the cartridge approx. .65" from the nose, ie.at a point equivalent to the diameter of the ball. Pull the thread back through itself and pull taut. Separate the two ends of thread, take them in opposite directions around the cartridge and tie in a tight double knot. Cut off the excess thread and the cartridge case is complete.



SKETCH G

- To fill the cartridge I use the largest powder flask I can find (mine's from Peter Dyson as noted in the introduction). The service load for a .69 cal cartridge was 110 grains. To achieve this I use two shots of the 54 grain charger giving 108 grains which is close enough. Once you have filled the cartridge, tap the nose on the work surface to settle the powder. Pinch the excess tube into a tail as crisply as you can and fold this over at right angles to the body of the cartridge. Having done this press down with the thumb on the end of the cartridge to compress the powder within the tube. Fold the edges of this flap towards each other and crease as sharply as you can. You will need to lay the cartridge fiat on the work surface to do this. This may allow some of the powder to spill back into the folded area. Once the tail folds are complete, raise the cartridge to the vertical and again tap the nose on the work surface to settle the powder. Finally fold the flap back on its elf and down the side of the cartridge. The tail may not lie completely flat against the side of the cartridge, but this is not a worry. The sketch below illustrates the steps in the folding process.

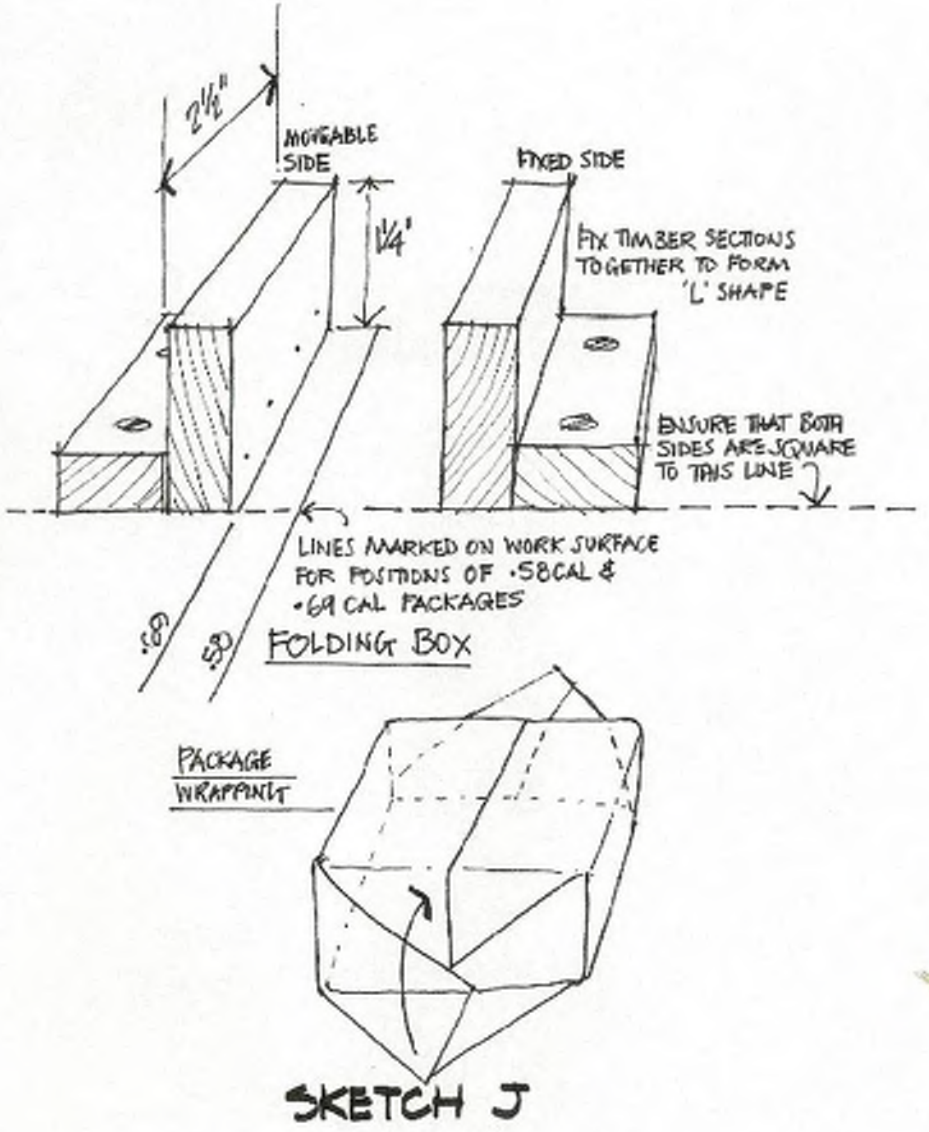


SKETCH H

- To form a package of 10 cartridges you will require a paper tube to carry 12 percussion caps. This is where the 1/2" dowel is used. I use a .58 cartridge paper trapezoid for this and it is formed exactly as the basic cartridge tube. Wrap it tightly around the 1/2" dowel, choke and tie one end, fill with 12 caps and fold or twist the open end closed.

- Once I have made the first 10 cartridges I set up the folding box to receive them. One 'L'-shaped side is static, the other can move to accommodate the two calibres, .69 and .58. The sketch below illustrates this. To establish the position of the moveable side, two rows, one on top of the other, each of five cartridges, are placed against the fixed side. The cartridges should alternate head to tail and the paper tails should be trapped between. The other side is then pushed against the cartridge stack till it is tightly compressed. Mark the position of the moveable side on the work surface and, with the cartridge stack removed, screw the side to the work surface aligning with the mark you made and ensuring that the sides are square to each other.

- Take a cartridge wrapper, 9" x 6 1/2", and place this centrally in the folding box. Replace the ten cartridges as before which should now be a snug fit within the box. Place the percussion cap tube against the end of the cartridge stack and fold the wrapper around the assembly as shown.



- Tie the package with twine, one turn lengthways, then one across the width, secure with a small bow knot and cut off the excess twine. It is very important to keep the tying process as tight as possible indeed when you pull the twine tight you will compress the package even more than the folding box managed to do.

- I'm still rather uncertain about using labels. Therefore in the meantime I use two methods of identification. The first is to use different wrapper colours for the two different calibres. FRBTR (table p.35) states that the wrapper colour for .58 cal cartridges was "ordinary" which I take to mean unbleached natural paper. That for .69 cal round ball cartridges is specified as "Green". I haven't yet found an appropriate green paper. The second is to make up two simple rubber stamps, "58 cal" and "69 cal" using an appropriate period typeface.

.58 cal Cartridges

- This process is identical to that detailed above with the exception that the cartridge only needs to be tied once at the nose (take one turn around the choked end, tie with a double knot and fold the end down over the nose of the cartridge).

- The tissue wadding representing the minie ball should, when firmly compressed, occupy a space of approx. 1", ie. the length of a typica1.58 cal ball.

- Obviously the cartridge and powder cylinder trapezoids are those required for a .58 cal round. The powder cylinder should be of a depth able to accommodate a charge of either 60 or 66 grains.

- The service load was 60 grains at the outset of the war. This was increased to 65 grains as the war progressed. I use the 66 grain powder charger to achieve this. I tend to favour the larger load as, without the use of a ramrod to compress the powder in the breach, the extra powder gives a better chance of ignition, particularly with the M1861 Springfield.

General Notes

- The inclusion of the percussion cap tube within the package gives a rather lopsided effect According to the September 1861 US Ordnance Manual (p.35 FRBTR) the dimensions of a package of .69 cal round ball cartridges should be length 2.6", width 3.1", depth 1.35". It is silent as to whether these dimensions allow for the provision of a percussion cap tube. The dimension for a .58 cal expanding (minie) ball package are 2.6" x 2.9" x 1.15". I confess to a difficulty in getting the package I've made into the lower sections of a cartridge box tin, either reproduction or original. I have attempted to work as closely to original dimensions as possible and yet my packages fit with difficulty.

- A refinement in the case of a .69 cal round would be to have the flat end of the dowel turned to a concave form. Thus when compressing the tissue wadding with this end it would tend to produce a spherical form to the wadding similar to the original ball. Also, when folding the powder cylinder end the folds would be pushed into this concavity, possibly making the folds more secure and reducing the chance of pushing the dowel through the folded end when assembling the cartridge. I will try this and report as to its effect.

- In his excellent CRRC article, Jeff Henion notes that sometimes the choking process, even when tightly tied, still leaves a small hole in the nose through which the tissue wadding is visible. He suggests that a touch with a grey felt pen to simulate the colour of the lead ball would disguise this view.

In conclusion it may seem that this process requires an extraordinary effort to create an object which is ultimately thrown away. However, my view is that if I dedicate my efforts to achieving the highest level of authenticity possible then such authenticity as I achieve will not be selective. I will attempt to apply it to all aspects of this most fascinating field of study.

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