Could My Bayonet be Confederate?

By Paul D. Johnson

The identification of the rare Richmond-produced Model 1855 socket bayonet has always been a challenge for the collecting community. The primary identifying characteristic has always been the absence of "U.S." stamped into the ricasso of the face of the blade. However, there are other examples of U.S. bayonets that also do not have a "U.S." stamped into the blade. Civil War examples include the Sharps and Spencer socket bayonets as well as the post-war M1867 Peabody bayonet. So, the question remains: How do you identify a C.S. Richmond socket bayonet with fluted blade?

Two authors, Albert N. Hardin, Jr., in his book, *The American Bayonet, 1776-1864*[1], and Robert M. Reilly, in his book, *American Socket Bayonets and Scabbards*[2], describe Confederate Richmond Armory bayonets. Reilly further describes these bayonets with "crude construction, welding flaws, forging flaws" and other differences from the U.S. Model 1855 bayonet.

Two types of bayonets for .58 caliber rifle-muskets were produced at the Richmond Armory and both had 18-inch–long blades. One was made of steel and the other made of iron. Steel bayonets were identified in Confederate Ordnance Bureau documents and correspondence as "fluted," "steel," or "M1855" bayonets. These bayonets look very much like the U.S. Model 1855 rifle-musket bayonet because the Confederate bayonets were made on machinery taken from the U.S. Armory at Harpers Ferry and transported to Richmond by the Virginia militia in April 1861.

In an effort to save steel or use fluted bayonets with broken or flawed blades, the Richmond Armory also began producing fluted bayonets with a shortened blade later in the war. Paul Davies, in his book, *C.S. Armory Richmond*,[3] states that these bayonets have a 15.25-inch–long blade and exhibit the same Confederate characteristics found on other fluted Confederate bayonets.

The second type bayonet with an 18-inch–blade was made of iron with a steel tip brazed to the point end. This bayonet had no flutes cut into the blade. The Confederate Ordnance Bureau referred to them as "3-square bayonets" or "unfluted" bayonets. During this study, it was learned that the fluted, steel bayonets were made for newly made rifle-muskets at Richmond Armory, and 3-square bayonets were made for repaired muskets or rifle-muskets, such as those captured from battlefields and repaired at the armory. Figure 1 shows these bayonets to illustrate the differences.

Because the C.S. M1855 fluted socket bayonet made at the Richmond Armory is so similar to its Northern counterpart, identification has been very difficult.

It is a well-known fact that Richmond Armory bayonets are not as well finished as their Northern counterparts. The author conducted a study to determine how the Springfield Armory produced bayonets that were consistently well finished and standardized, so that the bayonet was able to fit any rifle-musket. Conversely, why did Richmond bayonets, which were made on the same machinery captured from Harpers Ferry Armory, show such crude construction, including welding and forging flaws as described by Reilly? This study also attempts to determine any identifying characteristics from the manufacturing process which could aid in identifying these rare bayonets.

Figure 1. Overall views of the two models of bayonets made at the Richmond Armory for .58 caliber rifle-muskets. The top example is called a fluted or M1855 bayonet while the bottom example is called by the Confederate Ordnance Bureau as a "3-square" bayonet.

The first part of the study concerns the manufacturing and inspection process developed during the first half of the 19th century by the U.S. Ordnance Department. Once the Northern process is understood, the Confederate process is examined to determine similarities to the Northern counterpart, and to determine the identifying characteristics of Richmond Armory-produced bayonets.

UNITED STATES ORDNANCE DEPARTMENT MANUFACTURING PROCESS

The Northern manufacturing process is well documented in period literature and letters written by the personnel involved. Simply stated, the process included the approval of models, inspection of intermediate and finished articles, and the use of verifying gauges.

U.S. MODELS AND STANDARD MODELS

But how did an armory or contractor workman know the form and dimensions of a particular rifle-musket or bayonet part he was to make? Early in the 19th century, the concept of "Model Arms" or "Standard Models" was introduced into the ordnance service:

> *The model arm referred in the contract, and furnished by the Government to the contractor, will be considered a standard reference. The arms manufactured should conform in all their parts, in pattern or form, to the standard model; and should be equal in workmanship to the arms of similar denomination, made at the National Armories during the same period.*[4]

By the time the Civil War began, there were three levels of models: Model Arms, Pattern Arms, and Standard Models. When a new model, such as the Model 1855 rifle-musket, was developed by the U.S. Ordnance Department, a few examples were made at one of the armories (both small arms and bayonets) and sent to the U.S. Ordnance Board for comments and approval. The Ordnance Board could suggest changes to the design and/or request experiments be conducted on the samples. These experiments could include a field test or test firing of the firearm on the target range to evaluate the ease of loading, successful ignition of the powder, and the accuracy of the firearm. Once the Ordnance Board approved the samples, the Chief of Ordnance considered any additional changes and then submitted the sample to the Secretary of War for his comments and final approval. When the Secretary approved the new model, the sample was sent back to the armory so that the firearm or bayonet could be corrected with any changes required by the Board, Chief, or Secretary of War. When all the changes were incorporated, the sample became a "Model

Figure 2. Pictured here is one of 24 Model Arm bayonets made by Harpers Ferry Armory in 1838. The socket of this Model 1835 bayonet is marked, "USM No. 18." The clasp stud and screw head are marked with an "M" stamp. This bayonet served as a model for the workmen to copy when they set up the tools and jigs in the armory.

Arm," which was used by the armory as a baseline model for armory workmen to copy for production. The dies, tools, and jigs were then fabricated from the Model Arm in preparation for full-scale production. From these Model Arms, verifying gauges were made to check the form and dimensions of component parts as well as finished rifle-muskets and bayonets. Figure 2 shows a U.S. Model 1835 socket bayonet which is marked "USM No. 18."

Copying the Model Arm, the armories made Pattern Arms, which were sent to the contractors as their baseline models to copy. The contractor then used the Pattern Arm to produce the tools, jigs, and gauges necessary to manufacture the firearms required by his contract.

Before full-scale production commenced, the first few stands of arms[5] manufactured by the contractor were submitted to the Ordnance Office for approval. The Ordnance Department small arms inspector examined each contractor sample with verifying gauges and noted any deviations from the Model Arm. If the sample was evaluated as comparable to the Model Arm, the inspector recommended the example be approved by the chief of ordnance as a "Standard Model." If accepted, the contractor's Standard Model was stamped on the barrel with an ordnance bomb, "W.D.", and the year date, designating acceptance of the piece as a Standard Model. These marks were initiated in October 1863 by the U.S. Ordnance Department. Figure 3 shows these marks on the barrel of a Norwich Standard Model U.S. M1861 rifle-musket. One Standard Model was always returned to the contractor with a letter from the inspector documenting the deviations from the Model Arm which had to be corrected by the contractor before production could begin. A second Standard Model from the contractor was placed into the Model Office located at the Washington Arsenal.

Figure 3. These marks are stamped into the barrel when a contractor's sample arm was accepted by the Ordnance Department as a "Standard Arm." A letter from the inspector to the contractor always accompanied the Standard Arm documenting the deviations from the Model Arm.

ASSURANCE OF QUALITY — U.S. INSPECTION OF BAYONETS

To ensure that parts of rifle-muskets and bayonets were made to the proper shape, dimensions, and weight, the U.S. Ordnance Department developed an inspection system of individual parts, as well as the finished product. This system of inspection was used by foremen in the various shops within the armory as well as the inspectors testing the finished product. The *Regulations for the Government of the Ordnance Department*, printed in 1852, addresses this subject of inspection:

> *Section IX. INSPECTION OF ORDNANCE AND ORDNANCE STORES.*
>
> *Article 109..Regulations, in detail, for the inspection and proof of all ordnance and ordnance stores shall be prepared by the chief of the Ordnance Department, with the approbation of the Secretary of War, and the mode of inspection and proof shall be the same for all articles of the same kind, whether fabricated at the ordnance establishments, or procured by contract or by open purchase. The existing regulations on this subject will remain in force until changed by the proper authority.*[6]

The details of the inspection process for small arms and bayonets are contained in the third edition (1861) of *The Ordnance Manual for The Use of the Officers of the United States Army.*[7] These procedures were to be followed within the National Armories as well as in all contractor facilities. As with all ordnance equipment made at the armories and arsenals or purchased by contract, rifle-muskets and bayonets were always given a final inspection by Ordnance Department personnel before acceptance.

The *Ordnance Manual* described two inspections for the bayonet. Bayonets were first inspected individually, then with the rifle-musket as a finished arm. The *Ordnance Manual* provided detailed inspection procedures:

> INSPECTION OF SMALL ARMS
>
> *Bayonets*
>
> *The form and dimensions of the bayonet are verified with the proper gauges; the temper is tried by springing the bayonet attached to the barrel, the point resting on the floor. In case of doubt, the temper of the bayonet is definitely proved in the following manner:*
>
> *Two iron staples are fixed in a piece of oak plank on a workbench, 16 $^5/_8$ inches apart; one of them serves as a bridge, and has notches to receive the blade, — the other serves as a staple to holding the point of the bayonet close to the plank: the bayonet is fixed on a barrel, to the butt of which is fastened a brass ball weighing 6 pounds; so that, by inserting the point of the blade in the staples, the face and back resting alternately on the bridge, the blade sustains a weight of 9 pounds, which springs it about $^5/_8$ of an inch. In this situation the blade is also examined to detect flaws and cross-cracks. It should not remain bent after this trial.*
>
> *The inspector then seizes the blade near the point and strikes the elbow smartly on the workbench, to ascertain that the welding is sound.*
>
> *If the proof shows no defects, he verifies the dimensions and bore of the socket and the accuracy of the channels.* [i.e., mortise]. *He examines the dimensions of the clasp, to see that it fits well to the shoulder; that it turns evenly, without binding in any part; that the stop is well placed and firmly set; that the clasp-screw and its thread in the stud of the clasp are well cut; that the elbow has the proper form and dimensions.*
>
> *Marks. Bayonets are marked on the face of the blade, near the neck, with the letters U.S.; those rejected for defects that cannot be remedied are marked with the stamp of condemnation.*[8]

The next inspection, called "Inspection of Finished Arms," is for the bayonet and rifle-musket together and, as the *Ordnance Manual* states, "the arms will be put together and examined in their complete state. Some of the arms in every lot should be put together by the inspector himself."[9]

The following paragraph is found on pages 190 and 191 of the 1861 *Ordnance Manual*. For this inspection, the bayonet was fitted onto the finished arm and the fit is closely examined:

Figure 4. This illustration, "Testing the Bayonet," shows the inspector testing the temper and strength of a bayonet at the Norwich Armory. This illustration comes from T. Addison Richards' article, "The Norwich Armories," in *Harper's New Monthly Magazine*, March 1864.

> ***Bayonet.*** *— The socket of the bayonet should be a little below the muzzle of the barrel at the upper end. Work the clasp, to see that the ramrod does not interfere with it, that it bears well on the shoulders, that the clasp screw holds well, that the stock* [sic, stop] *is firmly fixed, and that the clasp moves evenly, without binding; the blade of the bayonet should set outwards a little toward the point. To try the strength and temper of the bayonet when fixed, spring it smartly in four directions toward the back and face and each edge, resting the point on the floor, and grasping the butt of the stock with the right hand and the middle of the barrel with the left.* [see Figure 4] *Examine the fitting of the bayonet to the barrel and see that the inside of the stock is clean and free from rust, and that the bayonet-stud is well brazed and of the right dimensions.*[10]

After this inspection and upon approval, the bayonet was accepted into the Ordnance Department inventory. Note that the "U.S." mark was stamped into the blade after the first inspection.

With these procedures, the ordnance department was assured that the rifle-musket and bayonet met the standards required for a stand of arms used by the U.S. Army.

VERIFYING GAUGES CHECK FORM AND DIMENSIONS

The first sentence in the paragraph for the inspection of bayonets states that "The form and dimensions of the bayonet are verified with the proper gauges. . . ."[11] These gauges, called verifying gauges, were made at the armory to check the shape and dimensions of each part. These gauges were used throughout the manufacturing process, as well as during the final inspection just described.

The various editions of the *Ordnance Manual* listed the gauges being used on the firearms being made at the armory at that time, including bayonets. The first edition (1841) listed 63 gauges for the Model 1840 flintlock musket, including five gauges for the Model 1835 socket bayonet. The second edition (1850) listed 68 separate verifying gauges for the Model 1842 percussion musket, including six gauges for the Model 1835 bayonet.

The third edition (1861) of the *Ordnance Manual* lists the verifying gauges for the Model 1855 rifle-musket and rifle, but not the Model 1842 percussion musket, which was no longer being produced. The 1861 *Ordnance Manual* was unique in that each gauge had full explanation of its purpose. There were a total of 68 gauges for the M1855 rifle-musket, including eleven gauges for the M1855 socket bayonet:

List of Verifying Gauges for the Rifle-Musket, Model of 1855.

Bayonet.[12]

#44. *Receiving-Gauge*:
Shows length, width, and set of blade.

#45. *Socket-Gauge, No. 1*:
Shows exterior diameter of socket below head, and diameter of head.

#46. *Socket-Gauge, No. 2*:
Shows exterior diameter of socket at top and bottom.

#47. *Mandrel-Gauge*:
Shows form of socket at lower end, size of cut for stud, length of socket, size of grooves, and position of clasp.

#48. *Blade-Gauge*:
Shows curve of front flute, the thickness of metal at commencement of front flute, at $7^1/_2$ inches and $14^1/_2$ inches from widest point of blade.

#49. *Dimension-Gauge*:
(To be applied before the clasp is put on.)
Shows position and size of socket at clasp-stud, position and size of clasp-stud, relative position of bridge-bead and clasp-stud, distance from top of slot to top of socket.

#50. *Neck-gauge*:
(To be applied before the clasp is put on.)
Shows lower curve of neck, upper curve of neck, diameter of neck, and relative position of neck, head, and bridge.

#$50^1/_2$. *Neck-Gauge, No.* 2:
Shows curves of junction of neck and socket.

#51. *Blade-Gauge*:
Shows profile of back of blade at the commencement of back flutes, at termination of bevel, at middle of blade, and 1 inch from point of blade, and the width of blade at the above-mentioned points.

#54. *Bayonet-Clasp Mandrel-Gauges*:
Shows exterior and interior size of clasp when the screw is in its place.

#55. *Clasp-Dimension Gauge*:
Shows thickness of body, thickness at bridge, width of stud, width of body at notch, position of screw-hole, round of stud, receiving-tool for form and size of finished clasp, with position of bridge and notch.

Figure 5 illustrates an example of a verifying gauge, made at the Harpers Ferry Armory in 1838, for the blade of the M1835 bayonet. The groove is stamped "US/C/No 46" which indicates this gauge was gauge No. 46 in the third set ("C"). The 1841 *Ordnance Manual* lists this number gauge as "Receiving gauge for bayonets." Twenty years later, the 1861 *Ordnance Manual* further describes this similar gauge as "No. 44 — Receiving gauge-Shows length, width, and set of blade." The gauge in the figure verifies the blade length and width, length of the neck or shank, and even the shape of the point.

Using these processes of making models, inspection, and verification, the U.S. Ordnance Department was capable of producing a standardized, well-made, and interchangeable bayonet.

Figure 5. A verifying gauge, numbered "No. 46", is described as a "Receiving gauge for bayonets." There were only four verifying sets made, and five different bayonet gauges in each set. This gauge was part of the third set ("C") made in 1838. This gauge checks the dimensions of the blade and shank.

Figure 6. Another illustration from Richards' article "The Norwich Armories" showing the Norwich Armory's "bayonet room" in 1864. (From *Harper's New Monthly Magazine*, March 1864.)

A PERIOD DESCRIPTION OF THE BAYONET MAKING PROCESS

The March 1864 issue of *Harper's New Monthly Magazine* contains very informative, well-written report on the Norwich Arms Company of Norwich, Connecticut.

The article was entitled, "The Norwich Armories" and was written by T. Addison Richards.[13] Richards was invited to tour the facilities at Norwich, see the operation first hand, and then write about what he saw. The article is very detailed ($14^1/_2$ pages) with some very enlightening line drawings capturing the workmen completing their tasks. On page 460 Richards writes:

> *The bayonet-blade is forged under a trip-hammer, after which it is rolled to its proper form — somewhat as the barrel is rolled. The socket is then forged, when blade and socket are welded together. It is next passed twice beneath the drop, after which it is ground and then polished, in the manner already described, in connection with the polishing of the barrel. . . . .*
>
> *As with all other portions of the arm so the bayonet is carefully tested in respect to its quality, strength, and temper. It is rigidly gauged and measured in every part, and is sprung by the strength of the workman or the inspector with its extremity set upon the floor, and a weight is suspended from its point to further try its temper. If it fails to answer all the trials thoroughly it is condemned and laid aside.*[14]

Figure 7. This illustration is called "Polishing the Bayonet" from the T. Addison Richards' article, "The Norwich Armories," from *Harper's New Monthly Magazine*, March 1864.

As mentioned above, grinding and polishing of the bayonet are an important part of the manufacturing process. Richards described it as follows:

> *The bayonet is polished by means of wheels, which are bound on their circumference with bands of leather, coated with very fine pulverized emery, applied with a sizing of glue. While these emery wheels are revolving with amazing velocity, the operatives, holding the pieces in their hands, press them upon the circumference until every portion in turn receives a very brilliant polish. During the application a gorgeous train of fiery sparks, or globules of melted metal, shoots from the wheels opposite the workmen. The danger in this operation came not from the emission of the fiery particles but from the suffusion of the air by the constant shower of emery dust, and the inhaling of the deleterious substance into the lungs. The trouble is now almost entirely provided against by the means of air-trunks, which are placed beneath the floor, and so connected with*

the stones, by suitable openings, as to thoroughly convey away the noxious atmosphere.[15]

The subject of inspection was closely investigated by Richards during his visit to the Norwich Armories. Richards observed a very stringent inspection system, first by the Norwich Arms Company, then by the government inspectors.

> *All portions of the musket* [and bayonet] *are closely inspected, by persons especially assigned for this duty, in all the various stages of their production, after which (since the work done here at the Norwich Armory is almost, if not entirely, for Government use) they are again closely scrutinized by inspectors appointed by the Government for that purpose.*
>
> *Should any flaw, even the slightest, be revealed, the part is condemned and set aside without mercy, the loss falling always upon the workman to whose fault or misfortune the defect may be traced. The losses, however, are always comparatively small, telling so unpleasantly as they do upon the operative's sum total of receipts when the busy scene of pay-day comes round; for the artisans at the Norwich Arms Company are, no less than other folk, very much controlled in their actions by self-interest, however great may be the influence upon them of higher motives.*[16]

An interesting fact of life for the workmen of the 1860s was that if one of their products was found to have a flaw, or differed from the prescribed measurements, the item was removed and the cost of that item deducted from the workman's pay. Expanding further on this subject, Richards wrote:

> *All failures are charged to the account of the workman through whose fault the failure has been caused. For this purpose each defective piece is carefully examined, in order to discover whether the fault belongs to the bad quality of the iron, or to imperfect rolling, or to errors and carelessness in other portions of the manufacture. This is readily determined by the appearance of the rent made in the bursting; and as each operative stamps his name upon his work as it passes through his hands, the responsibility is as easily fixed as is the cause of the trouble. In the case of the failure of a barrel in the proving, the workman to whose fault the defect is traced is required to pay a dollar therefor, which is not an unreasonable fine, since he is paid for his work by the piece, and is paid well, and since the whole value of the barrel is lost to the establishment through his remissness. The same system of payment and of accountability for defects or bad workmanship extends through all departments, and is found highly provocative of attention and watchfulness every where.*
>
> *. . . The workmen are paid so much per piece for their labor, and so also, as before remarked, are the operatives paid in all other departments according to the value of the article they manufacture and to a graduated tariff of wages.*[17]

Richards provides the modern day reader a vivid snapshot of the everyday activities of the average mechanic in the 1860s and the craftsmanship of these workmen.

With this understanding of the U.S. manufacturing process, the next phase of the study looks at the Confederate Ordnance procedures to determine what processes were in place and if these processes could have caused the "crude construction, welding flaws, forging flaws" described by Reilly.

CONFEDERATE STATES ORDNANCE BUREAU MANUFACTURING PROCESS

The Confederate manufacturing process was very similar to the U.S. process just described. This is because the C.S. Ordnance Bureau[18] merely copied verbatim the U.S. Ordnance publications and changed the verbiage that mentioned "U.S." to "C.S.".

After a review of the Confederate States' versions of the ordnance publications listed above (*Regulations for the Government of the Ordnance Department* and *The Ordnance Manual for The Use of the Officers of the United States Army*), the only difference in the verbiage was found in the Confederate *Ordnance Manual*. The first C.S. ordnance manuals were printed in 1861 by Evans & Cogswell of Charleston, South Carolina, and by West & Johnston of Richmond, Virginia. The only difference between the U.S. and C.S. documents was in the marks applied to the bayonet after its inspection. Whereas the U.S. *Ordnance Manual* states that bayonets are marked on the face of the blade with the letters "U.S.", the Confederate manual states (underlining is that of the author's):

> *Marks. Bayonets are marked on the face of the blade, near the neck, with the letters C.S.A.; those approved are marked on the neck with the inspector's stamp; those rejected for defects that cannot be remedied are marked with the stamp of condemnation.*[19]

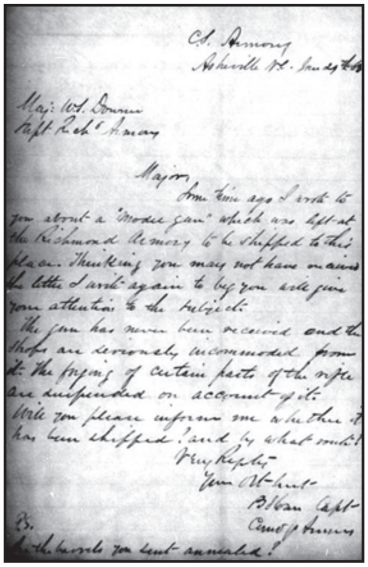
In 1863, an updated edition, entitled *The Ordnance Manual for the use of the Officers of the Confederate States Army*,[20] was published by Evans & Cogswell. The description of marking the bayonet now copied the same words in its 1861 U.S. counterpart and the marks in the blade were changed to "C.S." from "C.S.A."

> *Marks. Bayonets are marked on the face of the blade, near the neck, with the letters C.S.; those rejected for defects that cannot be remedied are marked with the stamp of condemnation.*[21]

It is obvious that this paragraph was ignored as Confederate socket bayonets do not exhibit any marks on the blades.

The study then turns to whether or not the C.S. Ordnance Bureau actually employed the process outlined in their ordnance publications. Research focused on letters and other correspondence within the C.S. Ordnance Bureau mentioning the approval of models, inspection of intermediate and finished articles, and the use of verifying gauges.

C.S. MODEL ARMS AND MODEL BAYONETS



C.S. Armory
Asheville N.C. Jan 29th 63

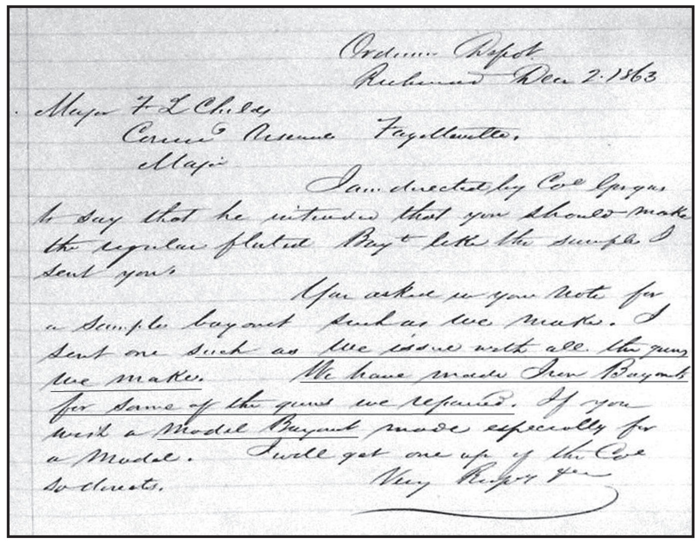
Maj: W.S. Downer
Supt Richd Armory

Major,
Some time ago I wrote to you about a "Model gun" which was left at the Richmond Armory to be shipped to this place. Thinking you may not have received the letter I write again to beg you will give your attention to the subject.
The gun has never been received and the shops are seriously incommoded from it. The forging of certain parts of the rifle are suspended on account of it.
Will you please inform me whether it has been shipped? and by what route?
Very Respy
Your Obt Servt
B Sloan Capt
Comdg Armory
P.S.
Are the barrels you sent annealed?

Figure 8. Captain Sloan writes Major Downer that the "Model gun" has not arrived at the Asheville Armory which is causing serious delays in the forging of parts of the rifle (National Archives).

Letters found in the National Archives indicate that the C.S. Ordnance Bureau used models for workmen to copy. A letter from the commander of the Asheville (NC) Armory, Captain Benjamin Sloan, to the Superintendent of the Richmond Armory, Major William Downer, indicates how important "Model Arms" were to the Confederate manufacturing process. Written on January 29, 1863, Sloan reminded Downer that a "Model gun" had been left at the Richmond Armory in December to be shipped to Asheville for the workmen to copy, but it had not arrived when the letter was written. Sloan stated that due to the lack of a Model Arm, the progress of rifle manufacturing at Asheville Armory had been seriously inconvenienced. He writes, "The forging of certain parts of the rifle are suspended on account of it [the lack of a model arm]." This letter demonstrates that the C.S. Ordnance Bureau did utilize model arms and how important these model arms were to the manufacturing process (Figure 8).

Another important letter was found that not only indicates the use of bayonet models but also defines what types of bayonets were mated with the rifle-muskets manufactured by the Richmond Armory. The letter was written to Major Frederick Childs, commander of the Fayetteville Armory (NC), from Major William Downer on December 2, 1863. This series of correspondence began when the Secretary of War and the Confederate Ordnance Bureau ruled that no more saber bayonets would be fitted to rifles. Major Childs asked the ordnance office what type of bayonet did the Chief of Ordnance want the Fayetteville Armory to produce for its rifles — either the M1855 fluted, steel bayonet or the 3-square iron bayonet with a steel tip and no flutes in the blade. Major Downer responded to Major Childs on December 2, 1863, stating that Colonel Gorgas intended Fayetteville to make the "regular fluted bayonet," and a sample or model had already been sent to Fayetteville to copy. Downer further explained that the fluted, M1855 steel bayonet was made for the new rifle-muskets made at Richmond while the iron bayonet (3-square, unfluted blade) was made at Richmond and by contractors for the guns that have been repaired and returned to service (Figure 9).



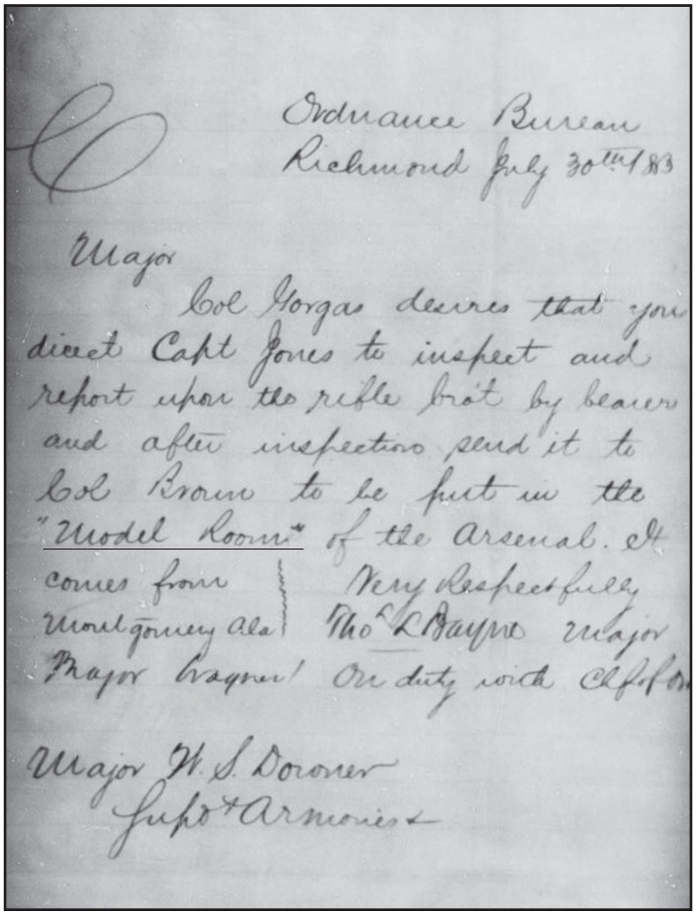
Ordnance Depot
Richmond Dec 2 1863

Major F L Childs
Comdg Arsenal Fayetteville
Major
I am directed by Col Gorgas to say that he intended that you should make the regular fluted Bayt like the sample I sent you.
You asked in your note for a sample bayonet such as we make. I sent one such as we issue with all the guns we make. We have made Iron Bayonets for some of the guns we repaired. If you wish a Model Bayonet made especially for a Model. I will get one up if the Col so directs.
Very Respy Yr

Figure 9. Illustrated is a copy of a letter from the ordnance office ordering Fayetteville Armory to produce the fluted bayonet for the rifles being made at that armory. A model bayonet had already been sent to Major Childs. Note that the fluted bayonets were mated with the newly made Richmond rifle-muskets, while the non-fluted, 3-square bayonets were made for repaired arms (National Archives).

MODEL STORAGE

As mentioned previously, U.S. Model Arms and contractors' Standard Models were kept in a Model Office located at the Washington Arsenal. The Confederate Ordnance Bureau also had a "Model Room" in the Richmond Arsenal. In a letter dated July 30, 1863, from a staff officer in the Chief of Ordnance office to Major W. S. Downer, the existence of the "Model Room" is mentioned. Major Thomas Bayne wrote that Colonel Gorgas, Chief of Ordnance, ordered Downer to have the C.S. ordnance inspector, Captain Frank F. Jones, inspect a model rifle from Montgomery, Alabama, and then place the rifle into the "Model Room" of the Richmond Arsenal. Unfortunately, nothing more is known of the Model Room (Figure 10).



Ordnance Bureau
Richmond July 30th /83

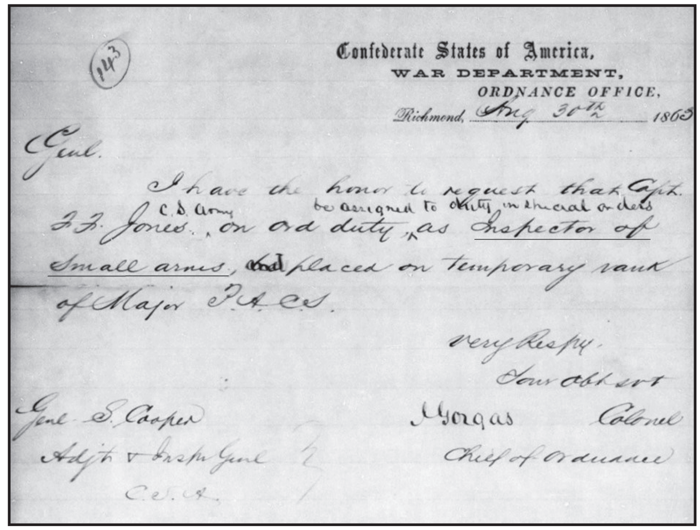
Major
Col Gorgas desires that you direct Capt Jones to inspect and report upon the rifle brot by bearer and after inspection send it to Col Brown to be put in the "Model Room" of the Arsenal. It comes from Montgomery Ala

Very Respectfully
Thos L Bayne Major
On duty with Ch of Ord

Major Wagner!

Major W. S. Downer
Supt Armories

Figure 10. Captain Bayne from the C.S. Ordnance Office requests that the model rifle sent from Montgomery, Alabama, be inspected and placed into the "Model Room" in the Richmond Arsenal (National Archives).



(143)

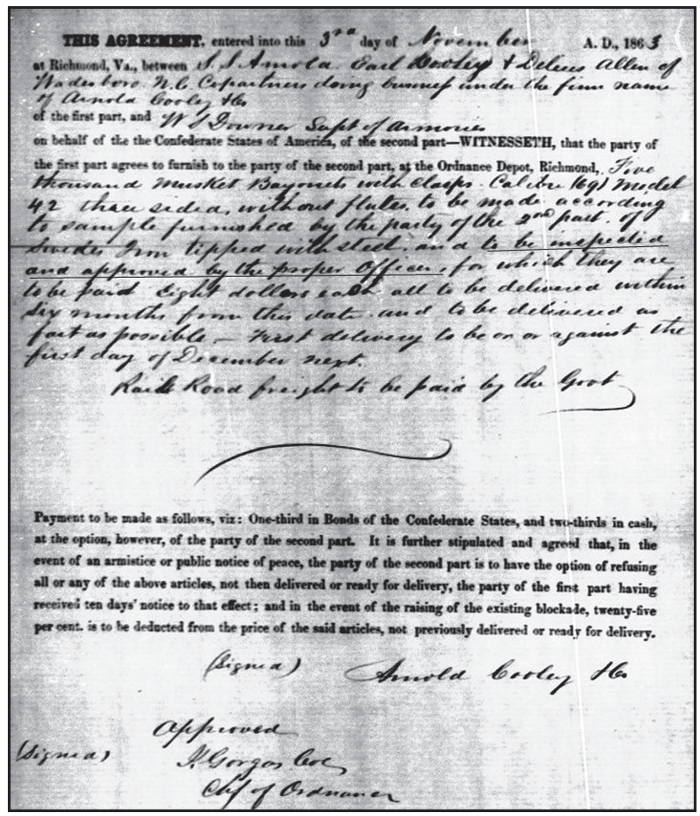
Confederate States of America,
WAR DEPARTMENT,
ORDNANCE OFFICE,
Richmond, Aug 30th 1863

Genl.
I have the honor to request that Capt. F. F. Jones, C.S. Army, on ord duty, be assigned to duty in the ord. orders as Inspector of Small arms, and placed on temporary rank of Major P.A.C.S.

Very Respy.
Your obt svt
J Gorgas Colonel
Chief of Ordnance

Genl S. Cooper
Adjt & Insp Genl
C.S.A.

Figure 11. This letter from Colonel Gorgas to the Adjutant General Samuel Cooper, requests that Captain Frank Jones be appointed as Inspector of Small Arms and given a temporary promotion to Major (National Archives).



THIS AGREEMENT, entered into this 3rd day of November A. D., 1863 at Richmond, Va., between S. J. Arnold, Carl Cooley & Delum Allen of Wadesboro N.C. Copartners doing business under the firm name of Arnold Cooley & Co of the first part, and W. S. Downer Supt of Armories on behalf of the the Confederate States of America, of the second part—WITNESSETH, that the party of the first part agrees to furnish to the party of the second part, at the Ordnance Depot, Richmond, Five thousand Musket Bayonets with Clasps. Calibre (69) Model 42 three sided, without flutes, to be made according to sample furnished by the party of the 2nd part. of Swords from tipped with steel and to be inspected and approved by the proper Officer, for which they are to be paid Eight dollars each all to be delivered within six months from this date and to be delivered as fast as possible — first delivery to be on or against the first day of December next.
Rail Road freight to be paid by the Govt

Payment to be made as follows, viz: One-third in Bonds of the Confederate States, and two-thirds in cash, at the option, however, of the party of the second part. It is further stipulated and agreed that, in the event of an armistice or public notice of peace, the party of the second part is to have the option of refusing all or any of the above articles, not then delivered or ready for delivery, the party of the first part having received ten days' notice to that effect; and in the event of the raising of the existing blockade, twenty-five per cent. is to be deducted from the price of the said articles, not previously delivered or ready for delivery.

(Signed) Arnold Cooley & Co

(Signed) Approved
J Gorgas Col
Chf of Ordnance

Figure 12. Illustrated is a contract for 5,000 M1842 3-Square bayonets from Arnold Cooley & Co. dated November 3, 1863. Note that all bayonets will be inspected by an officer appointed for such duty (National Archives).

ASSURANCE OF QUALITY — C.S. INSPECTION OF BAYONETS.

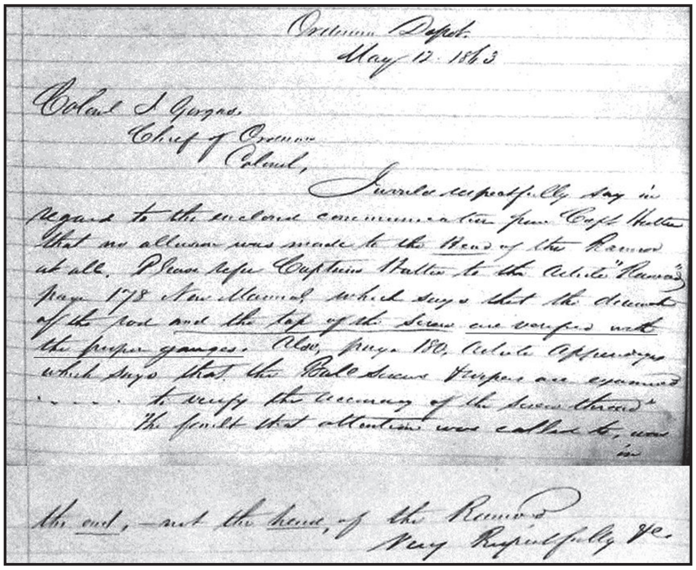
The next step in the study attempts to determine if the Confederate Ordnance Bureau conducted inspections and used verifying gauges as did their U.S. counterparts. Unfortunately, there are no actual items such as C.S. models and verifying gauges known to the author, so a search of Confederate documents and records was conducted to find any references to these items.

Figure 11 is a copy of a letter, dated August 30, 1863, from Colonel Gorgas to the Adjutant and Inspector General of the CSA, General Samuel Cooper, requesting that Captain Frank F. Jones be assigned to duty as the Inspector of Small Arms and given a temporary promotion to the rank of major.

A second reference to ordnance inspections was found in a contract document dated November 3, 1863, for 5,000 M1842 3-square iron bayonets from Arnold Cooley & Co. The underlined sentence states that all bayonets will be inspected and approved by a proper officer. All Confederate contracts have this statement of inspection of the final products (Figure 12).

VERIFYING GAUGES CHECK FORM AND DIMENSIONS

Upon reviewing the Confederate *Ordnance Manual* printed in 1863,[22] it was found that the descriptions of the 11 bayonet verifying gauges are listed exactly the same as in the U.S. *Ordnance Manual* (see pages 11-12).


Ordnance Depot.
May 12. 1863

Colonel J. Gorgas
Chief of Ordnance
Colonel,
I would respectfully say in regard to the enclosed communication from Capt Hutter that no allusion was made to the Head of the Ramrod at all. Please refer Captain Hutter to the Article "Ramrod" page 178 New Manual which says that the diameter of the rod and the top of the screw are verified with the proper gauges. Also, page 180, Article Appendages which says that the Ball Screw Wiper are examined . . . to verify the accuracy of the screw thread"
The fault that attention was called to, was in the end, —not the head, of the Ramrod
Very Respectfully &c.

Figure 13. On May 12, 1863, Major Downer requests Colonel Gorgas have Captain Hutter refer to the C.S. *Ordnance Manual* pages 178 and 180 which make reference to the inspection of the ramrod and specifically the threaded end of the ramrod being verified with the proper gauges (National Archives).

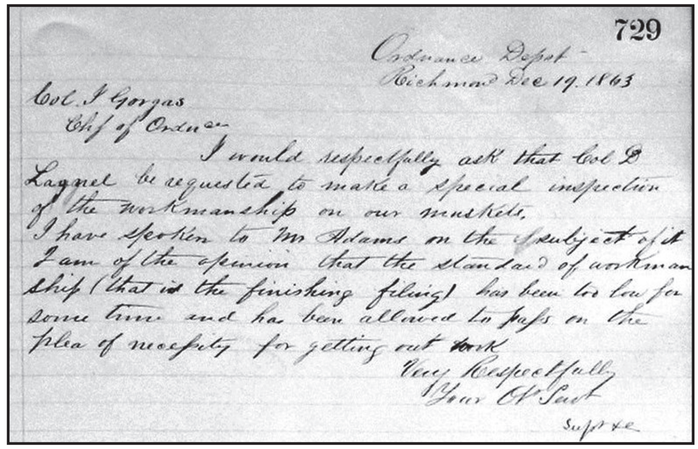

729
Ordnance Depot
Richmond Dec 19. 1863
Col. J. Gorgas
Chf of Ordnance
I would respectfully ask that Col D Lagnel be requested to make a special inspection of the workmanship on our muskets.
I have spoken to Mr Adams on the subject of it
I am of the opinion that the standard of workmanship (that is the finishing filing) has been too low for some time and has been allowed to pass on the plea of necessity for getting out work
Very Respectfully
Your Ob Servt
Supt &c

Figure 14. This letter to the C.S. Chief of Ordnance from Major Downer requests that a special inspection be completed because the standards of workmanship had slipped so low for the reason that the rifle-muskets and bayonets were required by the army as quickly as possible (National Archives).

Again, letters located in the National Archives provided information confirming the use of verifying gauges by Confederate inspectors. One example, dated May 12, 1863, was a letter from Major Downer to Colonel Gorgas, concerning a complaint from Captain John S. Hutter, commander of the Danville Arsenal (VA) (Figure 13). Downer requested Gorgas refer Hutter to pages 178 and 180 of the new (1863) *Ordnance Manual.* Downer stated these pages would inform Hutter of the *Ordnance Manual* description concerning the inspection of the ramrod threads which are "verified with the proper [verifying] gauges." Downer goes on to state that the ball screw and wiper are examined to verify the accuracy of the screw thread as well. Clearly, verifying gauges were used by C.S. ordnance inspectors.

To summarize, this study found that the Confederate States Ordnance Bureau followed the same process as its Union counterparts. The C.S. Ordnance Bureau had various models and sent them to armories and contractors to copy. Products were inspected by selected officers who used verifying gauges to check the form and dimensions. So, again, why do Confederate rifle-muskets and bayonets show the characteristics of "crude construction, welding flaws, forging flaws" as described by Reilly?

INSPECTION FOR FUNCTIONALITY OR STANDARDIZATION?

A letter from Major Downer to Colonel Gorgas on December 19, 1863, gives one major reason (Figure 14). Downer requested that a special inspection be conducted of the workmanship of the rifle-muskets at Richmond Armory. Downer stated that he is "of the opinion that the standard of workmanship (specifically, the finishing filing) has been too low for some time and has been allowed to pass on the plea of necessity for getting out work." Consequently, rifle-muskets and bayonets from the Richmond Armory had been passed by the inspectors if the parts were in working order, but might not fit the verifying gauges perfectly.

THE STUDY OF MANUFACTURING PROCESSES TO DEVELOP IDENTIFYING CHARACTERISTICS

The next question in the study concerns the actual manufacturing process within the armories. Until recently, little was known about the process of making M1855 bayonets for rifle-muskets.

What is known is that the machinery to fabricate the C.S. M1855 rifle-musket and bayonet at the Richmond Armory was taken from the Harpers Ferry Armory when that armory was seized by the Virginia Militia on April 18, 1861. In his book, *Harpers Ferry Armory and the New Technology*, Merritt Roe Smith summarizes the seizure as two complete sets of arms-making machinery with 4,287 finished firearms and enough components to assemble between 7,000 and 10,000 weapons. Smith writes that Southern sympathizers disassembled and packed over 300 machines, thousands of feet of belting and shafting, and 57,000 assorted tools for shipment to the Richmond Armory.[23]

In his book, *C. S. Armory Richmond*, Paul J. Davies includes a copy of a Confederate imprint entitled, "Doc. No. 40, Inventory of Musket Machinery, taken at Harper's Ferry, and now in the Armory at Richmond." Of interest to this study is the fact that 571 forged M1855 bayonets as well as another 2,014 M1855 bayonets in various stages of manufacture were taken by the Virginia Militia.[24] However, it is logical to assume that many of the dies, jigs, and small tools critical for the shaping and finishing the bayonet were lost during the destruction of the armory by the fire the Federal forces set before abandoning the Armory. Consequently, the workman at the Richmond Armory had to make these dies, jigs, and tools or accomplish certain process steps by hand, thereby creating a characteristic that can be used to identify the bayonet's origin.

Information on the manufacturing process of bayonets is scarce, only three major sources were found providing information on bayonet production. The first was found in the Barton J. Jenks Papers, 1830-1910, in the Hagley Museum and Library in Wilmington, Delaware.

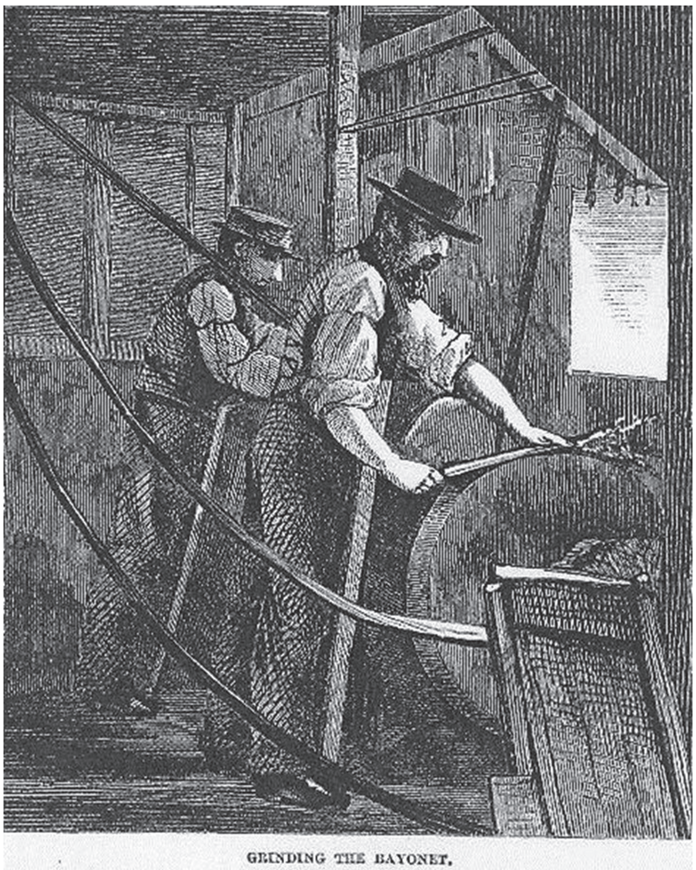


Figure 15. Illustration of the Norwich Armory's "Grinding the Bayonet" in 1864. (From the article in *Harpers New Monthly Magazine* of March 1864.)

Within these papers is a document from Cyrus Buckland, a foreman at the Springfield Armory, entitled, "Operations on Component Parts of Rifle Musket, as performed at the U.S. Armory, Springfield, July 1861."[25] A second source was the aforementioned book entitled, *C. S. Armory Richmond* by Davies.[26] Written in 2000, Davies quotes many original Confederate Ordnance Bureau letters and pay rolls from the Richmond Armory with bayonet production information. Finally, as already noted, information on bayonet production and inspection was found in original letters and documents located at the National Archives, Washington, DC.

Cyrus Buckland is listed in the payrolls of 1855 as a "Master Machinist on Experimental and Model Arms."[27] The document was sent to Mr. Barton J. Jenks, who was preparing to produce his first rifle-musket under contract to the U.S. Ordnance Department. To help Jenks with setting up his manufacturing process, Buckland listed the process steps to make a bayonet, bayonet clasp ring and clasp ring screw.

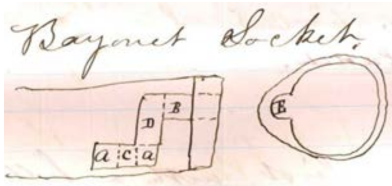
There were 33 separate manufacturing steps to produce a bayonet, another 18 steps to make a bayonet clasp ring, and six steps to manufacture the clasp ring screw, a total of 57 steps!

The bayonet manufacturing process was studied to determine when the workman had to actually touch the bayonet which might produce an identifying characteristic, such as off-center boring or excessive grinding. The steps with a possibility of creating a "difference" from the standard U.S. bayonet have been identified with an asterisk. (The comments in italics have been added to the document by the author to define the step.)

Bayonets[28]

1. Socket plate cut off
2. Plated (*for increased solder-ability and hardness)*
3. Blade forged
4. Neck headed ready for welding to *socket (upset forging to increase diameter by compressing its length)*
5. *Socket welded on — Hand
6. *Socket lap welded — under hammer (*forged welded)*
7. *Neck Swaged (*Forced through a confining die to reduce diameter)*
8. Annealed (*Heat treatment; increases ductility [such as stretching a metal into a wire] and reduces hardness)*
9. *1st Bored Socket drilled or bored out
10. 1st turned from bridge to neck
11. Blade milled 1st cut. Facing inside of blade from neck, forward 4 inches.
    1 fixture, 2 bayonets at a time
12. *2nd cut. Milling Face flutes entire length
    2 bayonets in a fixture
13. *3rd cut. Edges and Back rib.
    1 fixture, 3 bayonets at a time
14. *4th cut. Back flutes. Bridge fix,
    2 bayonets in a fixture.
15. *5th cut. At heel. Edges the blade at commencement of neck at each side.
    2 bayonets in a fixture.
    Points sheared off in a press.
16. *6th cut. Sides of point. Cross
17. *7th cut. Face of point. Cross
18. Tempered *(heated the metal to a proper temperature to reduce Brittleness)*

19. *Buffed — Buff ground on the face, edges & back.
    Grooved — Slot punched in 5 operations
20. *1st cut. A
21. *2nd cut. B
22. *3rd cut. C
23. *4th cut. D
24. *5th cut. Hole in bridge shaved. E



25. *Finish Bored
26. 2nd turned — same as first turning
27. Socket milled — each side of neck. Quite round
28. 3rd turned — Turns bridge
29. *filed — Necks.
30. *Ground — Back flutes on a grind stone
31. Drilled — and tapped for clasp stop screw
32. Polished
33. *Beveled — Corners smothed [sic, smoothed] with file

Bayonet Clasp

1. Forged
2. Annealed
3. Trimmed — Outside
4. 1st Drilling — hole in center .10″ diameter and stud hole
5. Punched — Stud hole to shape
6. 2nd bored — Hole bored up to size for reaming
7. 1st milled — to thickness under a press
8. 2nd milled — Milled all around. Also over top of stud 3 in one fixture
9. *2nd drilled — Screw hole
10. 3rd milled — cuts facing or notch which comes against stop screw
11. Profiled — Inclined edges which bear against barrel stud
12. Reamed — to size
13. 4th milled — Outside 2nd time
14. 1st polished
15. Slit — Stud sawed open
16. Filed
17. 2nd polished
18. Beveled — Corners taken off slightly with file

Bayonet Clasp Screw

1. Forged
2. Annealed
3. Milled & Cut
4. Finished
5. Tempered
6. Polished

Clasp Stop Screw – Finished from wire

* Operations that may cause an identifying characteristic.

C.S. M1855 RICHMOND SOCKET BAYONET CHARACTERISTICS

Using extant examples and the manufacturing process steps outlined above, the following list of identifying characteristics was developed. Rarely do all of these characteristics show on the same bayonet, although the blade will never show a "U.S." marking. Normally, a number of these identifying characteristics will be found on a bayonet, while other characteristics will be missing. Typically, when a sufficient number of characteristics exist, the determination of "Confederate" may be made. The number varies as some characteristics are more important than others. This list of characteristics have been observed on extant examples, and connected to the process steps above.

1. The bayonet weighs 4 ounces more than its U.S. counterpart due to the amount of iron in the metal. Often the metal is spotted or discolored due to the high content of iron in the steel.
2. The shank is 0.25″ longer than standard. (Step 7 — Neck swaged)
3. Weld of shank to socket is noticeable. (Step 5 — Socket welded on)

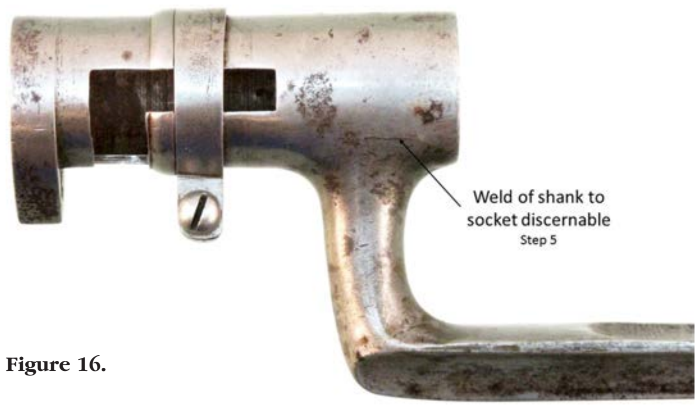


Figure 16.

4. Socket lap weld is discernable. (Step 6–Socket lap welded - under hammer)

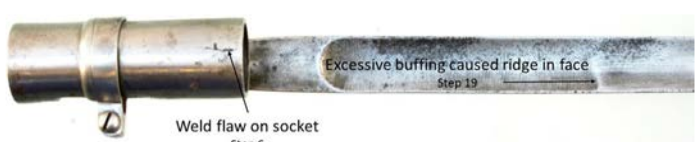


Figure 17.

5. Face flute is over-ground causing an uneven blade. (Step 19 — buff ground on the face)
6. The muzzle bore is off-center. (Steps 9 — 1st Bored and Step 25 — Finish Bored)
7. The bore of the bayonet is larger (.790" rather than .783") to fit on both Richmond and Enfield rifle barrels. (Step 25 — "Finish Bored")

Figure 18.

8. The fullers cut into the blade are off-center. (Steps 12 and 14 — Milled 2nd and 4th cuts); (Step 30 — Ground back flutes on grind stone)
9. The edges of the blade are not straight. (Step 13 — Milled 3rd cut)

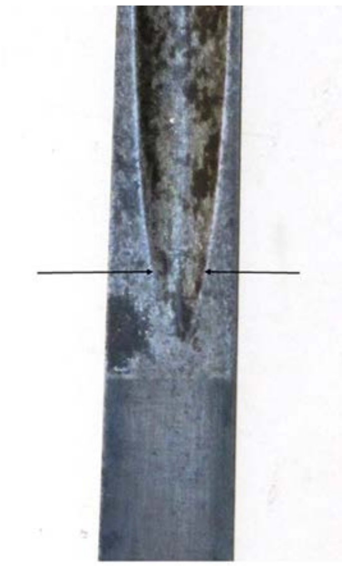


Figure 19.

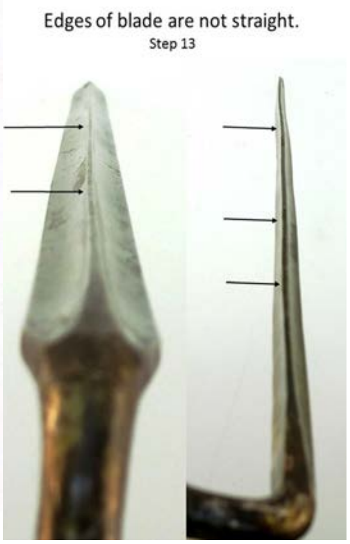


Figure 20.

10. The socket mortise is wider, 0.280″ vice 0.260″, to fit the wider Enfield front sight base, (Steps 20-23 — Grooved 1st-4th cuts)

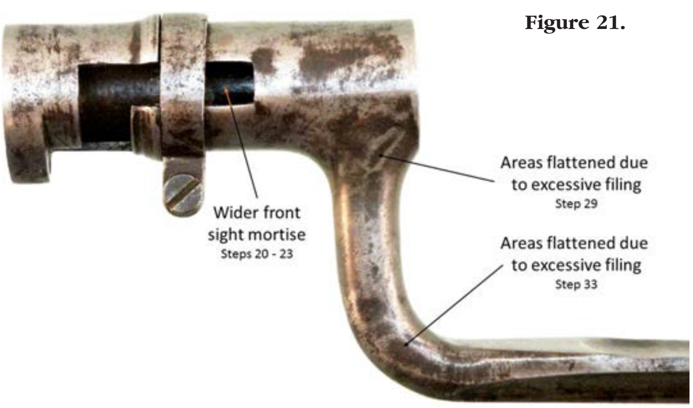


Figure 21.

11. The area around weld of shank and socket shows excessive filing causing flat areas. (Step 29 — Filed Necks)

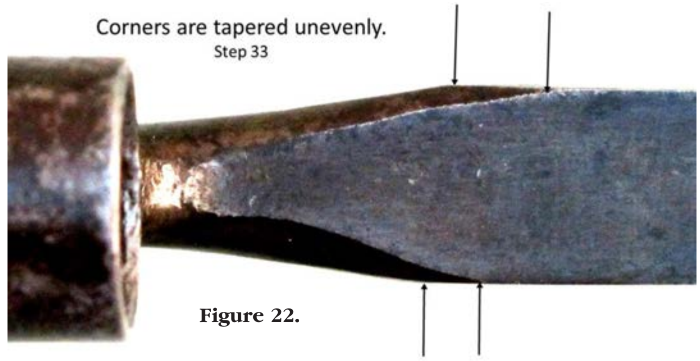


Figure 22.

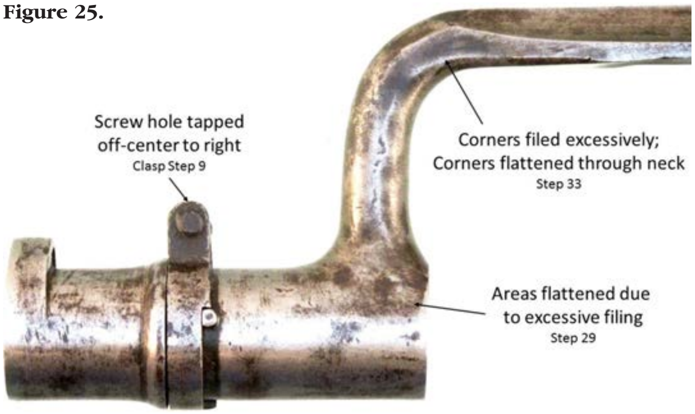
12. The corners are tapered unevenly. (Step 33 — Beveled-Corners smoothed with file)
13. The muzzle to stud distance varies with the result that the front of the socket and barrel muzzle are not flush. (Step 20 — slot punched 1st cut)

Figure 23.

14. The mortise cut through the bridge is off-center. (Step 24 — Grooved 5th cut)
15. The screw hole in the clasp ring is off-center. (Clasp Step 9 — 2nd Drilled)

Figure 24.

Figure 25.



It must be noted that any one C.S. bayonet may not exhibit all 15 identifying characteristics. Understanding the manufacturing process and knowing the characteristics that have been observed on known Confederate fluted bayonets will certainly aid the collector in the identification of these rare bayonets.

To summarize, it was found that the personnel in the Confederate Ordnance Bureau followed the same processes that they had learned before the Civil War. However, due to shortages of iron and steel and the need to arm the Confederate army with as many weapons that could be manufactured in the shortest time possible, shortcuts had to be taken. Confederate inspectors were passing small arms and bayonets as long as the arm functioned well. They paid little attention to standardization and appearance.

The manufacturing process used at the Springfield Armory in 1861 was a useful tool during the study and, as a result, a number of identifying characteristics of the Confederate fluted bayonets have been noted. The Confederate characteristics described by Reilly more than 25 years ago, "crude construction, welding flaws, forging flaws," have been expanded into 15 identifying characteristics. As more examples are located, additional characteristics may be found.

NOTES

1. Hardin, A. N. Jr., *The American Bayonet, 1776-1964*, Riling and Lentz, Philadelphia, Pennsylvania, 1964, p. 40.

2. Reilly, Robert M., *American Socket Bayonets and Scabbards*, Andrew Mowbray Inc. — Publishers, P.O. Box 460, Lincoln, Rhode Island 02865, 1990, p. 80.

3. Davies, Paul J., *C. S. Armory Richmond*, self-published, Carlisle, Pennsylvania, 2000.

4. Schmidt, Peter A., *U.S. Military Flintlock Muskets and Their Bayonets: The Later Years 1815 — The Civil War*, Andrew Mowbray Incorporated, Publishers, Woonsocket, Rhode Island, 2007, pp. 219-220. Schmidt quotes these regulations from "Whitney Papers, Reel 5, p. 1068."

5. A "stand of arms" was defined by the *Ordnance Regulations* as a rifle-musket and bayonet in the Civil War period.

6. Ordnance Department, *Regulations for the Government of the Ordnance Department*, Washington: Printed by Gideon & Co., 1852, p. 27.

7. Ordnance Department, *The Ordnance Manual for the Use of the Officers of the United States Army. Third Edition*., Philadelphia: J. B. Lippincott & Co., 1862.; hereafter "*Ordnance Manual 1861*."

8. *Ibid,* pp. 188-189.

9. *Ibid*, p. 190.

10. *Ibid*, pp. 190-191.

11. *Ibid*, p. 188.

12. *Ibid*, pp. 219-220.

13. Richards, T. Addison, "The Norwich Armories," *Harper's New Monthly Magazine*, No. CLXVI, March, 1864, Harper & Brothers, Franklin Square, New York, pp. 450– 465. This article can be found on the Internet, at the Cornell University's "Making of America" Website. Note: the line drawings in Figures 4, 6, 7, and 15 are from this article.

14. *Ibid*, p. 460.

15. *Ibid*, p. 456.

16. *Ibid*, p. 461.

17. *Ibid*, p. 458.

18. [1] The terms, "Ordnance Department" for the U.S. and "Ordnance Bureau" for C.S. are synonymous. In the *Regulations for the Government of the Ordnance Department of the Confederate States of America*, printed in Richmond by West & Johnston in 1862. Section 1 is entitled, "Regulations for the Ordnance Bureau of the Confederate States, Section I. — Ordnance Bureau in General."

19. Confederate Ordnance Bureau, *The Ordnance Manual for The Use of the Officers of the United States*, Second Edition, Charleston: Evans & Cogswell's steam power presses, 1861, pp. 173-174; Richmond, Va. West & Johnston, 145 Main Street, 1861. pp. 173-174.

20. Confederate Ordnance Bureau, *The Ordnance Manual for the use of the Officers of the Confederate States Army. Prepared under the direction of Col. J. Gorgas, Chief of Ordnance, and approved by the Secretary of War. First Edition.* Charleston: Evans & Cogswell, No. 3 Broad Street, 1863.

21. *Ibid*, p. 179.

22. *Ibid*, pp. 208-209.

23. Smith, Merritt Roe, *Harpers Ferry Armory and the New Technology, The Challenge of Change*, Cornell University Press, Ithaca and London, 1977, p. 319.

24. Davies, Paul J., *C. S. Armory Richmond*, self-published, Carlisle, Pennsylvania, 2000, Davies includes "Doc. No. 40, Inventory of Musket Machinery, taken at Harper's Ferry, and now in the Armory at Richmond" on pages 330-339 as from the collection of Lewis Leigh.

25. The Barton J. Jenks papers were furnished courtesy of the Hagley Museum and Library, Lucas Clawson, Reference Archivist/Hagley Historian, Manuscripts and Archives Department, in Wilmington, Delaware.

26. Davies, Paul J., *C. S. Armory Richmond*, self-published, Carlisle, Pennsylvania, 2000.

27. National Archives and Records Administration (NARA), Record Group 217, Records of the Accounting Officers of the Department of the Treasury, Second Auditor, Entry A-1 523B, Accounts and Claims, 1855-98, (Settled Accounts and Claims, 1817-94) 1855, 3244 to 3272, Box No. 23, Springfield Payroll for April 1855.

28. Barton H. Jenks Papers, 1830-1910, Manuscript Accession 1852, Box 2, Folders 1,2,3, Hagley Museum and Library, Wilmington, Delaware.