

Report on the Cannon Found in the Memorial Triangle Park, Brookhaven, NY

By Richard A. Thomas

This article is a consolidation of several emails written by Dr. Richard A. Thomas summarizing his research on the cannon prominently displayed in the Memorial Triangle Park, Brookhaven, NY. These communications, to members of the Fire Place History Club, were made in May and June, 2015, and have been slightly edited for this compilation.



The cannon is a Model 1885 3.2-inch breech-loading field rifle, nicknamed “the grasshopper.” Some call it the Model 1885 3.2-inch RBL field cannon. (RBL = rifled breech-loading.)¹

The year of manufacture, “1887,” is stamped on the muzzle front of the Brookhaven cannon. [See Appendix I for details.](#)

The letters “W.P.F.” is stamped at the lower left on the front of the muzzle. “W.P.F.” was the West Point Foundry in Cold Spring, N.Y., that, at the time of the Civil War, was operated by Robert Parker Parrott (R.P.P.). I don’t know who operated it in 1887 when the Brookhaven cannon was made.



The recoil brakes, with their bow springs, threw the gun forward and back, thus the nickname “grasshopper.”

¹ It wouldn’t have been reasonable for the War Department to give or loan new cannon it just had produced to fight World War I, so the artillery they gave away --- or “loaned,” was that which was no longer of use, including older German artillery from the war. A web site has speculated that the Brookhaven cannon might be a German Krupp 9-cm field gun. This model of field cannon, though outdated, was used by the Germans during the Great War, but the Brookhaven gun has a breech mechanism that looks very different from the Krupp field gun.

There was also a West Point Foundry Arsenal (W.P.F.A.) that served as a receiving and storage depot for government weapons made at the West Point Foundry.

The “803” on the right side of the front of the muzzle is the weight in pounds of the Brookhaven cannon at its manufacture. The weight does not include the weight of the gun carriage.

The 3.2-inch field gun carriage is sometimes called the Lt. Buffington steel gun carriage. It was invented by Lt. Albert R. Buffington while he was at the Springfield arsenal. He also designed the limber and caisson for the 3.2-inch field gun.

[Appendix II for details.](#)



Several coats of paint make it difficult to see the markings on the muzzle, even when viewed directly and up close. Several independent viewers agree with Dr. Thomas' description, above

The field rifle is covered in detail in Chapter IV of *Modern Guns and Mortars*, a circular for the course of instruction for artillery gunners, by the late Capt. Charles C. Morrison, Ordnance Dept., and Capt. James C. Ayres, also of the Ordnance Dept. The circular was published in **1895**. Chapter IV is on “Field Cannon and Carriages.” Here is the link to *Modern Guns and Mortars, Artillery Circular 1, Series of 1893*:

https://books.google.com/books?id=YBrOAAAAMAAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false

From: http://fieldsofthunder.com/artillery_cannons/

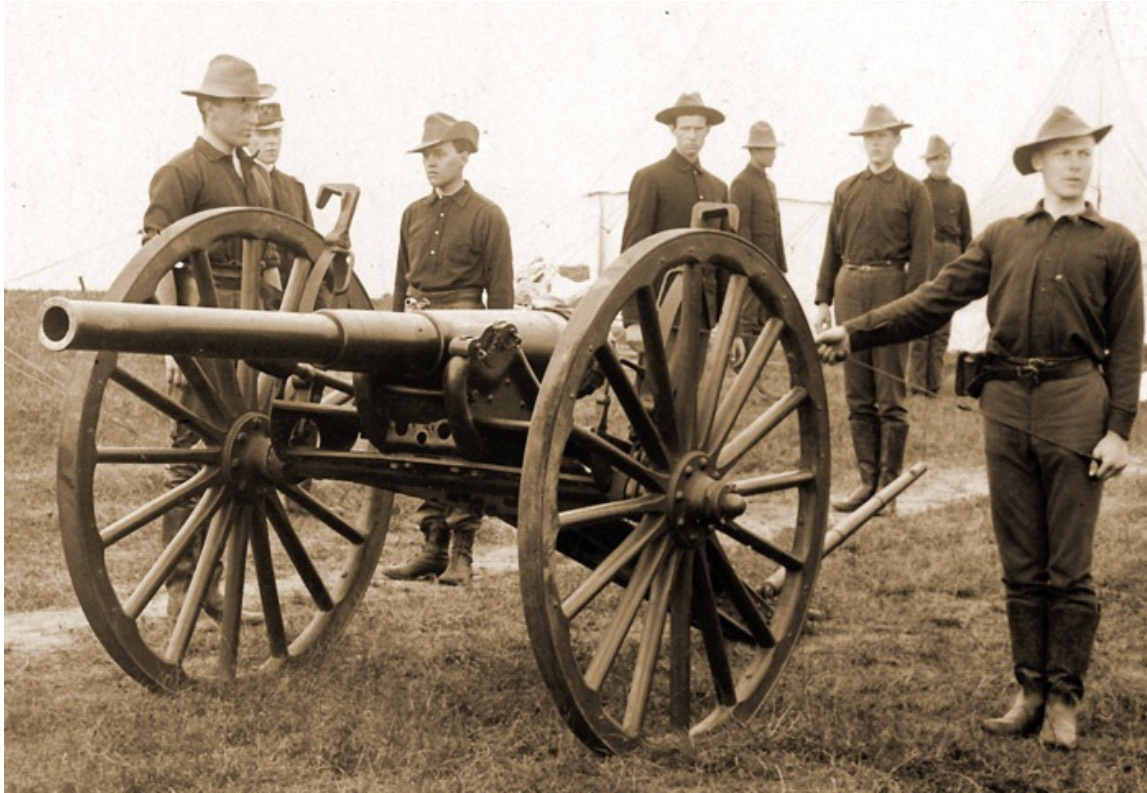
The next improvement for the U.S. cannon, which happened after the Civil War, was changing from muzzle (front) loading to breech (rear) loading cannons. One of the breech-loading field cannons adopted for the United States services was the 3.2-inch field rifle.

3.2 Field cannon – U.S. Model 1885

The newly designed 1885 3.2 Field Gun, unlike its predecessor the 3" Ordnance rifle (a front muzzle loading gun), was developed to load from the rear. This enabled the crew to load and fire at a more rapid rate. Its Indian War Era service record includes Wounded Knee in 1890. This gun was used in the Spanish American War battle at Santiago de Cuba and the Philippine Insurrection.

3.2 Field Gun *Ballistics* Information

These breech loading unique weapons were the 1st to use dampening recoil brake systems throwing the gun forward and back, giving it the nickname "grasshopper". Barrel length is 88" long with a 3.2" bore giving it an accuracy range of 5000 yards.



Model 1885 Cannon during Spanish American War Era. Although a soldier is holding the lanyard to fire the gun, the picture is posed as the recoil brakes have not been engaged. It is from: <http://www.barking-moonbat.com/index.php/weblog/comments-editor/18753/>

Although breech loading (a RBL, rifled breech loading gun), these guns were not QF guns (quick firing). A QF gun, in addition to breech loading, requires a pneumatic or spring recoil system which didn't appear until about 1895.



You can see a picture of this gun being used by the 71st NY Infantry on San Juan Ridge in July 1898 here: <http://www.history.army.mil/documents/spanam/WS-art.htm> 3.2-inch field gun, San Juan Ridge, Santiago de Cuba, July 1898

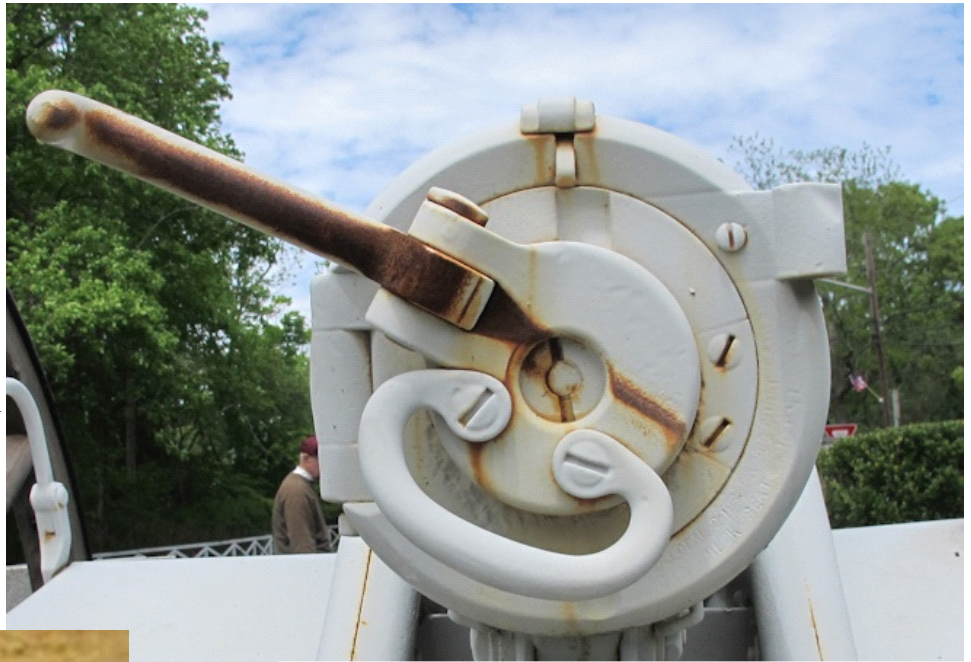
Even though out-of-date, there were 123 of these guns still "in service" in 1917.

You can see a great video of the gun being fired here: <http://www.history.com/shows/top-shot/videos/weapons-rundown-32-bag-gun> (The video is of the Model 1897 rather than the Model 1885 of the 3.2-inch field gun, but the models aren't very different. The M1885 field gun can be distinguished from the M1890 because the M1885 required three major castings, a tube which included the muzzle, a sleeve, and the trunnion casting. The M1890 had only the tube and trunnion castings.)

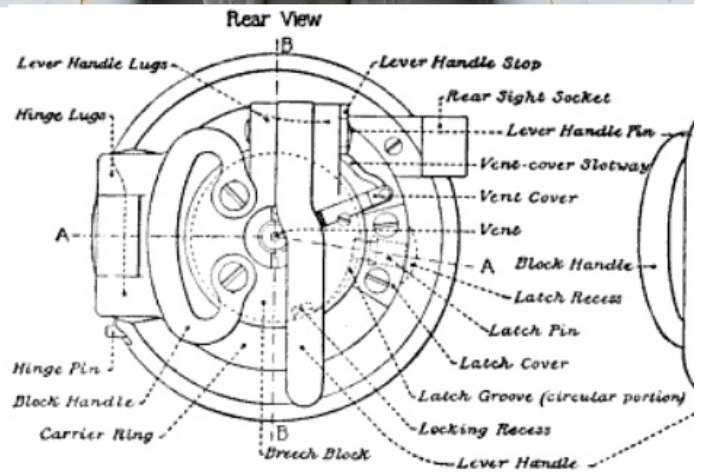
The picture is from: http://rememberthemaine.com/?wpsc_product_category=remember-the-maine-collection That web site calls it a Model 1898, but even though that particular cannon may have been manufactured in 1898, I don't think there was a Model 1898, so it is a M1897. I think it is the Spanish-American War, but it could possibly be later. (It could be the Philippine-American War of 1899-1902.)

The breech block of the Brookhaven cannon is rotated from the drawing. “The block is locked in its seat by a revolution of 60° about its longitudinal axis.”

This model of cannon was improved over earlier designs in having “gas check seats” and “special cups.” These are described in the circular, (they are parts of the “obturator”), but I couldn’t make much of the description other than it is very important to be able to handle the gas from the explosion that propels the shell.



A Model 1897 cannon ready to fire.



Here is how it used to look on the inside.

A circular wood block on the front [muzzle] of the Brookhaven cannon has rotted and fallen away (someone has placed it on the cannon carrier), so I expect the interior now fills up with water. The bore is very rusty.

The Brookhaven field rifle appears to be mounted on a standard field carriage for this 3.2-inch gun. It has the “lazy tongs” and “crank handle” for elevating the gun. It also has the bow-spring brakes for normal braking and for countering recoil.

There was a light carriage and a heavy carriage. The circular gives the weights and “weight per horse,” from which it is clear that the cannon, carriage, and *limber*** (we don’t have the limber) were pulled by six horses or mules.

A *caisson* was also available for this model field gun. The caisson (an auxiliary carriage that accompanies the main gun) carried pickaxes, shovels, spades, metal water buckets (unless they had been replaced by the new canvas bags), lantern, grease can and spatula, space for two extra boxes of projectiles, cartridge bags, and even a spare wheel.

There was also a *battery wagon* for the 3.2-inch rifle. It was made of “whitewood and oak, with three compartments.” There was one chest of saddler’s tools and another chest of carpenter’s and wheelwright’s tools. The chests had handles, so they could be “carried about.” They also had locks and keys. The battery wagon carried a grindstone, cans of sperm oil and coal oil, an anvil and a vise, and a forge chest. The forge chest contained a portable “Empire” forge, hammers, tongs, chisels, punches, a 12-inch bastard file, a 2-foot wood rule, a steel square, 2 smith’s leather aprons, a fire shovel, a fire rake, etc., etc.

There is a 3.2-inch field gun in the Memorial Park of Flemington, NJ. It points down Main Street. They painted their gun black. <http://www.barking-moonbat.com/index.php/weblog/comments-editor/18753/>

Here is the link to *Modern Guns and Mortars, Artillery Circular 1, Series of 1893*:

https://books.google.com/books?id=YBrOAAAAMAAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false

The chapter on the Brookhaven cannon is Chapter IV.

CHAPTER IV.—FIELD CANNON AND CARRIAGES.

THE 3.2-INCH FIELD GUN, 98. Breech mechanism, 93; weights, dimensions, etc., of the 3.2-inch rifle, 100; range table for 3.2-inch B. L. rifle, steel, with common shell, 101; range table for 3.2-inch B. L. rifle, steel, with shrapnel, 103; fuze scale, 103; carriage for 3.2-inch B. L. rifle, 105; limber for 3.2-inch rifle, 112; weights of the gun, gun carriage, limber, and equipment, 119; caisson for 3.2-inch B. L. rifle, 119; weight of caisson and equipment, 123; combined forge and battery wagon for 3.2-inch rifles, 123; weights of forge and battery wagon and equipment, 127. **THE 3.6-INCH FIELD GUN, 127.** Weights, dimensions, etc., of the 3.6-inch rifle, 128; carriages for the 3.6-inch B. L. rifle, 128. **THE 3.6-INCH FIELD MORTAR, 131.** Weights, dimensions, etc., of the 3.6-inch mortar, 132; carriage for the 3.6-inch B. L. field mortar, 135.

The breech-loaded, 3.2-inch rifle was entered in the World’s Exposition in Chicago in 1893, and in the awards book for the fair it is described as having a weight of 805 pounds. Perhaps the West Point Foundry weighed each cannon and stamped on the weight so one could figure out how many horses or mules one would need to pull it.

During the Civil War, the West Point Foundry stamped the following on the muzzle faces of its cannon:

Upper Muzzle Face: weight in pounds, Registry Number, year of manufacture, W. P. F. for West Point Foundry

Lower Muzzle Face: Initials of ordnance inspector, bore diameter in inches

On the *tube top* over the trunnions: “U.S.,” the Federal mark of reception. The Brookhaven cannon has this mark.

I suppose what I thought was “N.-12” could be the registry number, No. 12, with the “o” raised with a line under it.

I also found a report of all the changes they had the West Point Foundry make during the manufacture of the first twenty-five 3.2-inch guns.

** A limber is a two-wheeled cart designed to support the trail of an artillery piece, or the stock of a field carriage such as a caisson or traveling forge, allowing it to be towed.

Breech-loading was a new thing, so there were a lot of details to work out. The parts of the gun were assembled by heat shrinkage. (We tried that with the original ISABELLE (WASABELLE) superconducting magnets. That didn't go so well.)

The report includes an appendix entitled "Specifications for the Fabrication, Description and Nomenclature of 3.20-inch B. L. Rifle, Steel," and is accompanied with tracings and plates.

There is a step that says "weigh and stamp the gun." See: *Annual Report of the Chief of Ordnance*, June 30, 1889, (How to Make a 3.2-inch breech-loading rifle):

https://books.google.com/books?id=T5MtAAAAIAAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false

Where did Brookhaven's Cannon Come from? Perhaps New York City?

The War Department report on the Militia in 1907 stated that New York First Battery (NYC) had 4 breech-loading rifles, caliber 3.2, Model 1885 in serviceable condition, along with 4 carriages with limbers.

The New York Second Battery had 4 Model 1904 3" guns instead. The Third Battery (Brooklyn) had 4 Model 1902 3" guns. (The 3-inch guns had replaced the 3.2-inch field guns.)

The Sixth Battery (Binghamton) also had 4 breech-loading rifles, caliber 3.2, Model 1885 and 4 carriages with limbers.

I don't know why the First Battery and the Sixth Battery got stuck with the old guns. They were the only ones with Model 1885 guns in New York, but there were also some in Colorado and Wichita, Kansas.

Terminology: *Modern Guns and Mortars*, Chapter 1 has a discussion of all the terms used.

<https://books.google.com/books?id=YBrOAAAAMAAJ&pg=PP5&dq=artillery+circular+1895&hl=en&sa=X&ei=n4IsVfe00tejyAS39oOQDA&ved=0CCYQ6AEwAA#v=onepage&q=artillery%20circular%201895&f=false>

The powder charge for the 3.2-inch breech-loading rifled field cannon was in a "cartridge bag" rather than in a metallic cartridge case. (For those guns for which the powder charge is in a metallic cartridge case, the case also supports the base of the projectile.)

The bore of the cannon is the hollow portion in the center of the gun in front of the breech mechanism. It is composed of the main bore, the powder chamber, and the shot chamber. The main bore is the rifled portion through which the projectile travels. The powder chamber is composed of the main cylindrical part, ordinarily larger than the main bore, and of the front slope of the powder chamber, which is a conical surface uniting it with the shot chamber. The shot chamber is the seat of the projectile in front of the powder chamber. It is composed of the cylindrical portion, the short cone at the seat of the forcing band, known as the forcing cone, the long cone from the bottom of the rifling uniting the cylindrical part with the main bore, designed to make the deformation of the rotating band on the projectile gradual. (There is a soft metal band on the projectile. In its forward motion the band is so deformed by the lands (the flat part of the rifling between the grooves of the rifling) as to leave portions filling the grooves between the lands, which, acting as studs in keyways, constrain the projectile to make one complete revolution about its axis for each turn of the grooves.

The charge consists of

1. the powder and
2. the projectile

The powder charge is enclosed in one or more silk or serge bags, and is separate from the projectile.

The projectile is the missile thrown from the gun. Projectiles are of four classes:

1. shot,
2. shell,
3. shrapnel, and
4. canister.

Shot are projectiles not designed to carry bursting charges.

Shells are projectiles in which there is a cavity capable of holding a bursting charge to be ignited by a fuze [sic], ordinarily upon impact.

Shrapnel are projectiles with a thin wall enclosing a number of balls or small projectiles and a bursting charge, which is ignited at a desired distance from the gun by a combination fuze.

Canister are projectiles with a thin wall, enclosing a number of small projectiles, but with no bursting charge.

The fuze is a device for igniting the bursting charge in a projectile at a desired point. It may be a percussion fuze or a time fuze or a combination fuze.

The primer is the device for igniting the propelling charge.

There are two general classes of primers. The field gun friction primer is slipped into the vent without screw thread.

Obturator primers are screwed into the axial vent.

Chapter VII of the above reference is all about projectiles and Chapter VIII is about "fuzes."

Appendix I.

Notes on Gun's Manufacture

In 1885, the Ordnance Department issued an order for five M1885 3.2-inch guns with the DeBange obturator to the Watertown Arsenal in Watertown, Massachusetts, and an order for twenty M1885 3.2-inch guns with the Freyre obturator to the West Point Foundry.

Description of Obturation from Ordnance and Gunnery, A Text-Book Prepared for the Cadets of the United States Military Academy, West Point, by Ormond M. Lissak, 1914, p. 260.

Obturation.—There must be provided at the breech of the gun some device that will prevent the powder gases from passing to the rear into the threads and other parts of the breech mechanism. If any passage is open to the gases they are forced through it with great velocity by the high pressure existing in the bore. Their velocity together with their high temperature give s to them great erosive power, and the threads and other parts of the breech mechanism subject to their action are eroded, channeled, and worn away to such an extent that the breech mechanism is soon ruined and the gun is rendered useless.

In guns that use fixed ammunition the obturation is performed by the cartridge case, which expands under the pressure in the bore to a tight fit against the walls of the gun. The breech mechanism of these guns contains, therefore, no obturator parts.

Work began on the 20 guns at W. P. F. on 06 Mar 1886, and all were completed by 25 Aug 1887.

As the first order went to the Watertown Arsenal, the 20 guns made at the West Point Foundry were numbered 6 through 35.

The Brookhaven cannon is very probably No. 12 of this order, the sixth 3.2-inch breech-loading field gun made by the West Point Foundry. "N^o 12" is stamped on the gun's muzzle.

After the guns had been issued to the field artillery, it was found that the Freyre obturator was easily damaged during operation, so when the next seventy-five 3.2-inch field guns were ordered, they were all ordered with the DeBange obturator.

A third model of the 3.2-inch breech-loading rifle is called the Model 1897. It was designed for use with smokeless powder.

Although the cannon is a rifled breech-loading cannon, having an interrupted screw breech block that could be quickly opened, it didn't have "fixed ammunition" (that is, it didn't use cartridges, the powder was in a silk or cloth bag).

The Model 85/95 field guns could use the same powder. The powder chamber was made smaller in the M1897.

After the first orders, a gun factory was constructed at Watervliet Arsenal in New York with four 45-kW dynamos for electric power in the factory. The report for the fiscal year ended 30 Jun 1893 stated that the Watervliet factory had produced one-hundred and one 3.2-inch B. L. rifles since the beginning of operations.

Some of the Watertown Arsenal guns had also apparently been constructed with the Freyre obturator, as the Watervliet Arsenal reported that in other work of the fiscal year ended 30 Jun 1893, it had altered four 3.2-inch B. L. rifles of the West Point Foundry series and two of the 3.20-inch B. L. rifles of the Watertown Arsenal series by changing the Freyre gas-checks to De Bange gas-checks and fitting them with automatic vent closers.

TABLE No. 1.—Numbers, weights, and preponderance of 3.2-inch breech-loading steel field guns.

Number of gun.	Number of tube.	Number of jacket.	Number of transition hoop.	Number of sleeve.	Preponderance.	Weight of gun.
6	7	5	13	22	41.75	803
7	17	19	8	20	40.50	803
8	14	13	14	18	41.50	803
9	8	14	17	25	40.75	803
10	8	16	12	9	42.25	802
11	18	22	22	7	41.50	803
12	12	24	10	17	41.00	803
13	15	17	11	19	41.75	802
14	13	25	6	21	41.25	803
15	20	23	9	14	41.25	801
16	9	3	25	23	42.50	803
17	22	15	20	15	42.00	803
18	24	11	24	6	42.00	802
19	21	10	18	10	42.00	801
20	11	21	16	8	42.50	803
21	25	20	7	13	42.50	802
22	10	9	21	10	42.00	803
23	23	18	23	11	41.75	802
24	15	7	15	12	43.00	803
25	15	8	10	24	41.25	802

Table from p. 313 of *Annual Report of the Secretary of War for the Year 1887. In Four Volumes. Volume III.*
<https://books.google.com/books?id=L5AdAQAAIAAJ&printsec=frontcover#v=onepage&q&q&f=false>

Seven more of the early M1885 field guns with the Freyre obturators had them replaced with DeBange obturators and five of the seven were also fitted with “automatic vent closers” at the Watervliet Arsenal, according to the report for the fiscal year ended 30 Jun 1898.

There are stampings on the Brookhaven cannon about “Special Cups” and a “Gas Check Seat,” but as I expect the breech block is now rusted in place, it isn’t possible to determine what sort of obturator it has.

Appendix II

Notes on the Gun Carriage

The first carriages for the 3.2-inch B. L. rifles were made at the West Point Foundry at Cold Spring for which they were allowed \$800, although it cost W. P. F. \$1,200 each to make them. These were tested at Sandy Hook where the carriages developed cracks and other multiple failures. The carriages were sent to the Watervliet Arsenal and A. R. Buffington was put in charge of analyzing the failures and coming up with remedies.

He reported that the defects “about cover the entire carriage, and leave very little beyond the form and dimensions as a basis to work upon.”

It was at this time that he came up with his idea for braking recoil.

I, at first, deemed it necessary to apply to this carriage some device for relieving it of the initial shock of recoil, but nothing comprising the simplicity, efficiency, and durability necessary for our service has occurred to me . . .

A description of the bow-spring brake that was ultimately developed, by Lt. Buffington himself, can be found in *Annual Report of the Chief of Ordnance to the Secretary of War for the Fiscal Year Ended June 30, 1887*, beginning at the bottom of page 318.:


<https://books.google.com/books?id=ztSgAAAAMAAJ&pg=PA451&jpg=PA451&dq=%223.2%22+carriage+Lt.+Buffington&source=bl&ots=fqLth6fo2N&sig=APZmK1O5EOIEIIV5UWJpJ7Q-Do&hl=en&sa=X&ei=zehTVfSPJ4ydgwTQ3YLACq&ved=0CCoQ6AEwAw#v=onepage&q=%223.2%22%20carriage%20Lt.%20Buffington&f=false>

In that same reference, beginning on page 91 is a report on the “Buffington Field Gun Carriage” which is followed by “Explanatory Remarks” by Lieutenant-Colonel Buffington.

For a link to Lt. Adelbert Buffington, use: <http://www.goordnance.army.mil/history/chiefs/buffington.html>

REPORT OF THE CHIEF OF ORDNANCE.

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The brake used is essentially the same as the Prussian, page 535, Fig. 40 (Report of Chief of Ordnance for 1877). This is objectionable if it is to be used for checking recoil, in that it consumes time to apply and release it in action, the position of the screw, being under the gun in front, is not convenient, and the bar passing under the trail, far to the rear, is in the way in the service of the piece, particularly when limbering up. For a brake for recoil and down hill, and to serve as a mud scraper for wheels, I propose an iron or steel bar or rod *eyed* to the shoulder washer of axle at one end, the other end being a flanged shoe forged on in such a way that when the bar is held up vertically (the position of the eye being on top of axle) the shoe can be passed outwardly over the tire and, when in this position, the bar be thrown to the front or rear—falling by its own weight—the shoe will fall upon the tire, with flange outside, overlapping it. After making a part revolution the wheels by this arrangement would be held firmly, the carriage sliding until recoil ceases. It would be automatic; thrown to the rear in firing it would break the recoil; to the rear on the march it would be a mud scraper for the wheel; to the front on the march it would brake down hill. When not in use it would be carried vertically, fastened to the seat on gun axle. Two, one for each wheel, would be placed on the carriage. Going down hill it would be sufficient to brake but one wheel. Should this proposed brake be found to check *rolling* recoil too suddenly a stiff, short spring of this shape  fastened at its center to inside of shoe may be added, or to insure an elastic system it would be well to make this addition at the start.

The Archibald wheel, as recommended by the Light Artillery Board, is considered to fill the requirements of our service.

From *Annual Report of the Chief of Ordnance to the Secretary of War for the Fiscal Year Ended June 30, 1884*.