IRON BRIGADE

Version 3

by

Mike Willegal
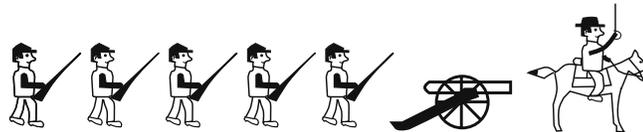
Miniature Wargame Battle Manual

Contents

•ABOUT THE IRON BRIGADE BATTLE MANUAL•

This battle manual is intended to help the gamer enhance the basic wargame as described in the `Iron Brigade` Rules booklet. Much of the information is presented in a form that could be used by the wargamer playing with other rules systems as well.

I would recommend that the optional rules (and ideas for rules) described here be used only on a selected game by game basis. In other words, to provide variety for a given game, a game master would selectively include, one or two rules from the battle manual. For example, one might use the visibility rules for a battle fought on a calm day, or in a fog. Another example might be the use of the worn out bronze cannon rule for an army that has been on an extended campaign.

Actually the amount of information about this war is so vast and varied that any gamer should be able to compile much useful information in no time at all. The structure of the basic rules themselves are very open and should not prevent you from creating or adding your own rules for special occasions. Do remember that the most important part of the rules system design was to keep the game simple and fast moving. Don't bog it down with too many exceptional rules, that won't really affect the outcome of the game.

Happy gaming

Mike Willegal   February, 1995

Comments and suggestions about this booklet and all the `Iron Brigade` rules and manuals are welcome. Please send to:

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X. Weapons

A) General

The basic game provides the wargamer with the tools to refight most of the ordinary engagements of the Civil War. This section will provide you with the weapons to add some variety to those otherwise ordinary engagements. These weapons include siege, naval, and other field guns not covered by the regular rules. This section will provide the gamer with specialized definitions for many specific arms that were used in the Civil War. If you know of a weapon that has not been included here, use your intuition to set up your own fire table using the tables given here as a starting point.

B) Field Cannon

Each type of cannon within each major type during the Civil War were about comparable. However there were some minor differences which could add some interest to your games. Detailed below are all the major types of cannon used during the war and many of the minor types.

Name: Name of piece, usually combined with caliber to specify exact type. If the initials BLR come after the name the piece is breech loading.

Caliber: Size of bore in inches, followed by weight of shot or bolt. Rifles usually known by size of bore, guns and howitzers by weight of shot.

Type: This refers to the fire table to use for this weapon.

Material: Type of material and construction of gun.

Bronze: Standard material for guns and howitzers. Weapons made of bronze almost never exploded when fired. All bronze cannon bore wore fairly quickly, but the rifles were especially bad and were not used much after the first few years of the war. Reduce the effectiveness of worn bronze cannon by one table at medium and long ranges.

Iron Wrought: Iron was the most successful of materials for the rifles just coming into use. Cannon made of this material were rarely known to explode when fired (only 1 instance of the 3" ordnance rifle failing is known).

Cast Iron: Cast iron pieces were easy to produce, but were unreliable in use. Many exploded when fired. Only 1 cannon exploded on the field at Gettysburg, and it was made of cast iron. When a battery of cast iron pieces fires, roll 3 six sided dice and if a 18 is rolled one casualty is taken from the battery because of an exploding cannon.

Steel: The latest in technology and very successful.

Can.: Indicates whether canister was available as ammunition for this weapon. Reduce effectiveness at short range by 1 table if canister is not available.

Shot: Used primarily on fortifications, ships and for counter-battery fire. Reduce effectiveness by 1 table if firing at any of these targets and shot is not available.

Shell: Would carry farther than case. If firing at infantry at long range and shell is not available, reduce effectiveness by one.

Case: Effective moderate range anti-infantry weapon. If firing at infantry at medium range and case is not available reduce effectiveness by one.

Wt: Weight classification for advanced movement purposes.

Num: An approximate number of that type of weapon used during the war. Few means less than 10 weapons of that type can be accounted for.

Year: Gives a rough idea of when cannons of this type were most frequently used.

Field Rifles (common to both sides)

Name	Caliber		Type	Material	Can.	Shot	Shell	Case	Wt	Num.	Year
Rifled 6 pdr. Gun	3.67"	12#	med	Bronze	*	*	*	*	lt	31	61-62
James Rifle *	3.8"	14#	med	Bronze	*	*	*	*	lt	180	61-62
James Rifle **	3.8"	14#	med	Bronze	*	*	*	*	lt	220	61-62
Ordnance Rifle	3"	10#	med	Iron	*	*	*	*	lt	870	62-65
Parrott	2.9"	10#	med	Cast Iron	*		*	*	lt	350	61-65
Parrott	3"	10#	med	Cast Iron	*		*	*	lt	280	63-65
Parrott	3.67"	20#	hvy	Cast Iron	*		*	*	hvy	296	61-65
Whitworth BLR	2.75"	12#	med	Steel		*			med	13	61-65

Field Rifles (US)

Name	Caliber		Type	Material	Can.	Shot	Shell	Case	Wt	Num.	Year
James Rifle ***	3.8"	14#	med	Steel	*	*	*	*	lt	6	62
Wiard	2.6"	6#	lt	Steel	*	*	*	*	lt	60	62-63
Wiard	3.67"	12#	hvy	Steel	*	*	*	*	med	18	62-63

Field Rifles (Confederate)

Name	Caliber		Type	Material	Can.	Shot	Shell	Case	Wt	Num.	Year
Armstrong BLR	3"	12#	med	Iron	*	*	*	*	lt	few	?
Armstrong	3"	12#	med	Iron	*	*	*	*	med	few	?
Blakely	2.9"	12#	med	Cast Iron	*		*	*	lt	few	61-65
Blakely	3.5"	12#	hvy	Steel	*	*	*	*	med	12	61-65
Blakely	4"	18#	hvy	Steel	*	*	*	*	hvy	few	61-65
Mountain Rifle	2.25"	6#	mt	Bronze	*		*	*	mt	few	62-65
Ordnance Rifle, CS	3"	10#	med	Cast Iron	*		*	*	lt	22	62-65
Ordnance Rifle, CS	3"	10#	med	Bronze	*	*	*	*	lt	20	62-65
Whitworth BLR	1.7"	3#	mt	Steel		*			mt	few	?
Whitworth BLR	1.92"	3#	mt	Steel		*			mt	few	64-65
Whitworth BLR	2.17"	6#	lt	Steel		*			lt	few	62-65
Whitworth	2.75"	12#	med	Steel		*			med	17	61-65

Field Guns (common to both sides)

Name	Caliber		Type	Material	Can.	Shot	Shell	Case	Wt	Num.	Year
Model 1841	3.67"	6#	6 lbr	Bronze	*	*	*	*	lt	700	61-63
Model 1857, Napoleon	4.62"	12#	12 lbr	Bronze	*	*	*	*	med	1100	61-65
Model 1841	4.62"	12#	12 lbr	Bronze	*	*	*	*	hvy	few	61-62

Field Howitzers (common to both sides)

Name	Caliber		Type	Material	Can.	Shot	Shell	Case	Wt	Num.	Year
Mountain, Model 1835	4.62"	12#	mt	Bronze	*	*	*	*	mt	400	61-65
Model 1841	4.62"	12#	12 lbr	Bronze	*	*	*	*	lt	250	61-64
Model 1841	5.82"	24#	24 lbr	Bronze	*	*	*	*	med	65	61-63
Model 1844	6.4"	32#	32 lbr	Bronze	*	*	*	*	hvy	25	61-62

*   The type 1 James Rifle was a 6-pdr gun Model 1841, rifled on James pattern with 15 rifling grooves.
**   The type 2 James Rifle was cast as a rifle in bronze. It had either 7 or 10 rifling grooves.
***   The type 3 James Rifle was cast as a rifle in steel. It had 10 rifling grooves.

Special Field Cannon Notes.

Breechloading Rifles were imported and used in limited numbers. The breechloaders really had little advantage in rate of fire because after recoil the gun would have to be wheeled back into position to fire, by which time a muzzle loader could be loaded. Most of these weapons were very accurate, but the pointing mechanisms were primitive and could not take full advantage of this, especially in hastily erected field positions. However, because of the compound advantages inherent in the use of breechloaders add 1 table to the effectiveness of breechloaders when firing at medium and long ranges. However there were often problems with the breech and when firing roll three six sided dice. If an 18 is rolled one casting is disabled and taken as a casualty.

Cast Iron Rifles could fire shot (bolts) but this increased the possibility that the cannon would explode. If bolts are fired from cast iron rifle, take one casting as casualty because of explosion if 17-18 is rolled on three six sided dice.

Wiard Rifles were mounted on specially designed carriages that allowed very high angles of fire. Most other carriages allowed only elevations of about 5 degrees.

Blakely Rifles had a tendency to destroy carriages. Whenever a firing a Blakely field piece, roll three six sided dice and if a 18 is rolled, one casting is disabled and taken as a casualty.

C) Small Arms

This section shows which shoulder arms fit into each class of small arms fire. Note that this cannot be a all-inclusive list and some weapons of one type may belong in different classes depending upon the manufacturer and the usage it has had. For the most part the Confederates did not use weapons requiring copper cartridges because of the scarcity of that mineral, especially after the loss of Tennessee.

Smoothbore Muskets	Obsolete Rifle Muskets	Rifle Muskets
Prussian	Austrian Consol,rifled	Austrian Lorenz
United States Flintlock	Austrian Thouvenin	Colt Special Model
United States Percussion	Leige	English Enfield Rifle
Austrian Consol	Mississippi	French Vincennes
	Palmetto	Remington
	Prussian	United States Springfield

Breechloading Rifles	Repeating Rifles	Muzzle loading Carbines
Sharps	Spencer*	Austrian Jaeger
Colt**		English Enfield
		French Carabine a tige
		United States M 1855

Obsolete Breechloading Carbines	Breechloading Carbines	Repeating Carbines
Hall	Ballard*	Spencer*
	Burnside*	Henry*
	Gallagher	
	Joslyn*	
	Maynard*	
	Merrill	
	Sharps	
	Smith	
	Starr	

* requires copper cartridge
** actually a repeater, but in this column because of obsolescent design

D) Snipers

The sniper's chart is an additional optional weapon classification. It really refers more about   the marksmanship and the assignment of the unit to special sharpshooting duties. These units should be of small size, 1 or 2 castings, and are allowed to shoot specifically at mounted personality figures instead of normal fire combat. Because of the special nature of personality figures, they are always considered $^1/_3$ ranks deep.

Snipers

```
 0   2   7  18
 1   6  17  28
12  11  10   9
```

E) Non-Field Cannon

Big guns were primarily intended for use in destroying fortifications and sinking ships. These rules do not attempt to simulate naval combat or the long protracted process of the seige. The rate of fire of some of the bigger guns could be slow as one shot in five minutes. Therefor guns marked with an asterisk (*) may fire only every other turn.

It may take many turns to set up these big guns. Therefore it is assumed that these guns are emplaced before the game begins. This will allow use of their long ranges. Without a prepared position these ranges would not be possible.

These effect charts are relatively untested, but could provide some twists in fighting land battles with off board support from stationary ships and fortifications.

1) Definitions

4 Truck carriage: The 4 truck carriage was the "standard" navy carriage for broadside cannon.

Barbette carriage: The barbette carriage was used with cannon mounted on the top deck of   forts and firing over the top of the parapet..

Casemate Carriage: The casemate carriage was used with cannon mounted such that they fired through an embrasure (opening in the wall) of the fort.

Seige Carriage: The seige carriage was a heavy duty version of a field carriage. Cannon   could be transported and fired on a seige carriage, but not nearly with the same ease as with field carriages. It was the usual procedure to fire guns mounted on seige carriages from prepared positions.

2) Cannon descriptions

Columbiads were used in fortifications for defense against attack by sea. The Rodman versions were developed just at the start of the war and used for defending Northern ports against attack, so were seldom in action. The older patterns were captured by the Confederates and used in repelling Ironclad attacks. A couple were rifled by the Confederates with mixed results. They were all mounted on fixed barbette or casemate carriages.

Columbiad,(Rodman)	Columbiad (Rodman)	Columbiad, Old Pattern,
10inch*	8 inch*	10inch*
0 7 29 81	0 6 37 97	0 7 25 73
6 28 80 160	5 36 96 180	6 24 72 144
10 11 10 8	9 10 9 7	10 11 10 8

Columbiad, Old Pattern, 8 inch*	Columbiad, 8 inch, Rifled*
0 6 33 87	0 7 25 101
5 32 86 162	6 24 100 200
9 10 9 7	9 10 9 7

Heavy Guns had been around for a long time at the start of the Civil War. Both versions were mounted on fixed barbette or casemate carriages in many forts around the coast and on the Mississippi River. The naval guns were also used afloat, usually on the standard 4 truck carriages. The 32 pdr versions were occasionally rifled by the Confederates.

Sea Coast Gun	Sea Coast Gun	Navy Gun
42 pdr*	32 pdr	42pdr*
0 5 21 49	0 4 19 49	0 5 21 49
4 20 48 78	3 18 48 76	4 20 48 78
10 11 10 9	9 10 9 8	10 11 10 9

Navy Gun, 32pdr	Gun, 32 pdr, Rifled
0 4 18 47	0 3 19 49
3 17 46 64	2 18 48 76
9 10 9 8	9 10 9 8

Siege and Garrison Guns were heavy long barreled weapons mounted on siege carriages for use in long term sieges ashore.

Siege & Garrison Gun, 24 pdr
0 3 17 45
2 16 44 70
9 10 9   8

Large Howitzers were designed to throw shells at a fairly high angle moderate distances. The sea coast versions were mounted on Barbette or Casemate carriages in well protected forts. The siege and garrison howitzer was mounted on siege carriages to be used by the land armies on the remains of fortifications after guns battered them down.

Howitzer,Sea Coast	Howitzer, Sea Coast	Howitzer,Siege&Garrison
10 inch*	8 inch*	8inch*
0 5 21 41	0 5 21 41	0 7 23 43
4 20 40 60	4 20 40 60	6 22 42 72
11 12 10 9	10 11 9 8	11 12 11 9

Howitzer, Siege & Garrison, 24 pdr
0 3 13 31
2 12 30 48
10 11 9   8

Mortars were designed to throw very large shell or case onto the enemy's entrenchments during a siege and could be quite effective for this purpose. The stone mortar fired a basket of stones a short distance and was used to protect permanent fortifications against storming parties.

Mortar, Heavy
13 inch*
```
 0  21  41   81
20  40  80  160
 -  11  10    9
```

Mortar, Heavy
10 inch *
```
 0  17  41   81
16  40  80  160
 -  10   9    8
```

Mortar, Light, 10inch*
10inch*
```
 0  13  41  61
12  40  60  80
 -  10   9   8
```

Mortar, Light, 8 inch*
```
 0  21  29  37
20  28  36  48
 -  10   9   8
```

Mortar, Stone*
```
 0   2   4   6
 1   3   5   7
10  11  10   9
```

Mortar, Coehorn, 24 pdr
```
 0  13  25  37
12  24  36  48
 -   8   7   6
```

War Rockets were used with poor results during the siege of Petersburg by the Union. Each 5 rockets fired counts as one cannon on the results table. Allocate a number of rockets to the player having them and keep track of the number fired.

War Rocket, Hales
2 1/2 inch
```
 0  21  29  37
20  28  36  48
10   9   8   7
```

War Rocket, Hales
3 1/2 inch
```
 0  21  31  61
20  40  60  88
11   9   8   7
```

Boat Howitzers were light cannon designed to be used ashore and in small launches by the Navy in hostile territory. They could be moved between a launch and a special carriage in a very short time (one turn). They did have a limited ammunition supply however. A special limber was designed for the Wiard Rifle and was issued to several Marine Corps artillery batteries.

Dahlgren, Boat Howitzer
12 pdr
```
 0   2  15  29
 1  14  28  40
 9  10   9   8
```

Dahlgren, BoatHowitzer
Rifled, 12pdr
```
 0   2  17  49
 1  16  48  68
 9  10   9   8
```

Wiard, BoatHowitzer
Rifled, 3.4 "
```
 0   4  25   73
 3  24  72  120
 9  10   9    8
```

Dahlgren Rifles were produced to provide the U.S. Navy with heavy rifles.

Dahlgren, Rifle, 30 pdr
```
 0   3  19  49
 2  18  48  76
 9  10   9   8
```

Dahlgren, Rifle, 50 pdr*
```
 0   4  21  49
 3  20  48  84
10  11  10   9
```

Shellguns were designed to destroy wooden ships with the large shells they fired. It turned out that the 15 inch version was very effective against Ironclads with less than 5 inches of iron backed by wood when solid shot was fired.

Dahlgren, Shellgun
9 inch*
```
 0   6  25   73
 5  24  72  136
10  11  10    8
```

Dahlgren, Shellgun
11 inch*
```
 0   7  25   73
 6  24  72  136
10  11  10    8
```

Dahlgren, Shellgun
15 inch*
```
 0   7  21  31
 6  20  30  44
11  12  11   9
```

Shellgun, Model 1845, 8 inch*
```
 0   6  25  45
 5  24  44  60
 9  10   9   8
```

Parrott Rifles were sometimes very unreliable, but proved useful, especially for long range bombardments. The 6.4 inch rifle was the most unreliable of the lot.

4.2 inch, 30 pdr
0   4 25 91
3 24 90 160
9 10   9   8

5.3 inch, 60 pdr*
0   5 25 101
4 24 100 200
10 11 10   9

6.4 inch, 100 pdr*
0   6 25 111
5 24 110 240
10 11 10   9

8 inch,200 pdr,(150)pdr*
0   7 25 101
6 24 100 200
11 12   11 10

Brooke Rifles were the South's answer to the Parrott and on the whole were excellent weapons aboard ship and in forts lining the sea.

rifle, 4.62 inch
0   4 25 91
3 24 90 160
9 10   9   8

rifle, 6.4 inch*
0   6 25 101
5 24 100 200
10 11 10   9

rifle, 7 inch*
0   6 25 111
5 24 110 240
10 11 10   9

Brooke Smoothbores served effectively mostly in forts lining the long southern seacoast.

smoothbore, 10 inch*
0   7 29 81
6 28 80 160
10 11 10   8

smoothbore, 11 inch*
0   7 37 97
6 36 96 180
10 11 10   8

Large English Rifles were imported by the south and used to some extent in the seacoast defenses and in Ironclads.

Armstrong, 8 inch*
0   6 25 111
5 24 110 240
11 12   11 10

Whitworth, 70 pdr*
0   6 25 101
5 24 100 200
10 11 10   9

Blakely, 4.5 inch
0   4 25 91
3 24 90 160
9 10   9   8

Blakely, 7 inch*
0   6 25 95
5 24 94 220
11 12 11 10

Blakely, 8 inch*
0   7 27 115
6 26 114 240
11 12   11 10

Other Siege Rifles. It was found that the 4.5 inch ordnance rifle could accompany an army on the march and proved effective at silencing troublesome enemy field batteries. The 4.5 inch ordnance rifle takes some time (10 turns) to emplace because of the seige carriage on which it was mounted. It should move as heavy equipment on the movement chart.

Sawyer, Rifle, 4.62 inch
0   2 15 45
1 14 44 60
9 10   9   8

Ordnance Rifle, 4.5 inch
0   4 25 73
3 24 72 120
9 11 10   9

F) Pike Units

Pike units were proposed by several southern leaders including Stonewall Jackson during the war because of the shortage of weapons. Fortunately no pike units were ever raised. They should always be considered of poor morale. They may only cause casualties if they are in contact with the enemy. Use the 10 results table and the fire combat rules to compute casualties.

G) Lancers

Few lancer units were formed during the war and they were not very successful because limited and haphazard training (not to mention the effect of modern rifled muskets). Usually they soon discarded the lances and acquired more conventional weapons.   Lancers may only use the lances when they are in contact with the enemy. Use the 11 results table and the fire combat rules to compute casualties when in contact with the enemy. Enemy units must use the 8 results table when checking morale for contact.

H) Grenades

Hand grenades were used to some extent during the Civil War, most notably by Sherman's troops in the Atlanta Campaign. Units may use hand grenades at a 1 inch range on the 12 results table. In addition the units throwing the grenades, may throw them from a prone position without suffering the 2 table down penalty normally incurred.

I) Volley and Machine Guns

Volley and machine guns of several types had limited use during the war, but most of them had limitations that prevented general acceptance in the armies. They were generally used for defense of static points. They should be organized like artillery batteries and use the same rules (except for acquired fire).

Gatling
150 shots/minute (US)

0	2	8	20
1	7	19	36
13	12	11	10

Agar coffee mill gun
42 made (US)

0	2	7	18
1	6	17	28
12	11	10	9

Williams
rapid fire breechloader
65 shots/minute
42 made (CSA)

0	2	7	18
1	6	17	28
11	10	9	8

Requa volley gun
175 shots/minute
 short range
 7 made (US)

0	2	6	14
1	5	13	22
12	11	10	9

Vandenburg volley gun (CSA)

0	2	6	14
1	5	13	22
12	11	10	9

XI. More Abstractions

A) General

These rules allow the referee to throw in some unusual twists into the game. Discretion is suggested in the use of these rules.

B) Visibility

1) Smoke causes loss of visibility. Referees may reduce visibility after several turns of combat because of battle smoke. If there is a lull in the battle the number of turns of battle is reduced by 1 for each turn of lull.

TURN	VISIBILITY
0-2	120
3-4	40
5-8	20
9-16	10
17-more	6

2) Wind disperses smoke, so half the number of actual number of turns of combat when checking the above chart.

3) Note that uniforms of troops may be identified at a distance of 36" and flags may be identified at a distance of 48" (if some wind is blowing).

4) Rain will also reduce visibility in a similar manner to smoke, but will also reduce fire effectiveness.

TYPE RAIN	VISIBILITY	FIRE EFFECT
mist	40	none
sprinkle	20	none
normal	10	down 1 table
hard	4	down 2 tables
downpour	2	down 3 tables

C) Destruction

1) Fires burn for the remainder of the game. Troops may not occupy positions that are on fire. Fires may be started by units in buildings at any time. Units may only start fires in woods if the weather is dry. Fires in woods expand only in the direction of the wind at a rate of 1 inch per 4 turns. If there is no wind, the fire expands 1" in all directions in 8 turns. There is a 1 in 6 chance to put out the fire if a non-personality casting spends 4 turns firefighting. Once the fire has been burning for 12 turns, it may **not** be put out.

2) Cannon may not destroy positions by fire combat. However they may start fires in buildings if 18 is rolled on 3 six sided dice after causing a casualty on units in that position. If there are no units in the building, cannons may fire at it as though there was 1 figure 1/3 rank deep in the building.

3) Units may manually destroy objects at the referees option. Some examples could be:

Wood Fence	1/2 turn - 2 casting per inch of front
Stone Wall	2 turns - 4 castings per inch of front
Abattis	2 turns - 2 castings per inch of front

These same materials could be used in constructing hasty defensive works in a similar time frame.

4) Referees may allow preset explosive charges to be placed on bridges or in buildings. They are set off by time fuses that have a 1 in 6 chance of failure for each 1 inch of length. The fuses burn at a rate of 1 inch per turn. These charges will destroy anything within a 1 inch radius.

D) Regimental Command

One casting in each unit represents the commanding officers of the unit. This casting can be represented by an officer casting, drummer, bugler or other special type casting. Anytime a unit suffers a loss of more than 1 morale level in one morale check, make another check to see if the regimental command is still intact.

Possible Command Loss Table

Roll on a 6 Sided Die that results in loss of command.

# of morale	Unit Base Morale Level		
levels lost	**5**	**6**	**7**
2	5-6	6	-
3	4-6	5-6	6
4	3-6	4-6	5-6
5	2-6	3-6	4-6
6	1-6	2-6	3-6
7	1-6	1-6	2-6

The command casting is not lost in any other manner than through this table (unless it is the last casting in the unit). Once the regimental command is lost, the unit suffers a single drop in base morale. i.e. an elite unit becomes regular grade, and a regular grade unit becomes poorgrade. Poor grade units that lose their command, get a rally rating of 0 and may not advanceunless a personality casting accompanies the unit.

E) Ammunition Supply

If you enjoy bookeeping you may want to keep track of ammunition supplies of the various units in your model armies. Most infantry carried 40-60 rounds into battle. This supply could last various amounts of time depending upon the weapon carried. Units can replenish their ammunition supplies only by spending one turn at a supply wagon or depot. Artillery carried varying amounts of ammunition depending upon caliber. However the caissons associated with each gun would normally ferry ammunition from the army supply train during battle, thusaverting ammunition supply problems at a battery level. Thus, ammunition normally was nota major problem (except at an army level) for Civil War artillery.

The table below shows the number of turns that a unit armed with a specific weapon may fire before running out of ammunition.

Weapon	**Turns**	**Weapon**	**Turns**
Muzzleloader	12	Mt. Artillery	8
Breechloading Rifle	6	Light Rifle, 6 pdr gun	25
Repeating Rifle	5	Medium Rifle,12 pdr Gun,	
Shotguns	8	12pdr Howitzer	16
Pistols	6	Heavy Rifle,24 pdr Howitzer	12
32 pdr Howitzer	6		

F) Balloons

The Union experimented with a balloon corps early in the war. Balloons must be raised from relatively static positions. Personalities in balloons may sight over hills (but not mountains) and forests. Enemy units may fire at the balloon, if in sight, at a 4 table down penalty. It takes two turns to raise or lower a balloon. Of course to raise the balloon, the hydrogen gas must first be prepared, which takes 24 turns.

G) Engineering Corps

The engineering corps was usually responsible with long term tasks such as building railroads, fortifications and so forth. For this reason, there are no special rules in this game for engineers.

H) National Differences

Some differences did exist between the Northern and Southern armies during the war. Some of these differences are listed below.

1) Southerners replaced losses by sending recruits to existing regiments more effectively thanthe North. The result of this was generally larger regiments and fewer green units in the field armies.

2) Southern artillery ammunition was generally considered inferior to that of the north. Reduce effectiveness by one table at long range. Note that northern ammunition was not toogood to start with.

3) Northern states formed new units as a form of political patronage throughout the war. Officers that commanded these units were usually green and often incompetent.

4) Southern units are considered to have more élan than Northern units, but Northern units are considered to be more stable over long periods of battle. To reflect this, the Federals get a plus one bonus to their rally rating, but their base morale rating is one less than an equivalent Confederate unit.

5) Northern heavy artillery regiments were pulled out of harbors and fortifications in 1864 and 1865 and sent to the front as infantry. They were very large (up to 1800 men), well drilled, but very green. Some of these units became quite effective after they became seasoned.

I) Regional Differences

1) State militia of both sides were of poor quality and were likewise poorly armed.

2) Wisconsin troops had a recruitment system similar to that of the South. Likewise, they should generally have larger regiments, and generally good morale.

3) Massachusetts militia were far better organized than most other militia before the war. Give them a better morale rating and better officers at the start of the war.

J) Time Differences

1) Union regular units were better trained than the volunteers for the first part of the war. They should be of a generally higher morale rating than volunteers during this period.

2) Western Federals should be of a generally higher morale class than Eastern Federals, especially towards the end of the war.

3) Confederate cavalry was more effective than that of the North until 1863, at which time the Federal cavalry gained parity. During 1864-1865, the Federals started to dominate as the repeating and breechloading carbines they were issued with outgunned the Confederates muzzleloaders.

K) Seasons

1) Players who run campaigns may want to take into account the effects of different seasons. Examples: better chance of mud in spring, snow in winter, and hot weather in summer.

XII. Setting Up Your Game

A) General

This section of **Iron Brigade** is intended to provide information on organizing miniature armies and battlefield for the play of the game.

B) Troops

Note that for infantry and cavalry units, one casting denoting the command for that unit should be mounted in place of one casting on one stand for that unit. This for use in the advanced organization rules.

	15MM base sizes		25 MM base sizes	
	Front	**Depth**	**Front**	**Depth**
Infantry 4 figure stands	$1^1/_2$"	$1/_2$"	2"	$3/_4$"
Infantry 2 figure stands	$3/_4$"	$1/_2$"	1"	$3/_4$"
Cavalry 2 figure stands	$1^1/_2$"	$1^1/_2$"	2"	2"
Artillery 4 gun batteries	1"	$1^1/_2$"	$1^1/_2$"	2"
Artillery 6 gun batteries	$1^1/_4$"	$1^1/_2$"	2"	3"
Personality figure	$1/_2$"	$3/_4$"	$1/_2$"	1"

C) Terrain

Here are some suggestions for making some model terrain to go with your model soldiers.

1) Roads - use strips of brown felt about 2" wide and long enough to cross the area you will be using as a battlefield.

2) Rivers - same as for roads, but use blue felt in various widths to make the width of the body of water desired.

3) Hills - cut some $3/_4$" inch pines planks into hexagons about 4" across. Place them a top each other to get the desired hill.

4) Fences, buildings, man-made objects in general - Most of these are best purchased at your local hobby shop.

5) Woods - One again, unless you are the creative type, these are best purchased your local hobby shop.

6) Swamps - You can use light green felt in various shapes to match the shape of the swamp you wish to create.

D) Taking Casualties

Casualties can be kept track of in two ways; the easiest is to purchase a quantity of casualty "caps" to meet your needs. These caps are placed over the head of castings as they become casualties. In a pinch small rubber bands can be used instead. The other method is to place toothpicks between the castings that are casualties and those that are not, on each stand. Those to the left of the toothpick should be the casualties. Remove stands from the battlefield when all castings on the stand are casualties.

E) Distribution of Troop Types

Armies are composed mostly of infantry, cavalry and artillery. The approximate proportions of each usually will be about 80% infantry, 13% cavalry, and 7% artillery. For artillery each 20 men translate into approximately 1 gun. Note that armies of less than 15000 men may have quite different ratios due to special missions (such as a cavalry raid). For larger armies a percentage of the artillery will be horse artillery. This will be about 1 horse artillery piece for each 200 cavalrymen.

F) Basic Painting Guide

Artillery and wagon carriages were painted a color called olive. At least two of my sources indicate that this really was a mustard yellow color with a hint of green. Some people will say that it was a dark green. I have found no reliable sources confirming this. Some other people have suggested that Confederates painted some of their carriages grey. Although this is possible, I have not come across any reliable evidence in this regard. Bronze cannon barrels were simply polished to a bright sheen. Iron or steel cannon barrels and other ironwork were painted a glossy black.

Musket barrels were finished by a process called browning, but soldiers often polished their weapons down to the bare steel.

Cavalry regiments were supposed to be equipped with mounts of entirely the same color.

Listed below are the basic uniforms of each side during the war. Note that some fine uniform books are available on the market and this listing just provides the basic coloring of the Yank and the Reb.

	Yankee	Rebel
Shoes	Black	Black/Brown
Socks	White	White
Pants	Light Blue	Light Blue/Grey/Butternut
Shirt	White/Lt. Grey	White/ Lt. Grey
Fatigue Jacket (Sack Coat)	Dark Blue	Grey/Butternut
Great Coat	Light Blue	Grey/Butternut
Kepi	Dark Blue	Grey/Butternut
Slouch Hat	Black	Grey/Black/Brown
Canteen	Blue Cloth Cover	Wood
Haversack	Tarred Black/White	Tarred Black/White
Belts & Cartridge box	Black	Black/Brown
Gun Barrel	Brown/Polished Bright	Brown/Polished Bright
Knapsack	Black	Black
Blanket	Grey	Grey
Trim-Infantry	Light Blue	Light Blue
Cavalry	Yellow	Yellow
Artillery	Red	Red

Note: Butternut could be light brown, buff, yellowish brown or even a olive-brown.

G) 15mm vs 25 mm Scales

Although these rules are designed around 25mm castings, they will play quite well when used with 15mm castings. All ranges and movement distances remain constant. The 15mm size stands will actually provide a more realistic density of troops than 25mm stands.

XIII. The Battle of New Market

The battle of New Market makes a fine battle to refight in miniature. I have provided here an order of battle for New Market and a rough map of the battlefield. This should enable you to refight this most interesting battle. For more information on this engagement I strongly recommend the book, The Battle of New Market (see bibliography).

The Confederate player may set his units no further North than the crest of Manor Hill. The Union commander must place the 18th Connecticut, 123 Ohio and Kleiser's Artillery Battery at the given locations. The Union Cavalry along with Ewing's Artillery Battery must be placed between the woods on the northeast corner of the board. The rest of the Union forces either arrive on the board at a later time from the road to the north or else start on Bushong's hill. Neither player may move troops off the board to the east or west. The Confederates move first. The Union side must drive the Confederates off the battlefield in order to win.

All infantry are assumed to be armed with ordinary rifled muskets. Union cavalry is armed with breechloaders. Confederate cavalry is armed with muzzle loading carbines.

UNION ORDER OF BATTLE - NEW MARKET

COMMANDER - SIGEL:POOR

	1st Brigade - Moor:Average		
18th Connecticut	12 figures	Regular	
28th Ohio	16 figures	Green	Arrives Turn 10
116th Ohio	24 figures	Green	Arrives Turn 10
123rd Ohio	24 figures	Green	
	2nd Brigade - Thorburn:Average		
1st West Virginia	24 figures	Regular	
12th West Virginia	20 figures	Green	
34th Massachusetts	16 figures	Elite	
54th Pennsylvania	20 figures	Elite	Arrives Turn 1
	Cavalry - Stahel:Poor		
	1st Brigade - Tibbitts:Average		
1st N. Y.(Veteran)	16 figures	Regular	
1st N. Y.(Lincoln)	16 figures	Green	
1st Maryland Home	2 figures	Regular	
21st New York	20 figures	Regular	
14th Pennsylvania	2 figures	Regular	
	2nd Brigade - Wynkoop:Average		
15th New York	4 figures	Regular	
20th Pennsylvania	6 figures	Regular	
22nd Pennsylvania	2 figures	Regular	
	Artillery		
Battery B, Maryland Light	6 - 3" Ordnance	Regular	(Snow)
30th New York Battery	6 - Napoleon	Regular	(Kleiser)
Battery D, 1st West Virginia	6 - 3" Ordnance	Regular	(Carlin)
Battery G, 1st West Virginia Lt	4 - 3" Ordnance	Regular	(Ewing)
Battery B, 5th U.S.	6 - 3" Ordnance	Elite	(du Pont)Arr. Turn 12

Confederate Order of Battle - New Market

Commander - Breckinridge:Good

1st Brigade - Echols:Poor

22nd Virginia	20 figures	Elite
23rd Virginia	20 figures	Regular
26th Virginia	12 figures	Regular

2nd Brigade - Wharton:Average

30th Virginia	12 figures	Regular
51st Virginia	24 figures	Regular
62nd Virginia	16 figures	Regular
1st Missouri Cav (dismounted)	2 figures	Regular

Attached Commands

Hart's Engineer Co.	2 figures	Elite
Augusta-Rockingham Reserves	16 figures	Green
Davis Co. Maryland Cavalry	2 figures	Regular
23rd Virginia Cav (dismounted)	8 figures	Regular
VMI Cadets	8 figures	Elite

Cavalry - Imboden:Poor

18th Virginia	20 figures	Elite
2nd Maryland Battalion	2 figures	Elite
McNeill's Company	2 figures	Elite
43rd Battalion	2 figures	Elite

Artillery - McLaughlin:Average

Chapman's Battery	4 - 12 pdr Howitzer, 2 - 3" Ordnance	Regular
Jackson's Battery	1 - 10 pdr Parrott, 3 - 12 pdr Nap.	Regular
McClanahan's Bat.	4 - 3" Ordnance, 2 - 12 pdr Howitzer	Regular
VMI Section	2 - 3" Ordnance	Elite

Rest of
Union Force

Bushong's Hill

Cavalry and
Ewing's Artillery

Wooden Fence

18th Conn.   123rd Ohio   Kleiser

Manor's Hill

Confederate
Forces

500 Yards

N
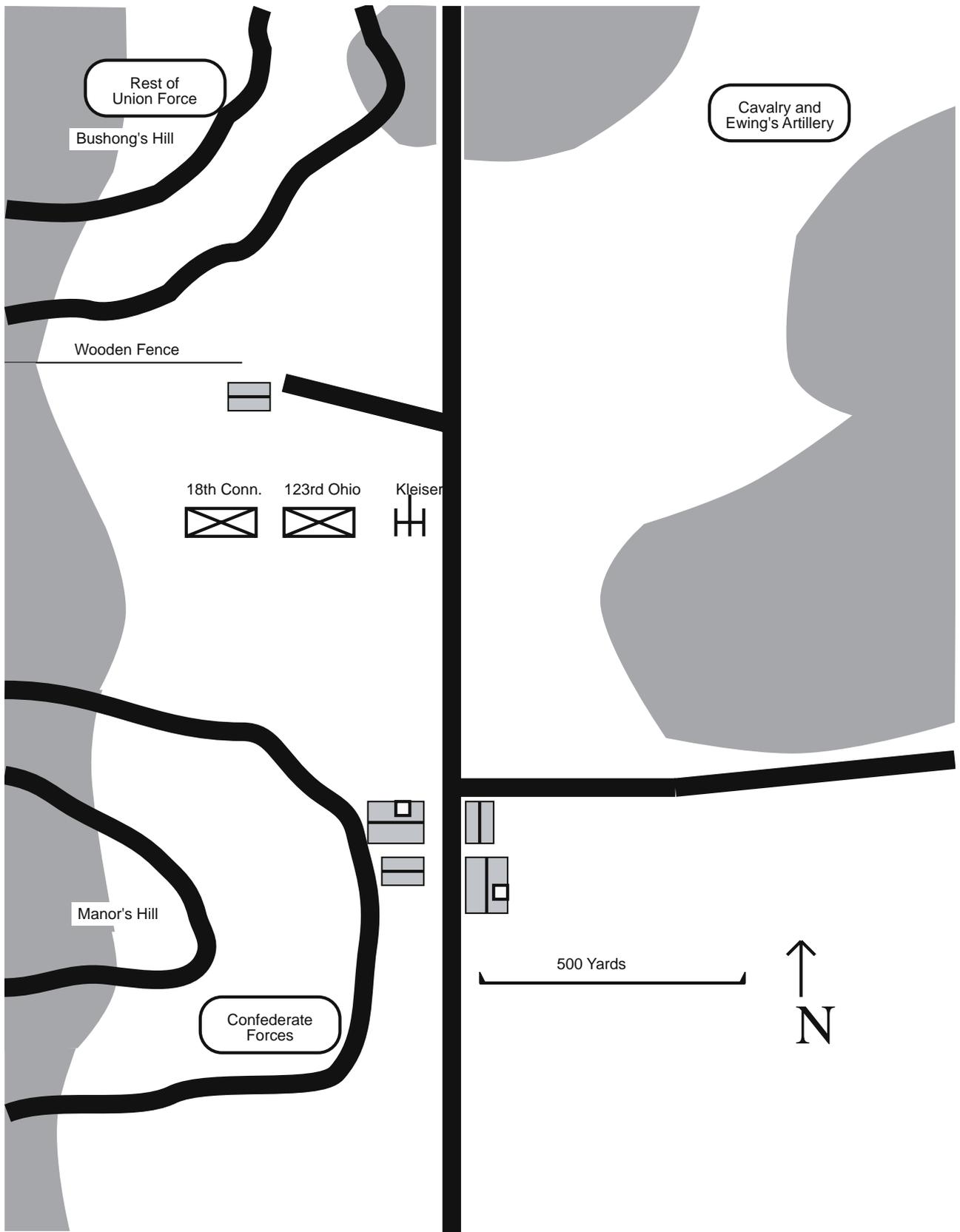
XIV. Technical Notes

A) General

Gamers who like to tinker with rules may make some use of this section which contains some of the information used in creating these rules. Other modifications to these rules which may be experimented with, include simultaneous movement systems and modifications for other wars of the period. Warning - these rules are copyrighted and this information is provided only for the individual use of the owner of `Iron Brigade`.

B) Movement

The infantry movement rates are taken directly from Hardee's Tactics and the cavalry movement rates can be found in many places including The Artillerist's Manual. Note that these rates are translated very closely into the movement rates of these rules. The doubletime rule is used to represent double quick and gallop movement speeds which could not be maintained for very long by the actual mortals that were fighting the war. The chart below is easily entered into a microcomputer's spreadsheet for further analysis.

	steps/min.	inch/step	yards/min	inches/min	inches/turn	mph
quick	110	28	85.56	3.42	8.56	2.92
dbl-quick-1	165	33	151.25	6.05	15.13	5.16
dbl-quick-2	180	33	165.00	6.60	16.50	5.63
back	110	14	42.78	1.71	4.28	1.46
		min/400yds				
horses	walk	4.5	88.89	3.56	8.89	3.03
	trot	2	200.00	8.00	20.00	6.82
	gallop	1	400.00	16.00	40.00	13.64
	yards/inch		**minute/turn**			
	25		2.5			

C) Results Tables

This program was used to generate the results tables. It is written in C. It should be able to be compiled by most any ANSI standard C compiler.

```c
#include <StdIO.h>
/*#include <stdio.h>*/

#define FLOATPT 1
#define RED 1
#define REDFACTOR 8
#define REDOPER +
#define REDCASFACT 1.25

double      maxcas = .3;
double      mincas = .05;
double      maxrat = 4;
double      minrat = .75;
double      maxtabl = 14;
double      mintabl = 4;
double      fir [20];
long  dfr [] = {1,2,4,8,13,21};
double      att [] = {1.,2.,4.,6.,8.,11.,14.,17.,21.,25.};
long  ndef = 6;
long  natt=10;
long  dcas, cas;
double      morale, casualties;
int    i1, i2, i3, i4;
FILE * output;

main ()
{
      printf ("Starting Table Gen \n");
      mintabl = mintabl/17;
      maxtabl = maxtabl/17-mintabl;
      maxcas=maxcas-mincas;
      maxrat=maxrat-minrat;

      for (i1 = 0; i1 < ndef; i1++){
            printf("%3d", dfr[i1]);
      }


      for (i1 = 0; i1 < natt; i1++){
            printf("%3d", att[i1]);
      }

      fir [19] = 13.2821/2;
      for (i1 = 18; i1 >= 0; i1--)
      {
            fir [i1] = fir[i1+1]/1.4;
      }

/*    Each table has an effectiveness of approximately 71% that of the table above it.
      These values are plugged into an array to used later.
      print 2 tables at a time */

      output = stdout;
      fprintf (output, "\n");
      for (i1 = 0; i1 <= 19; i1 = i1+2)
      {
            fprintf (output,"TABLE %3d                    TABLE %3d\n",i1,i1+1);

            fprintf (output," att   cas");
            for (i2= 0; i2 < ndef; i2++)
                        fprintf (output,"%4d ",dfr[i2]);
```

```c
                fprintf (output,"    att   cas");
                for (i2= 0; i2 < ndef; i2++)
                        fprintf (output,"%4d ",dfr[i2]);

                fprintf (output, "\n");

/*        The casualties are computed and printed here after printing the number of troops firing.
    do each line        */
                for (i2 = 0; i2 < natt; i2++)
                {
                        fprintf (output, "%4d",(int)att[i2]);
#ifdef RED
                        casualties= att[i2]*fir[i1]*.693147 * REDCASFACT;
#else
                        casualties= att[i2]*fir[i1]*.693147;
#endif
#ifdef FLOATPT
                        dcas= casualties;
                        i4 = abs(((long)(casualties*10) % 10)/2-5);
                        if (casualties*10 < .2)
                                fprintf (output, "    - ");
                        else
                                fprintf (output, " %3d>%1d",dcas, i4);

                        dcas= (long)(casualties+.5);
#else
                        dcas = casualties+.5;
                        fprintf (output, "%6d",dcas);
#endif


/*        The morale loss is a sum of the three factors plugged into arrays previously initialized.     */

                        for (i3 = 0; i3 < ndef; i3++)
                        {
#ifdef RED
                                morale = (((double)7/3)*(((double)dcas/((double)dcas+(double)dfr[i3])-mincas)/maxcas+(att[i2]/
    ((double)dcas+(double)dfr[i3])-minrat)/maxrat+((double)(i1 REDOPER REDFACTOR)/17-mintabl)/maxtabl));
#else
                                morale = (((double)7/3)*(((double)dcas/((double)dcas+(double)dfr[i3])-mincas)/maxcas+(att[i2]/
    ((double)dcas+(double)dfr[i3])-minrat)/maxrat+((double)i1/17-mintabl)/maxtabl));
#endif
                                if (morale-.5 < 0)
                                {
                                                morale = 0;
                                                fprintf (output, "  - ");
                                }
                                else if (morale -.5 > 7)
                                                                                {
                                                morale = 0;
                                                fprintf (output, "  R ");
                                }
                                else
                                {
#ifdef FLOATPT
                                        morale = morale -.5;
                                        cas= (long)morale;
                                        i4 = ((long)(morale*10) % 10);
                                        fprintf (output, " %2d>%1d",cas, i4/2+1);
#else
                                        i4=(long)morale;
                                        fprintf (output, "%4d",i4);
#endif
                                }

                        }

                        fprintf (output,"    ");
                        fprintf (output, "%4d",(int)att[i2]);
                        fprintf (output, "%4d",(int)att[i2]);
#ifdef RED
```

```c
                           casualties = att[i2]*fir[i1+1]*.693147 * REDCASFACT;
#else
                           casualties = att[i2]*fir[i1+1]*.693147;
#endif

#ifdef FLOATPT
                           dcas= casualties;
                           i4 = ((long)((casualties)*10) % 10);
                           i4 = abs(((long)(casualties*10) % 10)/2-5);
                           if (casualties*10 < .2)
                                       fprintf (output, "    -  ");
                           else
                                       fprintf (output, " %3d>%1d",dcas, i4);
                           dcas= casualties+.5;
#else
                           fprintf (output, "%6d",dcas);
#endif

                           for (i3 = 0; i3 < ndef; i3++)
                           {
#ifdef RED
                                       morale=(double)(((double)7/3)*(((double)dcas/(dcas+dfr[i3])-mincas)/maxcas+(att[i2]/(dcas+dfr[i3])-minrat)/
      maxrat+((((double)i1+1) REDOPER REDFACTOR)/17-mintabl)/maxtabl));
#else
                                       morale=(double)(((double)7/3)*(((double)dcas/(dcas+dfr[i3])-mincas)/maxcas+(att[i2]/(dcas+dfr[i3])-minrat)/
      maxrat+(((double)i1+1)/17-mintabl)/maxtabl));
#endif
                                       if (morale-.5 < 0)
                                       {
                                                       morale = 0;
                                                       fprintf (output, "   -  ");
                                       }
                                       else if (morale -.5 > 7)
                                                                               {
                                                       morale = 0;
                                                       fprintf (output, "   R  ");
                                       }
                                       else
                                       {
#ifdef FLOATPT
                                                       morale = morale -.5;
                                                       cas= morale;
                                                       i4 = ((long)(morale*10) % 10);
                                                       fprintf (output, " %2d>%1d",cas, i4/2+1);
#else
                                                       i4=(long)morale;
                                                       fprintf (output, "%5d",i4);
#endif
                                       }
                           }

                           fprintf (output,"\n");
           }

           fprintf (output,"\n");
      }


      printf ( "FINISHED!\n");

}
```

D) A Simple Simulation Program

This basic simulation program was used to analyze the effects of one regiment firing upon another without return fire. Note that each iteration is assumed to be equal to one game turn. The results provide a probability distribution of casualties in increments of 10% chances. The more passes of this simulation you make, the more accurate the distributions will be. The results will show you that fire combat without die rolling is not quite accurate. In actual play of the game you may want to roll a six sided die when firing, move up one table if you roll a six and down one if you roll a 1.

```
10 OPTION BASE 1
20 RANDOMIZE TIMER
30 DEFINT I,N
40 INPUT "Number of troops firing";NUMFIR
50 INPUT "Number of target troops";NUMTAR
60 INPUT "Probility of hit of single shot";PROB
70 INPUT "Number of shots per iteration";NUMSHOTS
80 INPUT "Number of passes of simulation to make";NUMPAS
90 DIM NUMCAS(NUMPAS),NUMTOT(NUMPAS)
100 FOR I5 = 1 TO NUMPAS
110 DIM NUMTAR(NUMTAR)
120 FOR I1 = 1 TO NUMSHOTS
130 FOR I2 = 1 TO NUMFIR
140 IF RND > PROB THEN 280
150 I3= RND*(NUMTAR-1)+1
160 IF NUMTAR(I3) <> 0 GOTO 200
170 NUMTAR(I3)=1
180 NUMCAS(I5)=NUMCAS(I5)+1
190 GOTO 280
200 IF RND*(6) > 3 OR NUMCAS(I5) >= NUMTAR THEN 270
210 I4=RND*(NUMTAR-1)+1
220 IF NUMTAR(I4) <> 0 THEN 210
230 I3=1
240 NUMTAR(I4)=1
250 NUMCAS(I5)=NUMCAS(I5)+1
260 GOTO 280
270 NUMTAR(I3)=NUMTAR(I3)+1
280 REM
290 NEXT I2
300 REM
310 NEXT I1
320 FOR I1 = 1 TO NUMTAR
330 NUMTOT(I5)=NUMTOT(I5)+NUMTAR(I1)
340 NEXT I1
350 PRINT "TOTAL NUMBER OF HITS";NUMTOT(I5)
360 PRINT "TOTAL NUMBER OF CASUALTIES";NUMCAS(I5)
370 ERASE NUMTAR
380 NEXT I5
390 I2=0
400 I3=0
410 FOR I1= 1 TO NUMPAS
420 I2=NUMTOT(I1)+I2
430 I3=NUMCAS(I1)+I3
440 NEXT I1
450 I2=I2/NUMPAS
460 I3=I3/NUMPAS
470 PRINT "AVERAGE NUMBER OF HITS";I2
480 PRINT "AVERAGE NUMBER OF CASUALTIES";I3
490 I1 = INT(NUMPAS/2)
495 IF I1 <= 0 THEN 620
500 FOR I2 = I1+1 TO NUMPAS
510 I3=I2-I1
520 IF I3<=0 THEN 590
530 IF NUMCAS(I3)<=NUMCAS(I3+I1) THEN 590
540 I4= NUMCAS(I3)
550 NUMCAS(I3)=NUMCAS(I3+I1)
560 NUMCAS(I3+I1)=I4
570 I3=I3-I1
580 GOTO 520
590 NEXT I2
600 I1=INT(I1/2)
610 GOTO 495
```

```
620 FOR I1=1 TO NUMPAS
630 PRINT NUMCAS(I1),
640 NEXT I1
790 I1 = INT(NUMPAS/2)
795 IF I1 <= 0 THEN 920
800 FOR I2 = I1+1 TO NUMPAS
810 I3=I2-I1
820 IF I3<=0 THEN 890
830 IF NUMTOT(I3)<=NUMTOT(I3+I1) THEN 890
840 I4= NUMTOT(I3)
850 NUMTOT(I3)=NUMTOT(I3+I1)
860 NUMTOT(I3+I1)=I4
870 I3=I3-I1
880 GOTO 820
890 NEXT I2
900 I1=INT(I1/2)
910 GOTO 795
920 FOR I1=1 TO NUMPAS
930 PRINT NUMTOT(I1),
940 NEXT I1
995 I3=0
997 I4=0
1000 FOR I1 = 1 TO 10
1005 I3=0
1007 I4=0
1010 FOR I2 = INT(NUMPAS*((I1-1)/10)+1) TO INT(NUMPAS*(I1/10))
1020 I3=NUMCAS(I2)+I3
1030 I4=NUMTOT(I2)+I4
1040 NEXT I2
1050 I2 = INT(NUMPAS*(I1/10))-INT(NUMPAS*((I1-1)/10)+1)+1
1060 PRINT "range";I1;"average hits";I4/I2
1070 PRINT "range";I1;"average casualties";I3/I2
1080 NEXT I1
2000 END
```

E) Estimation of Effectiveness of Fire During Various Battles

This table was entered into a microcomputer spreadsheet and used to estimate actual casualties   as compared to number of shots fired. `Iron Brigade` would generate a percent hits of approximately 3% in most of these situations. This is about 6 times the effectiveness generated by this spreadsheet. However it was necessary to increase effectiveness in order to produce a game that is fun to play. Admittedly these computations are gross estimates, but at least give some idea of the effectiveness of Civil War rifle fire. The percentage hits column is computed using this formula:

• enemy casualties/((number of troops-(own casualties*2/3))*(shots/minute*number of minutes))

The results were computed for both sides for each battle. The side listed first is considered the defender for that battle and uses the defender shots/minute (1). The attacker is listed second and uses the attacker shots/minute (.8). Shots/minute are low to take into account maneuvering and the lulls that would normally occur in battle.

shots/minute   1-defender   0.8-attacker

| Battle	Side	Time min.	# troops	enemy cas.	own cas.	%hits	cover	range
Pickets charge	US	20	5500	5000	2000	6.00%	0.2	50
	CS	20	11000	2000	7500	2.08%	0.3	50
Brawner Farm	US	60	2900	2200	912	1.60%	0.1	80
	CS	60	6400	912	2200	0.39%	0.15	80
South Mountain	CS	60	1100	318	100	0.51%	0.3	60
	US	60	1300	100	318	0.19%	0.5	60
Antietam	CS	60	33000	12401	10318	0.79%	0.15	100
	US	60	50000	10318	12401	0.52%	0.2	100
Olustee	CS	60	5200	1800	980	0.66%	0.2	80
	US	60	5500	980	1800	0.47%	0.2	80
1st Bull Run	CS	30	18000	2900	2000	0.58%	0.1	100
	US	30	18500	2000	2900	0.50%	0.15	100
Chickamauga	US	60	60000	18000	16000	0.61%	0.15	60
	CS	60	66000	16000	18000	0.62%	0.3	60

F) Types and Numbers of Artillery in the Armies at Gettysburg

This table is provided to give the gamer an idea of what cannon were most commonly used during the Civil War. As the reader can see, 3" Ordnance rifles and Napoleons predominated at this point in the war. This ratio remained relatively constant for the rest of the war. In the early years many more old howitzers and guns could be found along with a greater variety of rifles. 10 pdr Parrotts were more easily produced than 3" Ordnance rifles and were more common early in the war. However their reliability was questionable, and thus the reliable 3" Ordnance rifle became more common as it became available. This table was compiled from the book   Regimental Strengths at Gettysburg.

Not all of these guns were actually present at the battle, such as the Union 4.5" Ordnance Rifles. They all were part of the armies involved in the campaign.

Type	Union		Confederate		Total	
3" Ordnance Rifle	152	40%	73	26%	225	34%
3" Navy Rifle			4	1%	4	1%
10 pdr Parrott	60	16%	42	15%	102	16%
Whitworth			2	1%	2	0%
Blakely			3	1%	3	1%
14 pdr James rifle	4	1%			4	1%
20 pdr Parrott	6	2%	10	3%	16	2%
4.5" Rifle	8	2%			8	1%
6 pdr Gun			9	3%	9	1%
Napoleon	142	38%	107	38%	249	38%
12 pdr Howitzer	2	1%	26	9%	28	4%
24 pdr Howitzer			4	1%	4	1%
Total	374		280		654	

The Enfield Rifle Musket
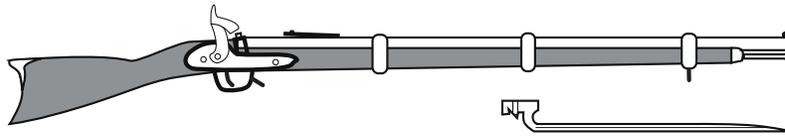
Name:	M 1853 Enfield Long Rifle
Manufacturer:	London Armory Company and other contractors in Birmingham and London England. Almost none used in the American Civil War were made by the Enfield Royal Small Arms Factory.
Number Imported:	At least 800,000
Weight:	8 3/4 lbs
Overall Length:	55 inches
Length of Barrel:	39 inches
Range:	Effective - 300 yards, Maximum 1100 yards.
Caliber:	.577 or .58
War time Price:	$20.00 - $30.00
Number at Gettysburg:	Almost half of all Union Infantry regiments were at least partially armed with Enfields.

Comments: The Enfield Long Rifle was first manufactured in America by Robbins & Lawrence in Windsor, Vermont. Later it became the standard British service rifle. Caleb Huse, purchasing agent for the Confederacy in Europe managed to buy enough to make the Enfield the South's standard infantry weapon. In the Union armies it was issued interchangeably with the Springfield rifles. The Enfield long rifle was an excellent weapon, equal to any rifle musket of the day.

The age of the rifled musket (including the Civil War) was short. It was really a transitional period between the smoothbore muskets of 1610-1850, and the machine gun of the twentieth century. Therefore the combat of the Civil War included elements of several kinds of warfare. The rifled musket was not effective enough to cause the total abandonment of the line formation. However it did have an impact on the number of casualties incurred and forced the abandonment of the bayonet as a primary weapon of war. Frontal assaults rarely succeeded, especially against fortified positions. The use of entrenchments became common, and sometimes resulted in trench warfare similar to that seen in World War I.

Rifled muskets were accurate to around 1000 yards, but not very many people can even pick out a target at that range. A regiment at that range appears as a solid mass, not individual soldiers. It is commonly stated that the maximum effective range of rifled muskets was about 300 yards. Even at that range, the chance of a typical soldier hitting his target was rather slim. However the effect of 400 men firing at that range over a period of several minutes could be effective. Assume a $\frac{1}{10}$th of one percent chance of a hit and 3 shots per minute for 5 minutes. That gives around 6000 shots fired and 6 casualties. This is only 2 percent casualties for a 300 man unit, but you must remember that a combat unit can only take about 15 percent casualties before becoming ineffective. However the firing unit will run out of ammunition before defeating an attacking column at this range.

As the attacker closes, the effectiveness will increase greatly. At these closer ranges, the effect of massed rifled musket fire could be devastating as testified by the huge casualty lists produced by this horrible war. A great many attacks petered out at about 40 yards distance from the defender. Perhaps the effect of fire at this range and closer was too much for most units to handle.

The Remington .44
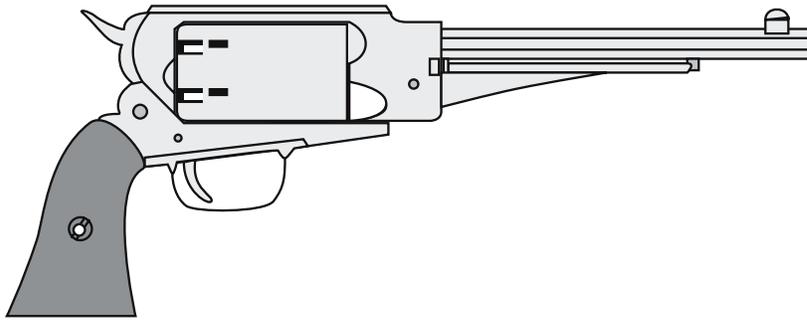
Name:	Remington New Model 1863 Army Revolver
Manufacturer:	E. Remington & Sons
Number Produced:	140,000
Weight:	about 3 lbs
Length of Barrel:	8 inches
Range:	Effective - 40 yards, Maximum 300 yards.
Caliber:	.44
Number of Shots:	6 shot, single action
War time Price:	$12.00

Comments: The Remington .44 revolver was typical of the the revolvers used during the civil war. Only the Colt Army .44 was more widely used. They were loaded from the front of the cylinder using paper cartridges, the charge being rammed "home" by the lever arrangement attached below the barrel. A percussion cap was then mounted on the nipple on the rear end of the cylinder. It has been said that these "cap and ball" revolvers could be reloaded in 20 seconds per shot. That would give a rate of fire of about 6 aimed shots per 2 1/2 minutes. That is actually less than that of the common rifled musket. However spare loaded cylinders could be carried and easily exchanged with one that has been freshly emptied, considerably increasing firepower for a short period of time.

The pistol was not a weapon that greatly influenced the outcome of any major battles during the war. However there was a wide spectrum of quality and styles. A notable import was the LeMat grapeshot revolver, that included a 16 gauge shotgun barrel below a nine shot .40 caliber cylinder. It was designed in the South, build in France and used by the South in some numbers. Such personalities as General P. G. T. Beauregard carried them. Cartridge pistols were just beginning to appear at the time of the Civil War and the Lefaucheux pinfire was the most common, the North having purchased some 10,000 of them. It was imported from France and was probably the the best handgun in common use during the war. The Smith & Wesson design was more modern, but military calibers were held out of production until after the war. Most Southern made revolvers were copies of the Colt or Whitney revolvers. The other major brands of revolvers used were the Adams and the Starrs. The Adams revolver had a double action, unlike most of the other major cap and ball revolvers of the time. The Starr could be used as either double or single action depending upon need. Even some flintlock and percussion single shot pistols saw action.

The Sharps Carbine
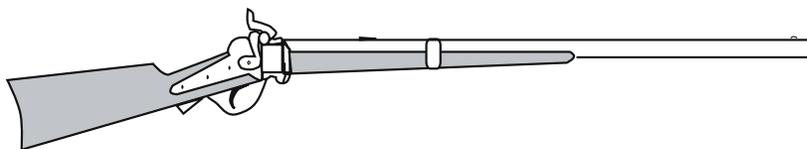
Name:	New Model 1863 Sharps Carbine
Manufacturer:	Sharps Rifle Manufacturing Company
Number Manufactured:	About 150,000 of all types
Weight:	7 1/4 lbs
Overall Length:	39 inches
Length of Barrel:	22 inches
Range:	Effective - 300 yards, Maximum 800 yards.
Caliber:	.52
War time Price:	$30.00

Number at Gettysburg: Out of 36 Union Cavalry regiments, 28 were at least partially armed with Sharps Carbines. Of the infantry, 7 regiments were armed with Sharps Rifles (3 of them sharpshooters).

Comments: Along with the Spencer repeater, the Sharps Carbine became the standard Union cavalry weapon by the middle of the war. This gave the Union cavalry a firepower advantage that proved decisive in many engagements. The Sharps was an extremely well manufactured weapon. It served continuously with General Joseph R. Howley's Connecticut troops for 26 months and he wrote; "Sharps Rifle is the best made arm that I have seen in the service" and "they are in excellent condition". The weapon was effective not just because of its rate of fire advantage over muzzle loaders, but because units firing such weapons could reload easily while under cover.

Federal carbines came in quite a variety, partly because mounted cavalry could not easily reload a muzzleloader and breechloaders had not yet been standardized in form or function. The most common were the Spencer, Sharps, Burnside, Smith, Gallager, Starr, Maynard, Merrill, Joslyn, Cosmopolitan, Hall, Warner, Ballard, Sharps & Hankins, Gibbs, Linder and the Wesson listed here in the order of numbers purchased by the U.S. Government. The variety of cartridges was almost as great as the variety of weapons themselves. Copper cartridges varied from the Spencer in two calibers, the Burnside, the Gallager, the Maynard, the Joslyn, the Warner, the Ballard in two calibers, the Sharps & Hankins and the Wesson. The Gallager, Joslyn, Sharps & Hankins also came in versions that were chambered for the Spencer .52 caliber cartridge. The Sharps, Starr and Cosmopolitan carbines took linen cartridges, while the Smith took a rubber cartridge. The Merrill, Hall, Gibbs and Linder carbines took the traditional paper cartridges. The Spencer, Sharps, Maynard and Ballard carbines were all considered excellent weapons. The Burnside, Smith, Cosmopolitan, Sharps & Hankins and Linder weapons were considered fair to good and the Gallager, Starr, Merrill, Joslyn, Hall, Warner, Gibbs and Wesson were generally considered poor to worthless.

Concrete information on armament of the Confederate cavalry is hard to come by, but it seems that they used whatever they could get. Pistols, shotguns, muzzleloading carbines, copies of Sharps carbines and captured Union weapons were all used. Lee ordered that a new muzzle-loading carbine be made for the cavalry in July 1863. The Confederate "Field Manual for the Use of Officers on Ordnance Duty" listed the Maynard as official arm of the Confederacy. This was primarily due to Maynard carbines captured in arsenals at the outbreak of the war.

The Ordnance Rifle
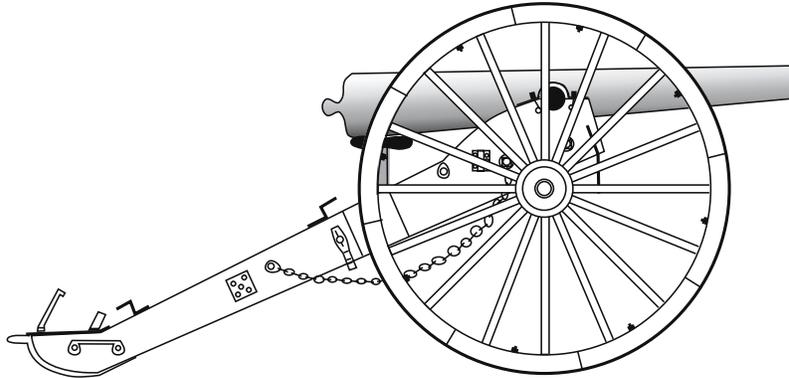
Official Name:	U.S. 3-inch wrought iron field rifle M-1861
Common Names:	Ordnance Rifle, Ordnance Gun, Griffen Gun, Rodman Rifle
Manufacturer:	Phoenix Iron Company, Phoenixville, Pennsylvania
Number Made:	Approximately 1300
Weight:	820 lbs
Overall Length:	73.3 inches
Range:	1 lb charge, 10 deg elevation, 9lb Dyer shell 2788 yds
War time Cost:	$250.00
Number at Gettysburg:	142 Union, 38% of total (372) 73 Confederate, 26% of total (280) 215 guns altogether, 33% of all guns (652)
Number at New Market:	16 Union, 73% of total (22) 8 Confederate, 44% of total (18) 24 guns altogether, 60% of all guns (40)

Comments: The 3-inch Ordnance Rifle was probably the best rifle in common use during the Civil War. It was well liked by both sides and as can be seen from the data above was the most common rifle in use by both sides from the middle of the war onward. It was the standard weapon for Union horse artillery partly because of its light weight. The effective range of these and other field rifles are limited below the theoretical maximum because of several factors. Sighting (known as pointing) of cannon during this era was crude, especially in the field where prepared positions did not exist. Shooting these weapons also depended upon watching the fall of the shot (or shell or case) at long ranges. Above 1100 or 1200 yards this was not practical. The real advantage of rifles over smoothbores was that accuracy of smoothbores falls off much more rapidly than rifles at ranges over 700 or 800 yards. Beyond this distance, duels between smoothbore batteries and rifles were extremely one sided.

There was an interesting phenomenon in the Union Army (and possibly the Confederate Army also). Artillery officers would attempt to get a transfer into the infantry in order to have a better chance of promotion. Hard-hit artillery batteries would get replacements from infantry regiments. Thus artillery batteries tended to consist of battle-hardened veterans, led by men promoted through the ranks. Although the quality of infantry regiments varied greatly, it seems that artillery units were of more uniformly good quality, especially later in the war.

Rifled Artillery Shells
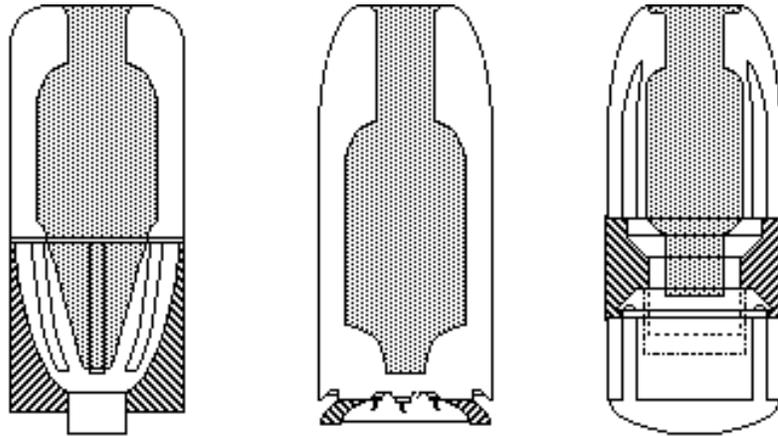
Schenkl	Parrott		Hotchkiss

Making sure the shells rotated rather than tumbled in flight during the age of muzzle loading rifled artillery was a major problem. The shells had to slip easily down the bore for loading, but grasp the rifling when fired for straight flight. These rifled artillery shells represent the three major ways of providing rotation to the projectile during the Civil War. In each of these illustrations, the shaded area is the bursting charge and the striped area is the part that takes up the rifling of the weapon when fired.

The Schenkl had a paper-maché cover over the rear portion of the shell. When fired this cover was forced into the rifling of the gun. The splines on the rear portion of the shell would cause the shell to rotate as the paper-maché followed the rifling. This paper-maché cover would disintegrate upon leaving the gun making the Schenkl shell safe for firing over the heads of friendly troops. This seems to have been a common practice during the war, but was universally disliked by the infantry. Some types of ammunition (none of which are described here) such as 12 pdr shell contained parts of which would fly apart from the shell upon exiting from the cannon bore. This type ammunition could not be safely used in firing over friendly troops. (**oh boy** - potential information for yet another optional rule!).

The Parrott shell had a brass cup at the rear of the shell which would be forced into the rifling upon discharge of the gun. This was the most common and successful of the methods used to hold projectiles to the rifling of guns.

The Hotchkiss shell was composed of three parts. The foremost was the shell containing the bursting charge. The middle section was a lead band which would be compressed by the rear section into the rifling when fired.

Other rifled shells like the Armstrong shunt and the Whitworth hexagonal were built to fit a specific rifle bore. The shell was aligned with the rifling when loaded, either from the breech or muzzle. These shells were hard to load once the barrel was fouled since they had to fit the bore exactly. Some shells contained a lead covering that was supposed to take up the rifling when fired. Some bolts had a routed out base, similar to that of the Parrott, which left a thin wall that was to be forced into the rifling at discharge. Canister rounds were designed **not** to take up the rifling when fired. Some rotation usually resulted and caused the balls to disperse more quickly than that of the smoothbore guns and howitzers. This is one reason why smoothbores were not obsoleted during the war.

The Napoleon
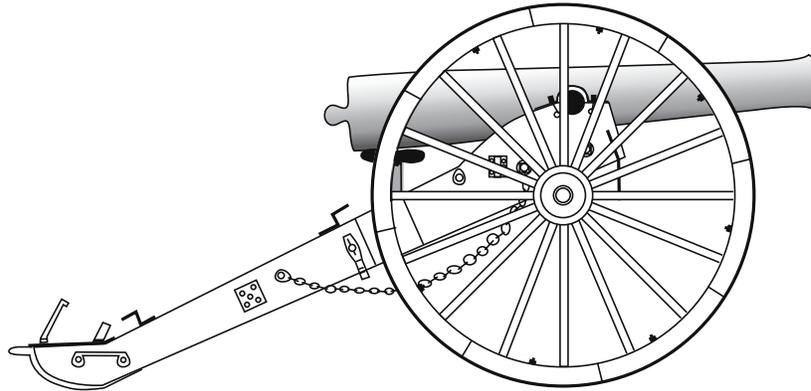
Official Name:	US 12 pdr gun model 1857
Common Names:	Napoleon, Gun-Howitzer, Light 12-pounder
Manufacturer:	Many manufacturers, both North and South
Weight:	1227 lbs
Overall Length:	72.15 inches
Range:	2.5 lb charge, 5 deg. elevation, 12lb shot
	1680 yds
Number at Gettysburg:	146 Union, 39% of total (372)
	107 Confederate, 38% of total (280)
	253 guns altogether, 39% of all guns (652)
Number at New Market:	6 Union, 27% of total (22)
	3 Confederate, 17% of total (18)
	9 guns altogether, 23% of all guns (40)

Comments: The Napoleon was developed in France to replace the 8 and 12 pounder guns and the 24 and 32 pounder howitzers then in use in that country. It replaced only the 12 pounder, bronze field gun, model 1841 in this country which weighed considerably more. This gun was the primary non-rifled field cannon used during the Civil War. Out of 288 smoothbores at Gettysburg, only 35 were not Napoleons. The Napoleon was very reliable and the most effective cannon available for repelling direct infantry assaults using canister. It was very reliable, but eventually the bronze bore could be worn out. Some of these worn-out bores may be seen in National Battlefield Parks even today.

Some artillery officers of the period preferred the Napoleon to the rifled cannon of the day. In general rifled cannon were not as effective as smoothbores when firing canister. Also shell and case rounds fired from rifled guns often buried themselves in soft ground before exploding. This usually was not the case with smoothbore artillery. The main problem with smoothbore artillery was accuracy at longer ranges. There were many cases of artillery duels between rifled and Napoleon batteries. At ranges above 700 yards the rifled batteries almost always persevered. At ranges above 1000 yards the Napoleon batteries were sometimes almost helpless. This explains why the armies of the Civil War contained both Napoleon and rifled batteries throughout the war. No other smoothbore could match the Napoleon in maneuverability and firepower. Hence by the end of the war, the Confederacy melted down many 6 pdr's and old model 12 pdr's to make new, more up to date guns.

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