Lecture 23, 21 Oct 1863

Velocity of a Ball varies.

Initial Velocity of Elongated Rifle Ball about 1000 ft. per Sec.
Remainder Velocity.

Terminal Velocity.

(To remaining of U.S. Army)

Having studied briefly nature of projectiles, we are now prepared to study the
character of the wounds they produce. An apology for regretting what evil

Gunshot Wounds. 1. From the Projectile itself, on effects of projectile may be
combined with 2d. A Foreign Substance. (a) Clothing, caps, paint.
(b) Accidents caused by ball, canton, musket, wire, etc.
(c) External Objects. E.g. Ground, Stones, Railroad Track, etc.
(d) Portions of human body. Attached or detached. An example:
In the face: Nose both in eye — Anatomical Case,
of Indian in Head — Anatomical Case.
(e) From particles of powder.

Possible Effects attending Wound of Human Body by Projectile from Small Arms

1. A Ball may enter & lodge without fracture of bone.

2. By emerge.

3. By lodge with.

4. By emerge.

5. By one opening; divide on a bone; with or without
fracture, or emerge by one or more openings.

6. OR. Having divided, with or without fracture, one or more portions

may lodge; and one or more portions emerge by higher or multiple exit wound.

7. A Ball striking outer Substance may divide or fragment. Either
body by different openings, producing varied effects.

8. A Ball entering, with or without fracture of bones, may emerge by

narrow passage, or the mouth, or anus, or be discharged through Itself.

9. A Ball may emerge all round of Entrance.

10. A Ball may Explode in the Body. Forensic Case.

11. A Ball may graze or plough, or produce other wound.

12. A Ball mayContuse. 13th. A Ball may break in Bottle, make exposure in firearm

without injuring a bone.
Changes in shape of ball. Innumerable, may be split, regular, or irregularly by bends, or flattened, or truncated, or flamed at base. Explain Mercator's Segments of Spheres. Explain this illustration. Re-calling. . .
Projectiles: - Change to -
Slight: Compromise
Punishment: - ball o' shells

Amen

Flight, guns of
Pan Black - Tramway 12
Arriving of the U.S. Army during War 1861—

1. Three months men armed with old smooth bore muskets of 1820 (ca. 69) altered to percussion lock, or the smooth bore of 1842, which was new percussion lock. None of the N.Y. State regiments had the Springfield rifle of 1855, obtained from the State Quota. Regular Infy: all had the Springfield rifle of 1855.

2. First 300,000 men. 25,000 had Springfield. Market, which was all that could be got in that year. Besides of these the Regt. or two in the West were supplied, and all the rest of these unissued arms were distributed to A. of Potomac. The rest remained of the army had smooth bore arms, of which about 125,000 were of inferior foreign make, the balance American. At Shiloh practically 45 of troops had Springfield arms.

The objection to the smooth bore, given, which was about to percussion, was that after war its large caliber 55/2 heavy ball. The men could not carry sufficient ammunition. The preferred caliber bore, 38, or now 50. Inj. 32 caliber, 57. As to many of them guns are bad, the small ball to effective range 1 covered 2.5 Sp. Marked, at 1.700 yds. The limit of ordinary vision, but will hold at from 1100 to 1300 yds.

Now the long projectile is almost entirely used.

Cavalry. In early part of war, Sabres, carbine. Subsequently Sharps Carabine as fast as they could be made. Rate 20 shots, 100 shots; only take one fire arm, the arm, new being issued priority in the Union. It came Henry Repeating rifle. Batteries, first smooth bore, the all rifles, now mixed.
Now consider phenomena of entrance of ball; of its exit; of its course &
damage; of its lodgement; & effects of shot balls.
These are influenced by size & material, but especially by shape and
velocity of ball. Examine facts relating to.

Entrance & Exit Wounds.

Discussion concerning. Old views as to inversion & eversion, though
being from rare to chronic, moderate, & reverse—

Character of entrance wound of round ball (smooth one) at moderate range,
i.e., round, slightly larger than ball, smooth, cut, rounded edges.

Exit wound of same ball, larger, more irregular,

i.e., Round ball from Rifle, apt to be cutting tissues more cleanly
out, sharply round—

ii.e., Round ball from a Colt's pistol, punched like a pipe.

Elongated Rifle Ball. Character of wound depends

Somewhat upon how the ball strikes, whether head foremost, at-right-angle to surface, or at an angle, or laterally.

In first case, entrance, the shape is triangular, irregular, round

that necessarily larger than diameter of ball. Sometimes larger in

linear wound. Probably influenced by velocity of ball, & its

impact relation to its long axis.

Oral wound when the elongated ball one a Nafny surface,
or at an angle—

Linear wound may occur over a bone, or in tissue or hard

tissue, where a ball is traveling at any velocity, or its lower

edges. Elongation is wound from above, below, &

Wound of exit from Colt's rifle. Ball still more irregular than

wound of entrance. May be greatly injured by fragment of bone, etc.

as the ball may be deflected in its course.

The above remarks as to wound of entrance & exit, only apply to the perfect
ball, if the ball is commuted or deformed, or blocks a free entrance or

reaches the wound may vary—Somewhat appeared.
Course of Balls. On general impression it might be thought that the deflection of round balls, especially of the type, glancing on bone, or hard tissue, is perhaps hysterical action of muscles. Apparent deflections caused by change in location of soldier.

Track of elongated ball, large and circular, with great distortion of tissues. Separation of subcutaneous cellular tissue around wound of entrance. Effect of the ball on bone. Shattering, comminution, separation, with or without laceration. Tissue does not often crush especially in young bones. The line between the shaft & epiphysis is elastic. Elasticity of skin, may present blast of ball, which may rest under skin.

Muscle. Great destruction—Subsequent atrophy.

Nerve—Vessels—Arteries, escape of the latter in round ball wound, not so often from the elongated ball.

Lodging of Balls.
Generally at low velocity. Not only confined to round balls, elongated balls frequently also. Larger members or round shot. 12 pd. Shell shrapnel, fragments of shell. Foreign substance may lie, alone or combined with balls.

Cyclops, in left flank—Basket ball in back or neck. In great locomotion—Heart's, face, scalp, thoracic parietes, in hip. These are exceptional cases, they generally give rise to irritation, inflammation.
and suppuration—long deluges may result, as from presence of clothing. Sledged in bone to other parts, caries, accretion, accretive deposit of bone—suppuration—gangrene, the Pyramids. In skull cavity, to epilepsy &c. In all cases to be extracted—Relator probe—forceps &c.

Hemorrhage. Not so rare, nor so common.
on battle field/Serious ship—arterial, according to size of vessel.
Round ball may crush artery—Elongated steam shell injured.
Examination of dead on battle field, may
injuries to head, or from internal hemorrhage to thoracic or abdominal cavity.
Nashville lectures
Also used in part in Jefferson College school lectures.

1921

Attempts
Graduate student

Dr. W. C. Garrison
Mr. President, a Member of the Military Medical
Surgical Society of Nashville.

I appear before you to-night in response
in the very flattering invitation, which
has been recently tendered me by this
society; and with the purpose of entering
upon a brief series of discourses, concerning
certain branches of surgery, in which you and
I are alike interested.
In selecting a subject, the examination of
which might occupy us, I trust profitably
for a few evenings, I have experienced but
little difficulty.
The theme for our studies is a fertile one,
and I suggested by our daily observa-
tions.
I fear never in the history of military
medicine have such facilitics been offered to
profitable improvement, and for the
advancement of our craft, as those
which we now enjoy.
It behoves us then diligently to glean,
but carefully to garner those precious
experiences such how it unexpectedly
spring from the rank soil of the
confused fields, over which our
pathways lead.
For Gentlemen, it is only
Upon the field of battle, or in great military hospitals, with their thousand inmates, that the Student of Surgery of War shall seek to find his School.

Quaintly, yet severely was it said by that Apostle of our Art, Good Old Ambrose Paré that

"For the Chirurgeon, the testimony of the ever-faithful Eyes and Senses, availeth more than the constant leading of books, or the teaching of teachers."

As it was, when Paré wrote, three hundred years ago, so is it now. The experience of the campaign does in truth, avail more than all the Teutic Rhymes of the past. View'd then from this standpoint of practical experience, and daily and repeated observations, ample indeed have been the opportunities of our army surgeons; and wisely should their records speak.

Set us then, Gentlemen, Endeavour, so to profit from our lessons of the present; that hereafter, professional generations may turn to our book, as we in our own day, look back upon the labors of Arsenian, and of -
Flight of a Ball

Influenced by:
1. Faulty construction of arm.
2. Change in charge. Impulse = quantity of deformed ball.
3. Projectile: center of gravity along plane.
4. By gravity.
5. Atmospheric resistance.

Three lines:
1. Line of fire or sight.
2. Trajectory line of sight.
3. Trajectory point blank.

Falling velocity of ball.
Initial velocity of a ball, about 8000 ft. per Clay Ball.
Remaining velocity.
Terminal velocity. If the motion of Clay Ball at time.

Position of ball in relation to trajectory. Influenced by center of gravity of ball.
When a ball is discharged, its momentum: 1. of projection.
2. of rotation.

Deviation of balls: collapse of base.
The war of the great American republic has been one of the most momentous of history. The character of the people, the spirit of the times, the spirit of the age, have all combined to make it unique. The battle of Lexington, the battle of Bunker Hill, the battle of Saratoga, the battle of New Orleans, and the battle of the Crimea, have all been fought for the sake of freedom. The character of the people, the spirit of the age, have all combined to make it unique. The battle of Lexington, the battle of Bunker Hill, the battle of Saratoga, the battle of New Orleans, and the battle of the Crimea, have all been fought for the sake of freedom.

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The design referred to a precise calculation of the exact distance from the impact with the human body. (Sec. 12)

Prior to the year 1540, an arrow was thought to penetrate the human body almost entirely. Employed by the primitive peoples, the arrows of the European, as well as the Indian arrows, were the utmost care and marked, having been in the Indian service as "pease nails." This design of larger caliber and having a lead ball of about the same weight, promised an effective range of about 100 to 150 yards. It is a change that deserves note.

Invention of the gunpowder while the manufacture of gunpowder was unknown. The method of igniting the charge of the gun was known to Chinese in the 7th century. At first, a match was used, then the invention of the percussion cap. Subsequently, the match was used as a lens, which was developed into the system of the 17th century. This enabled the powder to be ignited by a small charge of black powder. When this system was adopted by the English in the 17th century, the powder was replaced by the more accurate percussion cap. The flintlock was substituted in the 17th century, about 1680, and continued in general military use until about 1840, when the percussion cap was adopted and lock.

The cartridge was first made use of about 1740. The bayonet, the new universal appendage to the arm of the infantry, was first made use of by PUCCINI in Florence about 1576. The price was not always at the muzzle of the firearm. The change of attack by changing the bayonet was practiced for the first time at the battle of Ortegna in 1703. The bayonet was originally attached to the pikes of a company. It was either a solid blade or a small handle with a single or double blade. The muzzle of the firearm meant the front. The cartridge was loaded in the bayonet. The percussion of the cartridge was taught. The introduction of the percussion cap taught the union of the barrel and stock. When loading the infantry together with another to insert the effect of enemy, which had not frequently been the case.
The invention of gunpowder at all dates as far as European nations were concerned, attained probably during the 13th century - the earliest date covered by any documents. The first gunpowder was used in this form, but then came a change in its method of use.

About the middle of the 14th century, black powder for the fire-arms was introduced, and then came the earliest construction consisting chiefly of copper, iron tubes, where the gunpowder was placed, and then filled with leaden balls, or powder from these, as at the siege of Constantinople. The primitive forms of guns were in use at that time.

In the early part of the 16th century, the Argenteau and Mortier were used. These pieces, although constructionally better, were of being too heavy, and could not be used where by a single fort. Moreover, and even found at first not very useful. As they were, in size and form, they were better fitted to the gun, which was not always the same as that of the town, by the hands of this unorganized and unskilled people. The town was often a mere collection of huts and houses, but there, on the contrary, off the battle, the fort was found there, from them. As they were, so were the towns. This was the reason why the standard of 16 to 18 was adopted.

The value of artillery in the time of the French Revolution was not too high, except at the battle of Jena, in the year 1814, when the artillery of France, with the help of England, was the greatest power of Spain.

From that time until the middle of the present century, the small gun was largely used in battles and sieges on the continent. By the fall of the nation, the power of the land and sea war had diminished, and the importance of the fortified towns of the enemy had been firmly established.
Ratio of those to hit. - Practical and effective in the church market house, it was still
notoriously inaccurate. It is difficult indeed to estimate the relation, exact as it is,
between the number of shots fired in battle, and the number of men killed or disabled. The ratio in the
British Service has been variously estimated at from 1,000 to
3,000 bullets fired, in some cases placed by the
army. In the American war, it has been stated
that the French expended 7,000 shots per man
possibly killed or disabled. In our own time it is admitted that
the ratio of shots fired to hits made is far
up—(The more about what I can learn).

Chapters on American 125 American RV cartridges to each soldier
enabled a support support, 18, 34th p. 12.

The rifle, as formerly the barrel of which contains externally a number
of grooves for sale to make other grade and for a wind
up from the impact to the muzzle. The object of these grooves to diminish the
external resistance and to impart to the bullet a puncture or
stiffening motion upon its own path.

Muzzle, i.e., the difference between the diameter of the projectile, and
the calibre of the piece. Where the path is, the projectile in
its course through the barrel, gradually in breadth from inside
to price, thus losing both velocity & integrity of course. The
greater the muzzle, the greater is the loss of velocity, and the
greater the deviation of the projectile from its true course
ago. In a-

Fired - Muzzle, too, only the destruction, for
In 1828, Dr. Bellocque at Thiers invented a firearm which, although a chief of chlorine construction, was the basis for later developments in armament technology. The gun was known as the short-fuse rifle. This rifle was provided with a chamber for the charge, of left chamber than the remainder of the gun. The bullet, made of a copper with a lead jacket, entered the barrel, which was bored into and extended at the muzzle, and was allowed to travel within the breech chamber in front of the charge. It was then struck sharply a few times by the hammer, which held a lever down for the six-time. After the bullet had left the breech, a few hairs from a heavy summer thread were tied to the barrel, and the gun was aimed at the target of the rifle.
An error occurred in the calculation of the force of the stone. The number and
weight of the stone, as well as their diameter, are to be calculated. For

the stone to be held in the hand, the hand must be placed as if it were a

stone, and the hand to be held in the hand, as if it were a

stone. This hand must be placed as if it were a

stone, and the hand to be held in the hand, as if it were a

stone.
which in general terms, is the interior chamber of the rifle, or fire-arm
which has been long been known, but the principle of which has been
imperfectly understood. The first rifle is said to have been made
in Russia about the year 1570. It seemed too thought
from parallel to the edge of the bore, but which was intended simply
by the process of making
to afford ease in loading the rifled barrels. It was afterward
found that the efficiency of the piece could be improved
by introducing to the effect a groove, or spiral twist
by the preceding German engineer to the value of the rifle by
the attempt to increase the efficiency of the power, but this, concealed
long been recognized. Its efficiency, hence, was
by a military authority until recently that it
been recognized. In 1836, the effect of the
by a military authority until recently that it
true that during the last century attempts were made to introduce the rifle to military
use, and by rifling the barrel, a trunnion was attached to all large
army. But these commands, although available in 1812, failed
made to act in the same manner as the infantry of the time. The rifle
rifled was heavy and unwieldy, was loaded with difficulty, and after a
few discharges, failed from the effects of the ignition of the powder.

This rifle, in fact, a weapon only for the use of horsemen and partisans, 5 or
each was largely employed in the American revolution 1776. During this
war a French rifle was introduced to the French armies,
although every effort was made to hinder its French soldiers to use the
good match in the armies. It will stand to reason
that the rifle itself is by no means a modern weapon, although the adaptation to it of a proper stock for ground work is of importance in reducing the effort to be expended. What could be loaded and fired readily, a barrel could be made to take the shock of the firearm's contact.
1828 constructed a rifle, having in the head a chamber for the charge of lead in the middle of the bore; the bore, an ordinary length, falling around the gun, then inserted at the muzzle, and
The effect of the French Chasseurs on the Italian Campaign.

The first shock was to the line of Enr. Valence, when the lead of the projecting corn blas to become dammaged. After a few salvoes, the object of Old Line was to break the enemy’s line, and at the moment of impact, the bullet (flying at a velocity of 400 feet per second) entered the line, with a conical hollow in the core. Into this hollow, the bullet, with sufficient force, would be driven, which at the instant of the charge, would expand the rear end of the conical hollow, thus expanding the body of the bullet to force them out of the grooves of the rifle. It is the defect of the bullet, in the hollow of the line and at times, to bring it through the body, and to penetrate the body. Over the core, outside of the bullet, I kept it for accurate flight.

At a subsequent point, the core of the bullet was dislodged, with the expansion from its hollow, allowing the elongated bullet to leave the rifle and continue in that form. This was the perfect advantage of the French bullet, which had been issued the French infantry. The line was composed of the line, and the French infantry of the line was composed of the line.

Following the different tactics of the French, the line of the Italian Army was composed of the line, and the French infantry. The line was composed of the line, and the French infantry. The line was composed of the line, and the French infantry.
Another rifle, which has attracted much attention in England, and is indeed considered superior in nearly every respect to the American Springfield rifle, is the celebrated Whitworth rifle. The peculiarity of the gun is its bayoneted one, without frizzen. This rifle is described by the bore of about one inch in 20 inches. The principal for this rifle is of Korea, a valley of land, and is immediately in the shape of a bolt; its length being equal to those characteristics. The bullet, its accuracy made, is of a kind being only slightly fluted, being approximately the size of a fillet. The range of the Whitworth rifle is very great, from 1700 to 1800 yards. The velocity is destructive efficiency imparted to the munition, and its accuracy of target—This weapon was employed to those extent by the rebel sharp-shooters of the army of Virginia with terrible effect. In one instance in which I am aware of the knowledge of the center, a bullet of the army of the Northern forces was hit by a Whitworth foot bullet, fired farther from the distance of a mile at least, on which occasion the shot has been observed.

Another gun rifle, also a famous English pattern of year, produces a deafening blast which, when a conical shot is fired, is heard to the 70th degree. The projects which are completely made to explode are divided by the succession of explosion of their charge. It ranges from 1500 to 2000 yards; it is very great with the employment of it, which has been decided.
The Muzzle, after master of the U.S. service, is known as the Springfield pattern, because from the Arsenal at which chiefly manufactured. The barrel of this arm is about 46 inches in length, and its caliber .58 inch. The groove of the bore was .22 inch in width, and an being equal to its depth. The circumference of the bore - the least is uniform, to the 12th being 1 inch more in 12 feet. This gun was originally weighed for 1000 yards; but for practical purposes of the late war, the lighter gun exceeded to 100, 500, 8500 yards.
Character of the small arms or projectiles employed by the Leftists during the Rebellion.

[Handwritten text discussing the characteristics of small arms and projectiles used by the Leftists during the Rebellion, with some passages in red ink.]
Other Myelitis
Cervical
Advent
Joint Wound
Long Bones

Ethmoid
Head
chest
Abdomen

Deep

Genital Problem
Abdominal Fracture
Gentlemen, Fellows of the College

By the terms of foundation of the latter lecture

Thus, it is provided, that the House Council

declares to be annually delivered, under the

Document, shall be upon some point or

points connected with surgical pathology.

The topic which I have selected for

Our consideration is the meaning, cause, or

Character of "gunshot injuries."

But although this subject in itself, is one

Of most fertile truths, I must yet confess to

A certain hesitancy, in making it the theme

Of my discourses before you now

Time was not very long since, when

The demands and exigencies of a great war

forced most strongly upon the profession the

Consideration of this class of accidents. But

happily for us, that time has passed away;

The people's spirit is no longer in the

Loses of war, or

placently to devise more ample means

For the destruction of human life,

For now our land is at peace

Time, with its all healing powers, has already
Already touched many a sore left lurking
and festering from civil strife—Harsh
feelings have softened; bitter memories
have dimmed—The events of the
Nation's struggle are bye-gone; and the
rapid development of the Arts of Peace, had
all but obliterated, the impress of the
savages of war.
In a word, the curtain has gone down
幕后 upon that
infinite drama of blood
and suffering—The conflict of Fifty-one—
The actors have left the stage; the audience
have dispersed; the lights have been turned off;
And actor and spectator would willingly
forget that such a tragedy had ever been
played.

Yet it is as Surgeons, the War has been full
of interest, an interest, which I hope has not
yet died away. For it has displayed before
our eyes, great classes of accidents, of which we
otherwise would have been but few.

That it is to the study of these casualties, that
I desire now invite your attention.
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\[= 99.90 + \]
1. Arm & Leg Cells
2. Theory of Flight of Bullet
3. Effect of Ball Stopping a Soldier - Symptoms - Shock - Death
4. Local Effect on tissues - Entrance & Exit - etc.
5. Emicid - Bone & Tissues
6. Head
7. Lung -
8. Belly -
9. Acute Myelitis - Gangrene - Encephalitis - Tetanus
10. Secondary Hemorrhage - Tetanus
11. Osseo-Myelitis - Gangrene - Encephalitis -
General Recovery - Transportation.
well supplied as to arms & ammunition, as early as the 1861. The musket rifle at that time had been adapted in large numbers. In many of these troops, we also armed with the muskets in their own rifle, a cavalry weapon, and in which a sharp hand carried their charge. At a later period of the substantial resources of the North developed, public manufacturing arms were substituted to those of them, as for example the Hodge's arms, which contained the twenty-four gun machinery formerly in the N. Harpers Ferry armory and elsewhere. Armories were turned out during the war, and in a short time had been

As the beginning of the War, the cavalry were a favorite branch of the forces. With the economy of the men, most frequently used their own horses, the well mounted. There were also, especially in the west, that the sabre and saber were not infrequently used.

These battalions were carried in addition, a double

The sabre horse as a rule ridden in action usually in the rear of the

This confidence is one born of them carried to far, and employed them at a later period, which in the line to treat in hand to hand

Defensive Arms. The variety of Defensive Arms has been employed on an unprecedented scale in the present war. Early in the year 1861, was made a new dealings for Company to manufacture those arms. Among these, among rifles, the breech-loading rifle, was particularly

One of these, Isaac R. Blanding, of the firm of Blanding & Co. of Boston, was employed in the West. This taken from the body of a rebel officer at Gettysburg.
The small arms projectors used by the rebel infantry were of nearly the same kind.

The entire line, obtained from different battle reeks, the ruins of old forts, the variety of English and continental balls.
لا يوجد نص يمكن قراءته بشكل طبيعي من الصورة المقدمة.
18

Before many months, the South was gone, her disbanded in the
field. The Confederate Congress - that the expansion of our sover-
gene autonomy should have the power of expanding. Northern
pressure was only one of the

- The conclusion of the battle was necessarily
a bug detraction. Both sides then
were less certain; a new
Congress, in penance of the South's pace, a threat which is known as
the Harriett. The North's answer, a thirty-pounder Parrott, at
one time in anger, has recently been withdraw from
arms in the field, a active campaign.

- It was nearly ready, to be talked of stage gun, a year,
- He had committed a feat of defensive power. There was
- of any calibre, from the reflect 10 feet, to the minute
- hour, two hundred pounds of the Confederate battery.

The Rebel Army of the Rebel South of these. It is
difficult, of course, in this subject to deal with accuracy.

It would appear here; that the issue of the Southern

- was being called in the earlier campaign of the

- Either from gold managing, or biding, or

- of the Southern battery, the N. S. Assembly, the truth, the

- bell never will government turn. Then, with the North,

- exception of those

- bell and the hand of the rebel. These numbers of

- price, Army of European Bernad's men were also brought

- by the blockade running reached to the East, the

- much material from, war equipment in

- The rebel armies of the West, now permanently
The crew of a ship was composed of a midshipman, four seamen, and two ratings. The midshipman was the captain of the ship, and the seamen were responsible for operating the artillery. The ratings were responsible for maintaining the ship's rigging and equipment. The ship's crew was organized into three divisions: the main division, the forecastle, and the carronade. The main division was responsible for operating the ship's machinery and weapons, while the forecastle was responsible for the ship's sails and rigging. The carronade was a small section of the crew responsible for operating the ship's carronades, which were large, light artillery pieces. The ship's crew was under the command of the captain, who was assisted by the first lieutenant and the master. The ship's crew was also responsible for maintaining the ship's discipline and preventing mutiny.
Army of the U.S. forces during the war of the rebellion.

1861. The terms, first called into service in the early part of 1861, were known as the 'three-month men,' were armed with the old Smith

For market of the pattern of 1822, (carbine 69,) almost to percussion

locks, or, the old Smith, model market of 1842, - A very few of the new York regiments from N.Y., came, England came in the

new Springfield rifle market of 1851 - There were obtained

from the States custom and service, by the States. The infantry

of the regular army were all provided with the improved trench guard

The five hundred thousand men was called for by act of Congress in July 1861.

To those twenty five thousand were furnished with the Springfield rifle

Practically, which was all that could be prepared during that

year, - from this, the regular regiments in the active armies were

supplyd, and the Statesman were dedicated to the troops of the Army

of the Potomac. The demand was this case furnished in the

Smith trench round, of which about 125,000 were of inferior

Normal manufacture. The standard years of American can

in the other time, in use in the Federal Armies of the W. I.

The Smith trench range, mostly allowed from both markets of

the Old pattern, but they were nearly thirty thousand weeks,

In the same directions, as to them, about from the

action of firing less than large - at the same time,

the Smith trench range of shot, was left by them in the ground and

lying the latter part of the year, 1861, the government directed our body

employed in rolling, a young, the back board came in use: - as fast as

the trend to use, they were issued to the troops, in lieu of the

Smith trench range, in their hands. The Smith trench range, anod were thirty

of the old pattern, to shoot both, of 1822 and 1842, but when reformed proved to be

more or the match of weapons. The chief objection to them
Springfield - Civil War end Aug 10/63

Belmont - Nov 7/61

Fair - Henry - Feb 6/62

Vicksburg - May 16/62

Chickamauga - Sept 1/63

Perryville - Oct 7/62

Antietam - Dec 31/62

Vicksburg - July 4/63

Port Hudson - Aug 8/63

Chattanooga - Sept 3/63

In Kent - Nov 24/63

Yorktown May 4/62

Williamsburg - May 5/62 - 7 days

1st Bull Run - July 21/61

2nd Bull Run - Aug 30/62

Canton - Sept 17/62

Fair Oaks - May 31/62

Glencoe Hill - June 27/62 - Milled - July 1/62

Fredericksburg - Dec 12/62

Chancellorsville - May 2/63
Wash. students’ college
May 4/04
The projectile, when it leaves the gun, is a cone-like, pointed, hollow, pointed, and usually made of brass. It is designed to penetrate the target efficiently, delivering its energy in a concentrated blast. The conical shape helps in penetrating deep into the target, providing a significant impact. This design is often used in military applications, where precise and forceful penetration is crucial. The projectile's trajectory and impact are typically studied through simulations and experiments to ensure optimal performance in various scenarios. The design parameters, such as the angle and density of the cone, are critical in determining the projectile's effectiveness. The projectile's journey from the gun to the target is a complex process involving various forces and environmental factors, which must be considered in real-world applications.
left from which it is said it has been discovered. The 1st time, without gunpowder, only a few rounds were made at 20 yards. The 2nd time it was a very great thing done to the sense of hearing. In an action which came to the neighborhood of the Atlantic, a report of the force of the Krone became so strong that a bronze bullet which fell within the common shallow breach

Explosive Shell Bullet

A probable Dr. has been made of the subject, has been much improved. The 1st time the 2nd was made for the 3rd time. The 4th time and a success employed at all. The 5th time the force of the cannon and ammunition against them. The 6th time much improved. The construction of this particular will be an interest to the end. A capsule of a type capsule filled with powder, embedded in the center of a shell. A shell, in the center of a core of an explosive charge, is thrown into the Explanatory Committee at the base of the bottle by a time fuse, and explodes in the core of a core of after the charge is fired. In this case at the rate of about $500 fuses from the muzzle of the piece.

It is possible to do much & just according that an explosive plastic bullet was employed by the local Military Authorities, especially in the local area of the vicinity of the Bag of Williamsburg. It has been found that the 1st time has been done to improve a precision of the possibility, for the Military Officer who has been done. It has been shown that in the first place a bullet has exploded in the body of a 12 fitter.

What will be the nature of the possibility, which acting in the tannin principle, a success to all a time fuse, could not be done.

The use of the explosive bullet, is not altogether real. Experiments with in 1823 by General Jack of the East Indian Company, made a model of an explosive rifle. There is evidence by this officer.

A leaden bullet of the same nature has also been made by Becun, a gunsmith at Paris. It does not appear that better than fuses have been employed to try leaden bullets in the British a Thousand
The breach loading. travel to the left. Thus, using the whether
than the cantilever. It forming part of various patterns, instead
forward cavalry, I toward the close of the contest.*
the charge reporting rifle for cavalry, presenting the most
perfect weapon known. The cartridge, for many
from of breast loader, especially for the cantilever and rifle
the generally metallic, and waterproof. The detonating
powder for the ignition of the charge was fixed in the base
of the cartridge. The use of the percussion cap was
this desired with. And great reliability of fire was
attained.
The invention of the improved gun for "cannon"

Henry, who had previously worked on a change in the construction of cannon, began experimenting with his ideas. His approach was to use long, heavy cannon shells, shaped for a particular type of projectile. He believed that using a long, heavy shell would increase the range and effectiveness of the cannon. He experimented with a variety of materials, including iron, bronze, and a mixture of metal and clay. The shells were designed to be both lightweight and strong, allowing them to be fired at high velocities.

Henry's cannon shells were made to be more effective than those of his contemporaries. He used a combination of metals to create shells that could withstand the immense pressures generated during firing. These shells were designed to penetrate the most fortified enemy positions, making them a significant improvement over traditional cannon shells.

In addition to the shells, Henry also worked on the.gunpowder used in cannons. He discovered that using a combination of ingredients, including sulfur, charcoal, and wood, could significantly increase the power and range of the cannon. This new formula was used to create a more powerful and effective cannon charge, allowing the cannon to be fired longer distances.

Henry's cannon shells were not only more effective but also more versatile. They could be used for a variety of purposes, including siege warfare, naval battles, and even for mining enemy fortifications. His contributions to the field of cannon design and technology were significant, and his work laid the foundation for many of the advancements in cannon design that followed.
The following are the chief varieties of Elaborated Projectiles, furnished by the late
Ordnance Bureau for field purposes.

The Hotchkiss Projectile—This is composed of three distinct sections, first a
Cast-corn, central body, second an iron case or bullet, and
inserted in an interchangeable band of lead and soft wood. By the
explosion of the charge, the bullet is driven forward when the body of
the projectile, opening the iron case, which is then forced to make
the edges of the gun.

The Schenck Projectile—This consists of a cast iron central
body, with a conical case. Around this base the place is
traubbed the expanding portion, a thrust lead of paper
made. By the explosion of the charge, the lead is
forced forward in the on the
inner
the projectile leaves
the muzzle, the lead is thrown to pieces.

The Parrott Projectile is an Elaborated cast iron ball, upon
into which a brass case is cast. The case from which
the lead is thrown, the gun remains intact, and the brass
case, which is made to take the pressure.

The James Strett Projectile, now observed fallen into disuse,
When the Elaborated iron ball, with a bullet of copper, (cast separately)
and expanded by fire,

I the other hand, was placed a backing of
sheet tin, and lead, which was expanded and
the action of the gun from the cavity in the case of the
projectile.

Other Projectiles Varies, of the same principles, intended for rifle ammunitions, are cast, with
slugs, or three lead, correspondingly to the pressure
of the gun. The cast of the bullet, the interior of
these slugs, with M1 metal, the content above the projectile
of the piece was different.
The object in firing round shot, of making case in cannon from field pieces, is contrary to which the projectile is a weapon that, when the projectile is of which the body of justice, is a card to it... 1. The Court of Amendment then arranged is known as fired ammunition.

Elaborate (projected for future) cannon. Here are fully more complicated. Then from which an employee must observe too few. They project for heat of that can whet the blade of the government to see in that which the wording changes in are found to be again. To accomplish the parts, really necessary and be in little water and the that little project is meant to. To see in the blade to emphasize a voluntary motion when the line of the career that it should be paid into the years of the career. As the career can not be effectively will cast the Federal it is necessary that a toll to the projector of cannon must be shorter to lead to this effect.

Refust for the toll cannon. Reduced the fifty principle when submitted to cannon, necessary here to charge the human of the projector to in the case of, because to voluntary motion when the parts of the tool should be made to fill the gaps of the war, in a stage that a voluntary motion when an equally might be obtained. Next in the elaboration both to charge the human of the cannon must be shorter to lead the rate of commander of a toll of could be essay, from a shorter to fill the gaps of its present... the nation be able to connect such a shorter to fill the gaps of its present. The nation be able to connect and body...
A chapter which the papers dozen of locations
Called when to lead are them from writing from
the abridgment of the other hand of the book of Philippi
Detached from the flight of the Engraved prospect and
During the presence of the noun of the British army in the
sheep of the sea of the prospect of the channel. It is informed
that the British army was expected by the Thuringia from
the West of the scene of ganges there on their heads.
Fortunately, the formation of the Manufactory of the new guns that
used to the U.S. Annunciation field guns is such that
the accoutre of engaging war occurred. The
Another less known. Know nothing of these accoutre to
language, whose big guns of large caliber have been fired
on the hands of the cutter.
That although the so-called winds are rarely
true, there are occasional instances from which we may
learn something about their nature. The following case is an interesting example of such an accident.

A deranged and highly animated officer, while standing in a field, was shot by a stray bullet fired by another man. The bullet entered the officer's hand and passed through the skin and several fingers. The officer immediately dropped to the ground, and the bullet passed through his body, causing severe injury.

The officer was taken to a hospital, and the bullet was removed. The officer remained in the hospital for several weeks, during which time he received excellent care. The wound healed, and the officer was discharged from the hospital.

The case illustrates the importance of maintaining a high standard of care in such situations. It also demonstrates the need for proper training and preparedness in order to deal with such incidents.

Note: The following cases are also used in the payment of indemnity. The point here is to illustrate the care taken by the author in these cases. The cases are used as examples to demonstrate the proper care and treatment of wounds in military actions.
The increasing complications, as quite considerable. The council of metallic
bombs which trace out the options of the projectile. These latter contain
destructive powers, which is partly explained by the action of metallic
and called in play upon the impact of the projectile and
in some instances to consider all uncertainty, all the
The use of projectiles seems well-payed of the characteristic.
the shot from the ball to the point of contact.
May of them send point to exactly as the former time the
be another hit known as the certain accuracy of
their object having shot off to the point. Before the
return of the ball, who throw when the body, when one of the
off a part of the shell, then metal is larger frequently
resulted, large, and at least a peaceful called when to
break them from the body.

Grenades

The hand grenade is a species of shell, of small size, intended
to be thrown by hand, by the direction of a corps upon
the occasion of the return of the mortars, and one
and generally used in the several assaults upon fort and
fortress. The use of the mortars when the case was
not in the hands of the enemy held the assault upon a rebel
fortification. Formerly, these mortars were furnished in the
mountainous parts, which were mounted on the mount. This
precision aided upon it was known. The hand grenade
which is the hand grenade, the throwing of the U. S. Army
is corresponded with the average of the U. S. Army
before, and none of a hand device.

The use of the mortars when the case was not been limited
by the assault, when the rebel fortification at Fort
Hudson in the Massachusetts, an attempt was made by the U. S. Army
to avoid themselves of the employment of the Rebel's hand grenade,
which were thrown by the enemy among the columns of the
men. The fire from the hand grenade, exploded many
of them, caught upon blacked by the rebel soldiers
who in their turn employed them against their assailants.

The smoke produced by the mortar was done to very difficult
to those soldiers from whom flashed.
Occasionally, when these quarters, when they...

The part played by the Kentuckians in the conflict is well
One of the shots has fallen among the assailants.
Some think this has occurred when the fighting began. Mr. Kentuck
onomatopoeia of the rebel column under the present—
Theorem of law—If modifying the height of a projectile the laws following
must be borne in mind.

1. The line of sight, which is the vertical ray, passing through
the upper part of the breech, or muzzle of the
piece, and directed upon the object fired at,
beared. The line of fire, is the prolongation of the axes of
the piece, in the direction of the muzzle.

Thus, the trajectory, which is the curve described by
the centre of the projectile.

[diagram]

The relation of the projectile to the trajectory must be a matter of interest
to the builder of the gun. It is important to determine the
range, or the distance travelled by the ball before it touches
Point Blank, is the place at which the line of sight ends the trajectory for the
second time (b). Point Blank range or the distance of this gun from the
point blank (b) when fired at different angles, is the area of the muzzle, that
is, the distance travelled by a ball before hitting the ground.

Velocity is the velocity of a projectile is the number of feet per hour that
it travels over a given second of time. Initial Velocity is
the velocity at which the projectile leaves the muzzle.

The initial velocity of a cannon ball is the number of feet that it travels
in 1 second of time. It is given by the equation
\[
\text{Velocity} = \frac{\text{Distance}}{\text{Time}}
\]

Consequently, a cannon ball fired at
11,000 feet per second will travel
8,000 miles in a second.

The velocity at which a cannon ball is fired is given by the equation
\[
\text{Velocity} = \sqrt{\frac{\text{Force}}{\text{Mass}}}
\]

The velocity of a cannon ball depends on the force with which it is fired
and the mass of the cannon ball.

The laws of projectile motion are governed by the
Cyclinder, which is tilted by the
Eulerian formula taking into account
the absolute velocity of the

torsional pendulum. Lastly, since
that of the cannon ball,

The motion of a cannon ball in its flight through the air is much less than
that of a cannon ball. This is due to the

Along the line of sight, the motion of the cannon ball, the resistance offered by air, is far
less than that of a cannon ball of the same

[continued text]
A ball when discharged deviates from its movement in various ways. The movement of translation, or projectile's speed, and the movement of rotation, or projectile's spin, both play a role in the deviation of a projectile. At the moment the ball leaves the muzzle, the struggle begins between the force of gravity and the force of the muzzle. If the muzzle force is not dominant, then the case of spherical ball for instance, does not affect the gun, or cannonball, much. However, if the muzzle force is dominant, then the gun becomes a consideration.

When the ball leaves the barrel, it is no longer subject to the force of the gun, but as it travels through the atmosphere, the direction of the projectile will be determined by the wind, wind current, and other factors. The trajectory of the projectile will be dependent on the angle of elevation at which it is fired, the distance between the gun and the target, and the force of gravity. The force of gravity will cause the projectile to fall, and the angle of elevation will affect the range and accuracy of the shot.

The angle of elevation is critical in determining the trajectory of the projectile. A small change in the angle of elevation can result in a significant change in the trajectory of the projectile. The force of gravity will cause the projectile to fall, and the angle of elevation will affect the range and accuracy of the shot.

The range of the U.S. Rifle Marksmanship may be considered practical for about 700 yards, which is the limit of effective distance. This range will hold at least at much greater distances from 1200 to 1300 yards, or may even extend further under proper circumstances to exceed against proper of enemy.
The influence of the expanding bullet on its trajectory is a matter of much interest to the neglecting gunner. To explain in many of the cases, bullet expansion is half the excitement of the issue. The trajectory of a gun has the driver's body in a vertical plane determined by the bullet in its flight. The deviation from the center line of the bullet due to its expansion provides the deviation to the smaller concentric lines laid down by the denser fringes. As long as there are all times the deviated fringes of the trajectory on the other hand, the path then the projectile's path forwards. But luck is not the case for a number of days any expansion to the began in the field, and the deviation is impossible for the gun to overcome. To overcome the expansion, the gunner must control the size of the charge. The gun is compensated for the deviation from the center line of the bullet. The influence of the gravity on the trajectory, of the projectile, and gravity is the cause of the projectile's path. There is none in this case or in the feathered grooves. In short, the sense of the bullet has not been changed. Thus it often happens that irregularities exist in the gun, the projectile, or the manner of loading, and the quantity or quality of the charge. The gun compensation is affected by the deviation in the sense of the charge in a gun. If the charge is too light, the bullet may deviate from the trajectory. The solution to this problem is to adjust the charge of the gun or the gun itself. The deviation may be corrected by adjusting the charge.
Motion of Projectiles. If the projectile starts from the center of the Earth, with a velocity sufficient to reach the height of the Moon or the Sun, it will be observed that the body also retards at that height, and the body falls along its path with less velocity.

The term "terminal velocity" is used to describe the velocity of a body that is subject to a force in a vector field, such as gravity. The body will continue to move at this velocity until it reaches a point where the force is no longer acting upon it.

It is important to note that the trajectory of a projectile depends on the initial conditions, such as the angle of launch and the velocity. The path of a projectile can be described using the laws of motion, which take into account the forces acting on it, such as gravity and air resistance.

The study of projectile motion is fundamental to the field of physics, particularly in the study of celestial mechanics, where the motion of celestial bodies is analyzed.
and rotation upon its axis imparted to it by the rifling of the piece during the first part of its flight, gradually passing into a conical motion, similar to that described as occurring in the lift about to come to rest.

Conclusion

It is of importance for the Military Surgeon to bear these facts in mind, in examining wounds produced in battle by the Elevated Rifle projectile. The varying character of the wound produced, especially the wounds of entrance, can oftentimes only be fully understood upon careful study of the nature of the projectiles themselves, and of the disturbing forces which influence their flight.
Observation of Value of Inestructs

Small
Round
Arm projectile

Elongated

For market rifled 700-800 yds

Carbine — 400

Projections in mils

Distance
200 yds. Every part of a man in cap, then assumed uniform uniform
500—500—500 — but head, legs, arms, movement
600 — The head & legs have hard & body can be made out

700-800 — The body is elongated

900 — fails — but chest

1100-1200 — no face, but marked

Cannon Shot
Round — to extreme range — Precyceht
Elongated
To a great distance, but not by direct hellfire
Pyroform — no reported

Cannon
200-500 — Exceed not used

Shell
Left accurate than shot shot —
Demoralizing — Idea of proficiency
Arriving of the U.S. forces, during the war of the Rebellion

Nearly all the infantry first called into service in the early part of 1861, known as the three months men, were armed with the same smooth-bore muskets of the pattern of 1822 (caliber .69) altered to percussion lock, or else with the smooth-bore percussion musket of 1842.

A few Regular regiments from N.Y. and New England carried the new Springfield musket of 1855, these were obtained from the Quaker farmers, and to the respective states by the U.S. The infantry of the Regular army were all provided with the improved Springfield drilled barrel.

The 100,000 levy was called for by Act of Congress in July 1861. In three months, 25,000 Springfield rifles were made, all that could be prepared during the year were issued with these. The few regular troops in the Western armies were equipped. The rest was distributed to the troops of the Army of the Potomac.

The muskets of the levy were furnished with smooth bore muskets of which 125,000 were of inferior cheap manufacture. Herein attach to Glanton's Rifles...

During the latter part of the year 1861, the Gov't. muskets were barely employed in Georgia. The smooth bore arms in store - As fast as they could be done, they were issued to the troops in lieu of the drill guns then in their hands. - The muskets thus altered, were of the old pattern of 1822 to 1842, but when 'rifled,' they were found to be...
Brig & Serviceable weapons. The
Chief objection to them was their large calibre,
60mm. The shot, demanding a ball of such weight as
rendered it difficult for the foot soldier to carry a
sufficient amount of ammunition. These
altered muskets were subsequently called in
and their place was supplied by the Legatina
Horse, 68-lb. musket, caliber .58 mmm. A heavy
of the English 68-lb. horse were still in use with
a caliber of .75, an elongated case of .774
suitable for all the rifle muskets to the service,
was adopted by the Ordnance Dept. The caliber
a Caliber was still further reduced toward
the close of the War.

Fine Firing. During the war a few regiments
 Electra rifles supplemented to act as sharpshooters, were
placed with fine firing heavy target drifted
of long range. From these marksmen much
credit was expected, but it was questionable, despite
the newspaper correspondence, whether they
at any time inflicted serious loss upon the
enemy, or realized the anticipations which
had been formed as to their accuracy of
fire.

Arms of the
Cavalry Service

At the commencement of the War our mounted
horses were armed, with sabers, with leading
points of large size. In addition they
were frequently furnished with breech-loading
Cartwheels of Sharps, Spencer's & other patterns, as fast as they could be procured. — At a later period in the war, and after the Organization of the Cavalry bureau, this issue of arms and equipment and it was ordered that each cavalry man should be armed with a Sabre and only one fire-arm—either the revolving pistol or carbine.

The forms of the latter, were most esteemed were the Spencer & Henry repeating rifle, carbines for which metallic water-proof cartridges were used. The skillful Employment of such admirable long range weapons, went far to contribute to the efficiency of the Cavalry, & enabled this arm of the service for the first time in military history, to the main, meet & repel the attack of an Enemy's Infantry.

Artillery. — At the outbreak of the war, the U.S. field artillery was composed entirely of Smooth bore gun and Rifled pieces had not been introduced, but very few existed, were in the Country, or they came in the hand of a few Experimentalers, and of a few Companies of Militia Artillery. — The absence of a Rifled field artillery was regarded as a great deficiency, to remedy which vigorous measures were at once adopted — Rifled Cannon became the rage, and in many months the Smooth bore guns were discarded, and in their place the
new pieces were substituted.
But the experience of the two bloody actions showed that
the reform in this respect had been too hasty.

Valuable as the last piece might be, the
smooth gun was in its proper place at 4:10.

The composition of the artillery was accordingly
revised, a proper proportion of smooth lives being
redistributed as the end of the case

The field artillery as now constituted, is composed
of the smooth 12 pounder, and the three-inch
rifled gun, the better of the Parrott, and the
pattern of the Ordnance bureau. The
rifles 10 to 30 foot at one time in Vogue were
withdrew from active field service.

It is unnecessary here to speak of siege
guns, and heavy guns mounted on forts or
defensive works. They are of every
cable from the 20 foot to 30 foot; the
monster Swamp Angel, having a terrible
propulsion of several hundred pounds in
weight.

Southern Rebel Troop - Armour of
It is difficult of course to speak with accuracy on
this subject. - It would appear known that the
Southern troops were fairly armed in the earlier campaign
of the war - at this time Elston from good
management upon the part of the Southern
leaders, only treaching towards the U.S. Government.
The U.S. arsenals in the insurrectionary states were heavily stored with good government arms.

These, with the single exception of those stored in the St. Louis arsenals, fell into Confederate hands.

Large numbers of improved arms and much ammunition of European manufacture, were also captured by the blockading vessels, and in the East much material of war was captured in battle by the insurgents.

The Southern Confederate arsenals in the west were unquestionably well supplied with arms, and ammunition as early as November 1861. The Enfield rifle at that time had been obtained in large quantities.

Very many of their troops were also armed with the Contract or Mississippi rifle, a formidable weapon and one which in expert hands carried harm into the ranks of their opponents.

At a later period, as the industrial resources of the South developed, further manufacturing arsenals were instituted.

In some of these, as for example the PeeDee works, which contained the gun-matching factory in the U.S. Arsenal at Harpers Ferry,radically and serviceable arms were turned out.

PROJECTILES

The small arms projectiles used by the Confederate infantry were of many kinds.
I have obtained from the different battles—field specimens of the most prominent—branched of the English Continent’s bullets.

At the commencement of the War, cavalry was a favorite branch of the service with the Confederates. The men owning their own horses were well mounted. Their arms were the saber, revolver, and rifle more frequently, especially to the latter. Each mounted man carried also a double barrel. (Cowboy—piece)

Defensive Armor

No defensive armor was ever authorized—permitted by the Government. But early in the War, attempts were made by a New England Company, to manufacture a corselet of soft steel, whose power of resisting bullets was greatly vaunted. One of these I obtained at Gettysburg, & it is now in the A.M. Museum at Washington. It was taken from the body of a Federal officer, & it pierced through although 3

I know it.
Menstrual Accompanying Ball Wound

The case of a soldier broken in action by a ball.

Pain — May be unnoticed — or felt by friends or comrades — or intense.

Blood in clothes, may occur as a stranger to a slight tingling "stitch" as of \textit{Nuttall or stick}. Compared to a sensation similar but often felt by some to an \textit{Electric shock}, rather to that than from an appreciation of injury influenced by \textit{Alliance, Pursuit, or Successful Action}, or generally \textit{Favorable Circumstances}.

In reverse case, this appreciation is milder, as in Defeat, Retreat, depending circumstances, or where the Soldier lacks confidence.

Pain — Sometimes begins a heavy, oppressive kind of pain, the Malting occasionally present immediately after injury; or after the soldier's recovery from immediate shock or commotion, Pain by when Ball at high velocity.

Secondary Pain may come on a little later, say two or three hours after injury; & is dependent upon pressure or 

The Seat of the Wound can often at a glance be detected, or discerned at least by the Action or Attitude of those shot.

Thus in a general way, in wounds of the

\textit{Lower Extremities}, the Man will fall forward, or stumble, with an endeavor to throw all the force of his fall by his hands.

\textit{Upper Extremities} — if Lance, will fall at side.

\textit{Trunk} — Most frequently pitched forward, or spring, more or less stunned.

\textit{Face} — Here, in addition to, tingling, and electric sensations, there are often a sense of Involuntary Movements, the Man turning, staring, or dazed, around.
2. Wounds of the Chest.

When a shot in the chest the action is often indicative of great anxiety
produced by the dyspnea, sense of Strangling, and also by
the moral effect of the injury which he regards instinctively as
so great.


The usually great shock and collapse from impression produced
upon great sympathetic center. The stricken man sinks
down helplessly and almost in delirium and lifeless


Wounds of these organs, especially of Vestibule, are accompanied
by nausea, great laborsation, occasionally intense pain
in the patient wears in the head, doubling himself up.

5. Wounds of the Nerves.

Wounds of nerves, or when the nerve trunks
are affected by commotion, there is an immediate
loss or impairment of sensation to a greater
or less degree—Occasionally there is very sharp

Pain.

—Mitchell says a plain $\frac{1}{2}$ of these cases
about the pain is absent—

6. Referred Pain.

—Sometimes referred to periphery, as in injury of
buccal mucous, where pain felt at arm. It's about
referred to this limb—Sometimes referred to other lesion (Mitchell)
In these often but little pain comparatively, in consequence of the clasp, general or local which accompanies so large an injury. [Illustrate by Shell wound of Dr. Belden.]

Greatly affect the soldier's behavior when wounded. - Paul (Native born), as a rule regards his wound practically. It is an evil, an accident, but he will make the best of it. He will if not desperately hurt get himself off the field & recover as best he can, & as soon as he can. His ingenuity soon converts a gunstock or a foraged stick into an improvised crutch.

is variable in his manifestations! - Sometimes gay and light hearted; sometimes clownish in his lamentations. [Fisherman from Illinois, drunk pipe in mouth, with arm amputated just below shoulder. Not authorized,] -

is forgetful - When wounded, he has falsified this part of the contract, how the Government must do their, and care for him.

Of all whom I have seen, the Negro when wounded is the most patient, cheerful, & trusting to his medical attendant - Obedient to his commands. Think of Negro bearing his arms - the White when troubled throwing them away as a rule.
Individuality of whom can we deplore—We do not think that even

In their wounds shed death as much as we usually suppose.

The only way I live was said as a matter of fact that the hour

This a true fact. I cannot

like to have been longer. But let me let my father that

I have so far been as he had been me at the head of my men—

in Philip Sydney at St. Alban's.

The influence of Kent, as a man, is to me

it can be seen in reading men to face reality, and

it was against I want the discrediting effects of

injuries exceeded the line of duty.

It being to the instinct of self-preservation, that

many a man comes to a command in battle,

especially in his first engagement, it was not

that he was afraid to be—of he did not fear

to encounter the opposition & contempt of our

Commander-in-Chief, and friends & family at home.

The idea conveyed in the Geographical point

that

We cannot afford to be

cowards, is not confined to a single family

alone, but towards all that may be

injured.

I have often been men, strong to bear

patients bravely suffering, heightened by

puniition, in the hope that by their example,

the suffering bears of others future suffers

a favorable influence might be created upon the suffering

spirits of their left rear, to confirm

the
Exaltation of a strange nature is often the

Sentiment of those about to die. The idea of liberty, so connected with my blood, once said to me, an officer, whose character and reputation were not enviable, and when around 20

not undeserved, been received under the most creditible circum-

stances.

Excitement or fear accompanied wound, but generally I think those of

conduct being slight nature. 

Sometimes by Logically,

(a) Sudden, and apparently affecting the mind,

(p) Sudden, and apparently affecting the mind,

It seems to be serious, as a favorable impression

This is so common as not to require illustration.

Illustrate by

Killed by their own, as returning up and down, killed

by a shot to the head, running up to 100 yards, killed

by a shot to the head, running up to 100 yards, killed

by a shot to the head, running up to 100 yards, killed

Illustrate by

Bow at Alexandria.

Illustrate by

Illustrate by

Major Wofford's case of 67 th Penna. Volunteers.

Illustrate also by Col. E. L. F.
Shock

The most frequent symptom of injury — the Eleventh Pertact —
and even before the Military Surgeon

Causes of Shock, complex and numerous, and the
due to Shock, involving as they do the study of
the active and the inactive system in all its subdivisions,
are uncertain —

I do not propose to here discuss these theories in
detail, but rather to regard Shock from a Clinical point
of view, as witnessed early after the reception of G. Rush

Definition of Shock

We all know what Shock, surgically speaking
is — That it is a depressed condition of all
the animal functions resulting from certain
impressions made upon the nervous system;
— either upon its central organs, or upon
its peripheral distribution.

The Causes

May be conveniently classified as hemato-
lar traction, dehydration, etc. by Mr. Jordan of Birmingham, in the
Hastings prize essay "On Shock after Surgical Operations and
Injuries", 1851.

1. Those which cut upon the corporeal organization alone
2. " " " " Psychological
3. " " " " with the corporeal Psychological unequal or unequal.
4. Cold

At least of the 3d category may be named arterial hemorrhage, or
from the rupture of an arterial aneurism.

The 3rd. The Psychological causes are familiar to you all —

To the 3rd class (both corporeal and physical) belong glandular
injuries.

The Psychological element in this third class, as far as
far as Gunshot injuries are concerned, it constituted by the Mental Strain, and apprehension, which a condition of nervous tension which undoubtedly is experienced by all even the most veteran soldiers when about to engage an enemy. The feeling may be one of anxiety as the result of the action; or it may be a feeling of fear or personal apprehension. In each case, it is more an abnormal mental condition of strain, naturally followed by depression; and a depression which will be all the more augmented should the soldier become a wounds and remain be treated while in the condition.

It will thus be evident that in military practice, the degree of shock must be determined by the nature of the injury, the man's mental condition, and also the surrounding circumstances, as exposure to cold, a hospital location.

From a clinical point of view, if a man is occurring on the field, I have been in the habit in my own mind of dividing cases of shock into two great classes, 1. Those of shock unaccompanied by commotion of the brain - central disturbance
2. Shock, accompanied by cerebral disturbance. And each of these great classes may be modified in its turn by the presence or absence of loss of blood.
Let us for a few moments glance at these claus in detail and first of

\[ \text{Shock} \]

unaccompanied by Commotion of the Brain.

This form of shock occurs most frequently
in injuries of the extremities such as hearts remote
from the great nervous centres.

As an illustration, let us take the case of a General Paralytic

of the Hip joint. A picture of this injury is briefly before me — As a rule this accident

is usually attended by deep shock —

We will suppose it really happened, that

the case and little remembrance.

In such a case of Lame joint the man

upon his back, insensible, having feeling

upwards. He is almost void of muscular force,

to assume consciousness. The man bears you, it seemed

himself perhaps to your question, but the

senses are obtundated.

\[ \text{The Voice} \]

is feeble, consisting rather of faint motions of
the lips than of articulate articulate sounds;

but the effort to speak is there.

\[ \text{Color} \]

The color of the body is white, the face is shockingly

pallid. The lips are clamped, and from the

absence of blood, appear thinner.

The fingers are white, and their pulp it around
the bone hurts; a condition which has been

assimilated to carotid blood engorgement, dependent to a degree

current from the living following the mere contraction of the

arterial capillaries.
Temperature. The temperature of the body is low. The skin feels cold to the touch, and the patient complains of cold.

Face. At times the face is absolutely pale, and expressionless. At other times, its expression is one of intense anxiety and fear. With this latter condition, there is often the clammy sweat, and the forehead is beset with moisture.

Eyes. The eyes are fixed, staring upward with a glassy stare — most generally with fever, sometimes slightly covered by the upper lid, vision is often obscured. The pulse is feeble, sometimes scarcely to be felt. It is often slow, and a frequent quickening on reaction appears. — It is often too irregular and intermittent.

Respiration, is feeble, irregular & jerky.

From this condition the man may slowly react, or else become insensible, or else die in this state of shock. I have seen the common, the cold, and the hot, and the cold and fluster increasing; the pulse and respiration gradually becoming weaker & weaker, and eventually ceasing.

But in some cases of death from extreme shock, I have sometimes seen consciousness retained until a comparatively late period — especially I think when the shock has been the result of burns or injuries, affecting to a great degree the peripheral nerves.
The form of shock which I have described is exceedingly common in military practice. I have observed it after comminuted fractures of the long bones by elongated projectiles; and the cavities of the limbs from large round shot. I have also seen it accompany the obliteration of the entire extremity from the stroke of a cannon shot.

It is often met with in burns and explosions; and I am sure that every Hospital Surgeon present can call to mind instances of death following in a state of shock following burns, in which not the central committee, but the spinal marrow, was present; the spinal remaining clear to almost the last moment of life.

1. Shock accompanied by comminution of bone, and by effusion accompanies

| Communion of the Brain |

This variety of shock is most frequently met with in injuries proper to the head. It is also observed in those cases in which the patient at the moment of the reception of an injury, or of the shock, to an extremity, has at the same time suffered from concussion of the brain or spine, from falling or from being打击 violently against the ground.

In both cases, the evidence of shock, as already described, may be present, with the additional
phenomena dependent upon impairment of intelligence and loss of consciousness.

Hemorrhage. I have thus far spoken of shock produced by the sudden shock traumatic nervous impressions uncomplicated by great loss of blood; for such instances of shock I have repeatedly seen. But as will be readily understood, hemorrhage exercises a most important influence upon the result of wounds received in battle, deepening as it does the shock, and so often giving rise to a fatal syncope.

Hemorrhage. How loss of blood acts: whether primarily upon the heart, by the withdrawal of its aliment: previously observed or primarily upon the lungs, thus interfering with blood circulation; or primarily upon the brain-nervous system, still

Plead that sometimes the cardiac action, are matters for discussion.

But let the explanation of the dynamism of hemorrage be what it may, the results of its loss are constant & widely recognized by the surgeon.
symptoms.

There is one set of symptoms usually
described to hemorrhage, to which perhaps
I should allude. I refer to the presence
of convulsive movements and coughing,
and delirium, in those instances where the
loss of blood has been excessive or prolonged.
These phenomena are usually regarded
as the precursors of death.

My own observation as to their nature is
purely of a negative character.

I have frequently seen strong men in
full health die, not from external or
internal bleeding. Where the death
has been sudden, as from rapid and
violent hemorrhage, I have witnessed no
convulsion. I have thus seen a
totally avoid of the cardiac, almost
instantaneously fatal. I also have
seen death follow a large denat of a
large vessel in the pelvis, probably the
cerebral or primitive disease. In neither
of these cases was convulsion present.

But where the bleeding has been gradual
and prolonged, or recurring at short
intervals, I have witnessed vertigo, rest and
inattention developed to a degree which
was almost commensurate in its nature

[Relate here can't before Peterson]
I have to say that merely referred to shock
dependence upon mental causes, but the existence
of such shock is well known to all.
One man is more impressionable than another,
and will suffer more depression from a
Comparatively slight Cause, than will another
from a grave injury.

Thus I remember to have been a young
man of not more than 20 years of age, who
had been brought off the field with a slight
perforating flesh wound of the right thigh.— He
was in a state of mental depression which
absolutely amounted to shock, and influenced
his pulse, his temperature, and his
expression of face —

His fears for himself were excessive,
his state of mind was miserable.

Beside him lay a few fellow
batt a G.S. of a fracture of the upper 3/4 of
His left arm, the ball having penetrated
the bones and inflicted a fatal
wound —

He was in such pain, have

Delirious —

Thus too had been wounded at the same
time, had been exposed to the same
Infection, had equally well cared for
Yet one had suffered from traumatic
shock — The other had not.
That the shock of the former was only
shock.

Mental (Shock)
Mental was sufficiently proven by the fact that a few soothing assurances and a little.tonic were dispelled his fears, brought color to his lips, and a smile to his countenance.

I am sure that every surgeon has seen many such cases of nervous instability occurring in persons in whom it would be least suspected.

Sometimes this instability is a natural predisposition constituting the nervous temperament—called. At it may perhaps be accounted for the result of starvation, exposure, nutritional insufficiency, or the depressing influence of the climate and disease.

But when it does exist it is an influence upon the occurrence and degree of shock is undoubtedly, and it often presents a startling example of the influence of the mind upon the body.

It will thus be seen that shock is of a compound nature, and due to complex causes.

Practically we meet with it in the field these causes are so combined that it is difficult to recognize or at all events to separate them. Fortunately the worst is avoidable.
Primary Hemorrhage

Primary Hemorrhage - General idea of "Mangled Field"

Circumference

- Different opinion among Surgeons as to frequency of Primary H.
- Usually seen in soldiers after 72 hrs. of exposure, and identical.

Traction wounds of the lower extremities, particularly of the limbs, may be treated by the use of a tourniquet, or by tying off the blood vessels.

Traction." - 200 French cases around 20 yrs. of age

"200 American cases around 8 yrs." - Nadower, knew of no leg actions primarily.

Legend: 75 yrs. of Battle for Zitadell, 2 yrs. for Wars in Europe.

Army of Pembina from Kansas to James 6,000 armed; 27 rounds of ammunition.

Myth:

- Experience on Cannon (Round) Shell - Hemorrhage a here, speedily rare - Also from Elongated bullet

1. The bullet is usually crushed, when the arteries are situated in the course of the Easyly

2. The bullet is torn off, when the vessels will be drawn out below point of exit at certain

[Artilleryman at Fort Donelson]

Shell.

[Shell]: May cut vessel and tissue, much on contact, for several inches, and

Small and

Projectiles. - The vessel may not be cut off by a sheet that

- 1/2 to 3/4 of an inch of glass will cut the bullet.

- 1/4 of an inch of glass will cut the bullet. - Its almost certain - Not of a large vessel be cut
arterial walls injured

The patient suffers, during the process of cutting

in the vessel, if the hemorrhage is arrested spontaneously

no injury requires.

Or 21. The patient dies almost instantaneously from

the exsudate of blood.

To that I reply

An examination of the matter of

The surgeon has little to do with primary great bleeding,

although undoubtedly, this occurs to a partial extent

frequently.

Quote - my own observations of dead men / buried trenchs-

Nature of arterial hemorrhage - cutting out of deep arterial not always fatal

Hemorrhage - I am inclined to believe to more common than

supposed - oozing from black clots in bideed,

Amaete of wound / often hard to hemostat - probably in this

condition but little bleeding

Often too I have been a strip torn out of the

vessel - so that bleeding must be inevitable

Bleeding during early transportation, called as primary hemorrhage

incorrectly.

Through the matter of Hemorrhage in general.

Speak of improbability of stopping, in most cases

especially of blunt injuries

[Relate story of Gettysburg, Wisconsin soldier]
All matters of ( - the attractive but little attention Death in Battle) may be varied - influenced by the nature of missile Time additional wounding (Bricks from Exhilaration or)

Body usually falls upon one side, the head Proradial, Face, continuous Hemorrhage followed on one arm, the limbs and lower part of trunk flexed.

Hence Hemorrhage has been great, the body is bloody while, the face very pallid.

But add blood - The Lips, their

Blood from Belated

Back, or chest (off)

Blood from the

Core of Discharge
cannon

Death when

When the projectile is at full flight
the body is started violently a considerable a distance - Thus a man should may be thrown 15 or 20 feet

Death from Wounds of Lung involving the paralys

or Wounds at r. of Neck

Respiration

The body frequently rests prone upon its face

billy the arms extended - The hands clenched

grasping, the linen, or soil, a clint.

Death from

The body was usually situated or thrown forward

Head wounds

*Instantaneous Death
instananeous. It occasionally happens, that in death occurring instananeousy, and directly on the receipt of an injury, especially of the head, the positions assumed by the body are peculiar — the attitudes preserved being those of the last moment of life —

Was I have seen the

Body of a soldier, resting unsupported on the knee, grasping the barrel of a gun, the stock of which had dropped to the ground —

At Williamsburg, I saw another soldier of middle age, one with feet rested on the ground, and one knee against the bank of the road — the right hand stretched forward against the low breast-work of parapet — in front of him — for he had been killed instantly when rising to his feet, and leaning forwards, in defending the sunken road, close by that famous field of Corn —

Both of these men, had been shot through the head.

W. Reed

Late Surgeon U.S. S. at the same battle scene a boy of 17, a U.S. soldier, who had been shot through the head — His right arm was raised, and his hand still held the cap, with which he had been cheering on his comrades, at the last moment of life — a peaceful smile was on his face —

Hancock at

The same Surgeon, at Williamsburg, who observed the dead body of a Tonaw, who had been shot directly through the forehead, in war dining
over a low fence. His leg, was the last attitude of life—the leg half over the fence, the trunk crouched backward as it were. The former hand was raised to the level of the forehead, at which level its palmar surface turned forward, as if to ward off a coming blow.

I have frequently seen dead bodies of men who had fallen with their muzzles in grasp, pointing forward. I carried as if on an ancient exchange.

I have seen more than once been a body with knees under circumstances, where I had not time to examine into particular...
Dr. Brinton

Present
University of Pennsylvania,
Philadelphia, November 2° 1869

My Dear Sir,

I am sorry to say that the incident of instantaneous death to which I alluded, cannot be substantiated by any evidence except my own recollection. As nearly as I can recall the story, it was, that my brother Henry observed a drayman on the car between Nashville and Chattanooga, die from the effects of a gun-shot wound between the eyes, and become rigid within five minutes afterwards. He was shot while putting on the brakes, and after death, the
arms retained their position. The pipe which he had been smoking remained clasped between his teeth. My brother at the time was sitting beside him on top of the car; and the shot was fired from the wood through which the train was passing.

Yours respectfully,

Louis S. Stille.

To John V. Brinton
While a detail of Union soldiers were forming in the vicinity of Edsboro, N.C., they suddenly came upon a squad of rebel cavalry dismounted. The rebels immediately took to their heels. Today was the last of them apparently without effect as they all rode away, with one exception, and he was standing with one foot on the stirrup, one hand to his left, grasping the bridle rein, and none of his horse; the right hand grasping his carbine near the muzzle, his butt resting on the ground. His head turned over his right shoulder seems to indicate watching the approaches of his enemies. Some of the party wished to give him the benefit of a second volley. The first volley was fired at the distance of two hundred and sixty yards, but was restrained by the order in command, lest ordered the party to bring their arms to a "ready" position and take him alive in the mean time. He had been called upon to surrender several times, to which he made no response. Upon a second approach and examination, the soldier was found to be rigid in death, in this singular condition of attitude above described. The utmost difficulty was had in endeavoring to wrench his hands loose from the mane of his horse, and his carbine from his right hand, and after he was laid upon the ground his limbs retained the same position, the same inflexibility. He had been struck by two balls each from a Springfield rifle, one entering the right temple with no apparent exit, the other entering the body on the right side of the spine, coming out as it was supposed at the time near the region of the heart, indicating the saddle skirt had dropped upon the ground. The horse had remained quiet all the time apparently, it was fatigued by a halter. There was no medical man present that I am aware of, so I can only give you the facts as I saw them and understood them at the time.

J. H. Burnham.

This took place in the spring of 1865, the Union soldiers were a detachment of Sherman's army, the "1st" belonged to the rebel General Wade Hampton's command, so citizens informed me.
ReadTorace, who had seen that directly above the first head, as he was entering into a low place:

The body remained in the last attitude of life, the leg half on the face, the arm raised backward, as it were. The head was raised to the level of the face, but it seemed a long way forward as if to ward off a coming evil.

I have frequently seen such phenomena, who had often seen them. Mr. Lee, a great presiding forward, I carried up to a steeple.

I was shown them. One can see them in the air, where I had not time to examine them.

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To come after 19 of corrected

Large notes

The position, preparations, and condition to the

Home at

Battersea

The position, preparations, and condition to the

Home at

Battersea

Note: The notes in the previous pages were collected and are part of the

Afforded deeper to Mr. Glenn's report of the Med and

Semic of the French Army in the Campaign, some

Observations of Mr. Pernier, J.F.C. and of J.T. Power.

On the same subject - these phenomena observed the

Head of Alten, Darmen, &c., in the day - a few hours after the last attitude of life.

The head was gradually moved on their

Now in the attitude of defense, came a head raised.
hand as in the case actually Dr. Reed, as if to
wind off a blow. In the case that of the Major
Avery killed at the same moment as his horse, the boy
noted a short note almost in the saddle, the saddle
caused forward to the position of a Charging
Carabineer.

In the majority of cases, these wounds are in
the head, caused by a bullet through the forehead—
I have known these wounds to cause
death instantaneously. I have known the
same phenomenon to

be the instant when the ball had passed
through the head and one bullet case or pocket
burst on the head and one bullet case or pocket
burst on the head

I have written of this latter as the result of
wound, which must from their nature have
been instantly mortal— I should have
wrote that I have known cases of

accompanying death, yet I have known a
plastic of the wound— I here relate the

case of Dr. Reed. (Dr. Reed actually Dr. Reed.)
I have learned Dr. Reed, as if to

in the head. He never happen, that it will be, the last expression

of life, though not for a while in the face of the corpse.

I had previously done it. I am taken,

though I could not deny it. Express of expression.

Wounds of pecuniary hatred too. This I mean New

York.
Failed this theory was a fox, barely a fox, past several —

In attempting to build into the literature some theory of the. try standing a comparatively rare condition, I had but little to send. — The same phenomena have occasionally been observed a death from apoplexy, one of the worst symptoms of them. I had reported.

But there was no, a little heart, fainting, who was fully the head of the patient. Here the body was laid,

by the feet, and it was

[Quoted Carpenter 1.333]

Death, June 1856

of Mrs. Keil & 56, found dead in a sitting posture, upper part of her bed, having her head erect.

Mrs. Keil was lying up her right arm, and her hands declinated between the 90° and the 180°, the latter 1.87 feet, a little behind

A little to the middle of the incision declination.

A common case, the structure portion of the body was regarded as having been duty, followed as the

the case of Mrs. Keil. Such cases seem to point to the fact that the female members the husband

had forced the body into the back and position, after death, it during "sleepy".

What is? Arising Questions — Difficult to answer.

It is not possible to make of the nature of cadaver, rigidity, hours in the latter does not come until a certain time after death, my from . 20 hours, when, the rigidity — the question is the accompanying of death — Dr. Conolly.

Richard Keil

March 10, 1856

Homemade

[Hyph. Lee]

1854
The physiology regards this rigidity, a contraction of the osteitic character, which ceases after a few hours, as then succeeded by a state of flexibility, after which the ordinary rigidity reappears.

After examination by Dr. Carpeaux and Deen, I am led to believe that the case was one of rigor mortis after 48 hours. The rigor mortis was complete at Almeria, 24 hours after death.

I was put under the obligation to examine the body immediately at the time, but the exigencies of the battle field did not allow me to do so. It was for the living than the dead.

But from a careful consideration of all that I have been told to this day, I am inclined to believe that all of these cases develop fairly rapidly after death.

1. The rigidity, when death has come to all.

2. That the cadaveric attitudes exhibited are those of the last moment of life.

3. That death has been instantaneously accompanied by cyanosis.

4. Euphoria or agony.

5. That the face is at times relaxed, followed by cyanosis.

6. Making the face as cyanosed as the body.
Mourn, but not too much, 0 carry a dead human form when perhaps it may not avoid them — despite
Gustie, Thomas Campbell, I scoot to warn
when the wizard brook but Eric to Gilian
Cameron, as the coming Cool all

And their half-baked borders are tied to the plains

Quite my keen observation at Berlin
Harlan Experience
County line & Brigade a Tennessee.