

Manual for rifle practice

George Wood
Wingate

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MANUAL
FOR
RIFLE PRACTICE.

INCLUDING SUGGESTIONS FOR PRACTICE
AT LONG RANGE AND FOR THE FOR-
MATION AND MANAGEMENT
OF RIFLE ASSOCIA-
TIONS.

BY.

GEN. GEO. W. WINGATE,
GENERAL INSPECTOR OF RIFLE PRACTICE, N. G. S. N. Y.

SEVENTH REVISED EDITION.

Go—bid the soldiers shoot.—HAMLET, Act V, Scene 2.

NEW YORK:
W. C. & F. P. CHURCH,
ARMY AND NAVY JOURNAL, 240 BROADWAY,

1879.

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TILDEN FOUNDATION
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EXTRACT from the Minutes of the Meeting of the Board
of Directors of "THE NATIONAL RIFLE ASSOCIATION,"
held at the City of New York, March 5, 1872:

The following resolution, offered by GENERAL SHALER,
was passed by a unanimous vote:

Resolved, That the MANUAL OF RIFLE PRACTICE, pre-
pared by COL. GEORGE W. WINGATE, and which has
been examined and approved by the Major-Generals com-
manding the First and Second Divisions N. G. S. N. Y.,
be approved and adopted by this Association, and that
the Commander-in-Chief be requested, if the same meets
his approval, to adopt the same officially for the use of
the National Guard.

GENERAL HEAD-QUARTERS STATE OF NEW YORK,
ADJUTANT-GENERAL'S OFFICE,

ALBANY, August 26, 1875.

General Orders, No. 24.

The revised Manual of Rifle Practice, prepared by
Colonel George W. Wingate, General Inspector of Rifle
Practice, is hereby adopted for the instruction of the
National Guard of the State of New York.

By order of the Commander-in-Chief,
FRANKLIN TOWNSEND,
Adjutant-General.

Official:
ALFRED H. TAYLOR,
Assistant Adjutant-General.

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Preface to Sixth Revised Edition.



THE increased demand for this work having made the printing of a new edition necessary, advantage has been taken of the occasion to incorporate in the text the alterations in the system that have been introduced by the author since 1875 in the management of the rifle practice of the National Guard of the State of New York, including directions for practice with "Wingate's Indicator," which has been invented since that date. The rules of The National Rifle Association having been materially changed, those now in use have been substituted for those contained in the Fifth Edition.

The paragraphs altered are designated (1878) and are as follows :

As to Indicator Practice, par. 114, 188. 373, 458 to 477.

As to Marksman's Badge, par. 285, 288, 289, 327, 328.

Practice Kneeling limited to 400 Yards, par. 278.

4 Cavalry not to Fire from Saddle, par. 296.

3 Volley Firing to be at 200 Yards, par. 311.

1 File Firing, par. 313, 314, 323.

2 New Figure of Merit par. 332.

iv PREFACE TO SIXTH REVISED EDITION.

Men to Shoot Over, par. 395.

Targets and Butts, etc., par. 397 to 399, 404, 413, 420,
434, 455 456.

Rules National Rifle Association, pages 210 to 226.

Directions for Shooting, pages 243, 251.

Alterations allowed in Remington Rifle, page 255.

Running Deer Target, page 290.

New Blanks for Returns, pages 294 to 299.

This work, first put forward as an experiment, has now been thoroughly tested. A number of defects have of course been found which the alterations contained in this edition are intended to obviate. Undoubtedly others exist; yet the results that have been attained in New York, through the system prescribed in it, have been gratifying in the extreme. While rifle practice was introduced in the National Guard of that State in 1874, it was not until 1875 that it was taught to any extent or that any reports were made by which the improvement made can be ascertained.

By a comparison of the reports for 1875 with those for 1877, it will be seen that the number of troops practicing in Class-Firing has increased from 7,670 to 13,343; that the number qualifying in the Third Class has risen from 2,235 to 8,024, an increase of 258 per

cent. ; those qualifying in the Second Class from 802 to 4,930, an increase of 514 per cent., and the Marksmen from 533 to 2,126, an increase of 300 per cent.

Extraordinary as these figures appear, the instruction which the rank and file are receiving from their officers is so general and thorough, and the interest evinced so rapidly increasing, that it is confidently expected that a similar percentage of improvement will be shown for 1878.

These results could not have been accomplished if it had not been for the constant and generous support which the author has always received at the hands of Major-General Franklin Townsend, the Adjutant-General of the State, and the aid and advice of Major-General John B. Woodward, its Inspector-General, for which he is under special obligations. It has also been largely owing to the zeal, intelligence and energy of the Division, Brigade and Regimental Inspectors of Rifle Practice, for whose unwearied exertions he desires to here tender his most sincere thanks.

It may not be improper to remark that the success which has been attained in New York has led to the adoption of this system in many other States, and that it is now used officially in Massachusetts, Connecticut, Vermont, New

Jersey, Illinois, California, Louisiana, besides several others, as well as in the Navy, and to a certain extent in the Regular Army.

The preparation of this work, and the development of the system, have necessarily required much time and thought, and sometimes considerable personal sacrifices from the author. But, in view of the National importance of training the military forces of our country to use their rifles with precision, this is not regretted if they have, to a slight extent, at least, contributed to advance this result, and to justly authorize him, either now or in the future, to consider that they have enabled him "*—to do the State some service.*"

NEW YORK, *June 1, 1878.*

Preface to Fifth Revised Edition.



WHEN this work was originally prepared few, if any, Americans had any practical experience upon the subjects of which it treated; and the author was compelled to rely mainly upon foreign publications for everything outside his own limited experience as an individual. Since then the establishment of Creedmoor and the regular instruction of the National Guard of the State of New York in rifle practice have resulted in developing a degree of skill fully equal to anything that is known elsewhere, and culminating in the triumph of an American team over the victors of Wimbledon, in two International matches, by scores unparalled in any similar competitions.

The movement in favor of rifle practice has also extended to other States. Rifle ranges are springing up everywhere, and in a short time Creedmoor will have many counterparts.

During these three years the system prescribed in this work has been extensively tested, both in the drill-room and on the range. While the general principles upon which it is based, and particularly the rules "that the range is the place, not to learn, but to test what has been learned in drill," and "that skill in marksmanship can be taught in the same manner as any portion of the Manual of Arms," have been proved to be correct, yet the experience obtained during this period, and also the alteration in Upton's Tactics, has required many important additions and some alterations.

The Manual has, therefore, been carefully revised, and to a great extent rewritten, the new or altered sections being designated by a star. The Appendix has been *entirely* rewritten, and greatly enlarged; the references originally given to the scores made in England and Canada having, however, been omitted, as having all been surpassed at Creedmoor.

It has been the intention in the present edition not only to conform the Manual to Upton's Revised Tactics, but to take advantage of all the information and experience that has been obtained through the practice at Creedmoor (the want of which was so greatly felt when the National Rifle Association was first

organized), as well as that resulting from the instruction of the National Guard, to reduce and simplify the method of instruction prescribed, as well as to describe the best manner of fitting up armories for rifle practice, and of constructing and operating ranges.

In view of the many Rifle Associations that are constantly being formed, and of the novelty of long-range shooting, the author has incorporated in the Appendix such information as to their general management, the conduct of matches, etc., as he considers will aid their labors, together with some suggestions in regard to position, wind, elevations, and other matters in individual practice (both with military and long-range rifles), the management of teams, and other similar subjects, which it is hoped will be found valuable by all desirous of becoming expert riflemen, and particularly by officers who are desirous of being able to thoroughly instruct their men upon this most important part of military duty.

Desiring that the work may be used as a Manual throughout the United States, pains have been taken to give the same references to the Sharps, Peabody, and Springfield rifles used by the National Guard of the various States as the former editions contained to the Remington

rifle, used by the National Guard of the State of New York (for whose use it was originally prepared).

In the preparation of this work, the author has not sought to confine it to the limits of his own experience, but has endeavored to take advantage of that of others. He has submitted the manuscript to several of the best shots at Creedmoor, and has received from them many valuable suggestions, particularly from Colonel H. A. Gildersleeve, Major Henry Fulton, Colonel John Bodine, and Mr. G. W. Yale, as well as from Generals Alex. Shaler and John B. Woodward.

The reputation of these gentlemen in regard to rifle practice, is so well established that it is considered that their opinion will have a weight beyond that of the author, and he desires to render them proper acknowledgments for their aid.

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PART I.



DUTIES OF OFFICERS.

1.* An officer upon the General Staff to be known as the General Inspector of Rifle Practice, should be assigned general supervision over the rifle practice of the troops. He will prepare all forms and blanks and see that the prescribed method of instruction is properly carried out. An officer upon each division, brigade, and regimental staff should be assigned the supervision of the rifle practice of his command, under such regulations as may be prescribed by the General Inspector. They should be known as Inspectors of Rifle Practice.

The selection of ranges, their construction, and mode of operation, the condition of the arms of the troops, and the quality of the ammunition issued, in addition to the general instruction in rifle practice, should be under the charge of these officers, each of whom will report

to his superior, from time to time, such information upon these subjects as may be required. No officers should be assigned to this duty, who are not good shots and interested in the subject of their duties. They should be required to qualify for the "Marksman's Badge," † and should habitually wear it while on duty, to encourage the troops to compete for it.

2.* General officers are to give their special attention to the instruction in rifle practice of the troops under their command and to bring to notice all neglect upon the subject.

3.* Every regimental commander is responsible for the instruction of his command in musketry. He will make himself acquainted with this most important part of a soldier's duty by careful study of the following regulations, by giving personal superintendence to the companies under instruction, and by availing himself of the assistance and information to be derived from the Inspectors of Rifle Practice.

He will assemble the officers under his command for theoretical and practical instruction as often as he may judge necessary. He, and not the Regimental Inspector of Rifle Practice, will conduct all correspondence on the subject

† See Page 144.

and be answerable for the correctness of all returns, etc. He will afford every information and explanation that may be called for by the General Inspector of Rifle Practice, or the Division or Brigade Inspectors, and should he be in doubt as to any point under these regulations, or deem it necessary to make any exception thereto, he will apply to the Brigade Inspector of Rifle Practice, who will give the information or refer the question to the general officer commanding. When unable to attend to these duties in person, they will be discharged by the officer next in rank.

4. Captains and lieutenants are to make themselves equally conversant with these regulations as with the tactics, are to be present at the musketry drill and practice of their companies, to acquaint themselves with the proficiency of every member thereof in marksmanship and judging distance, and are to take part in the preliminary drills and individual firing. Company officers are to go through the entire course prescribed for recruits.

5.* Each regimental inspector of rifle practice shall have personal charge of the instruction in rifle practice of the officers and recruits, and the *theoretical* instruction of the entire command in that particular.

He is responsible to the commanding officer, that the rifle practice of the several companies is carried out with uniformity and in strict accordance with these regulations, and will act as umpire in case of disputed hits. The general practice of the command at the range, will be under his direction, and all competitions for the badge of "Marksman" are to be under his personal supervision. He will aid and assist the commandants of companies in all matters relating to rifle practice, and will see that proper provision is made in the Regimental Armory, for rifle practice and that the targets and other appurtenances for that purpose, are safe and in good order. He should examine all company returns upon this subject and prepare all returns required to be made by the regiment in relation thereto.

6.* The Inspectors of Rifle Practice like Adjutants and Quarter Masters, are appointed for the convenience of Commanding Officers in a particular branch of their duties, but it is the latter alone who are responsible for the due carrying out of these regulations, and for the due training of both officers and men in their respective duties.

7. The non-commissioned officers are to be first instructed in the course if practicable, and

are to assist in the instruction of the men of their respective companies.

8. Individual instruction being the basis of marksmanship on which the efficiency of the company depends, and first principles having the greatest influence upon individual instruction, classes of recruits should be watched with the greatest care.

9. As many portions of the "position" and "aiming" drill depend upon movements which cannot be readily detected when erroneously performed, instructors will be careful not only to explain clearly every movement, but to make the men understand the reason why such movement is prescribed and the effect of any deviation therefrom. They will use every endeavor to illustrate their instruction by the use of diagrams and models, as well as by personal example. They should keep up the attention of the men by an animated tone, and be careful so to manage the drill as to avoid unnecessarily wearying them.

PART II.



INSTRUCTION OF THE SOLDIER.

10. The instruction in musketry is divided into—

1. Preliminary Drill.
2. Practice.

11. Under the head of Preliminary Drill are comprised the following subjects :

1. Instruction in the care of the rifle.
2. Theoretical principles.
3. Sighting drill.
4. Position drill.
5. Aiming drill.
6. Indicator or Candle practice.
7. Blank firing.
8. Armory ball practice.
9. Judging distance drill.

12. Under the head of Practice are comprised the following:

1. Firing with ball singly.
2. Firing by file.
3. Firing by volley.
4. Firing as skirmishers (or advancing and retreating).

13. As soon as a recruit has learned the "school of the soldier," he will be put through the course of musketry instruction.

14. Special care should be devoted to impressing upon the soldier that not only his military efficiency but his own safety depends upon his being able to use his rifle efficiently, and that no degree of proficiency in the other parts of his drill can, when in service, remedy a want of proficiency in marksmanship.

15. The instructor should not allow the recruits to be discouraged by any previous ignorance in the use of arms, nor by any imagined unsteadiness of the nerves, but should explain to them in the first instance, that any man who has no defect in his sight can by perseverance become a good shot. That so far from incessant practice being necessary, a very fair degree of skill at known distances may be acquired by individual practice when off duty in "position" and "aiming drill," "snapping caps," &c.,†

† See diagrams of targets for private practice, App. p. 200.

provided care is taken to strictly follow these regulations in such practice, and keep in mind that any variance from them will establish habits that it will be extremely difficult to cure.

16*. All soldiers are to be considered as recruits in rifle practice until they have gone through the regular course in

1. Theoretical instruction,
2. Aiming; and position drill and candle practice,

3. Class firing,

by which time they should have become fair average shots. They will then be known as "*trained soldiers*."

17.* The "*trained soldiers*" will be required to perform an "*annual course*" of rifle practice, to maintain the efficiency secured by their previous instruction as recruits.

18.* Where a regiment has not been through the regular course in rifle practice they will be instructed by their company officers with the assistance and under the supervision of the regimental inspector. Soldiers subsequently enlisting will be instructed by the regimental inspector, in the preliminary course prescribed for recruits.

19.* The "*annual course*" will be conducted by the company officers with the assistance of

the regimental inspector as above prescribed. The *theoretical* instruction of both recruits and trained soldiers will be conducted by the regimental inspector.

PART III.



PRELIMINARY DRILL.

ARTICLE I.

CARE OF THE RIFLE.

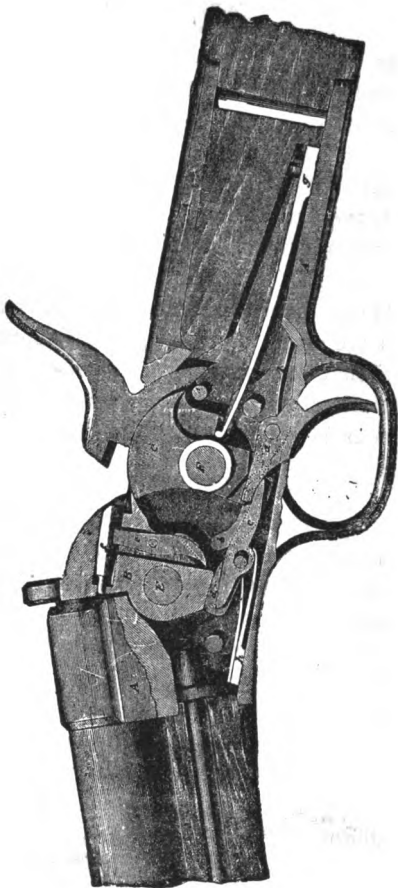
20. In this exercise the soldier is to be taught the names of the different parts of the rifle, the rules for taking it apart and cleaning it, and how to preserve it from injury.

21. The officers and non-commissioned officers should first be instructed in the course, to qualify them for instructors; after which the company can be divided into as many squads as there are instructors.

22. Each squad should be assembled in its quarters under charge of an officer, if practicable; or, in the absence of an officer, a well-instructed and careful non-commissioned officer, who will require each man to take his rifle apart in the prescribed order—being careful to explain

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Plate 1.—REMINGTON RIFLE.



as they progress what is laid down in the instructions below relating to the care and cleaning of arms.

23. The recruit will be first taught to name the parts of the lock and explain how to dismount it, the parts to be named in the order in which they are removed.

24. As the Springfield muzzle-loading rifle is being abandoned, no instructions in regard to it are given. When the Remington rifle is mentioned, the model adopted by the State of New York is referred to (50 cal. with assimilated half cock.)

REMINGTON RIFLE.

25. The operation of the Remington rifle adopted for the use of the National Guard of the State of New York, is explained in the annexed cuts :

Fig. I shows the arm with the several parts in the position assumed in the act of firing, the side of the frame being removed to enable the several parts of the arm to be seen.

Fig. II shows the arm when open to receive a cartridge. The side of frame and also of guard-strap are removed.

Fig. III shows the arm with the breech closed after inserting the cartridge. The side of the

frame and guard-strap are removed, and the breech-block is shown in section in order to expose the firing-pin and firing-pin retractor.

The New York State model differs from the Remington rifle, adopted by the navy of the United States and by various European nations, in the following particulars:

First. The firing-pin is retracted by a *positive* movement consequent upon the act of opening the breech in order to load.

Second. The cartridge-case is ejected from the chamber of the gun by an ejector-spring operating through the extractor.

Third. The hammer is arranged to operate in connection with a secondary sear so constructed as to permit the hammer to pass under the breech far enough to secure it as soon as closed. In this position the secondary sear is engaged with the half-cock notch, and the arm cannot be fired until the hammer is again cocked.

The positive retraction of the firing-pin is effected by a lever *e* (*Fig. I*), and dotted lines *e* (*Fig. II*), which, when the block is drawn back, rides over the lever or secondary sear *c*, and draws back the firing-pin *f* to the position shown in the drawing. When the hammer strikes the pin *f*, it drives it forward and explodes the

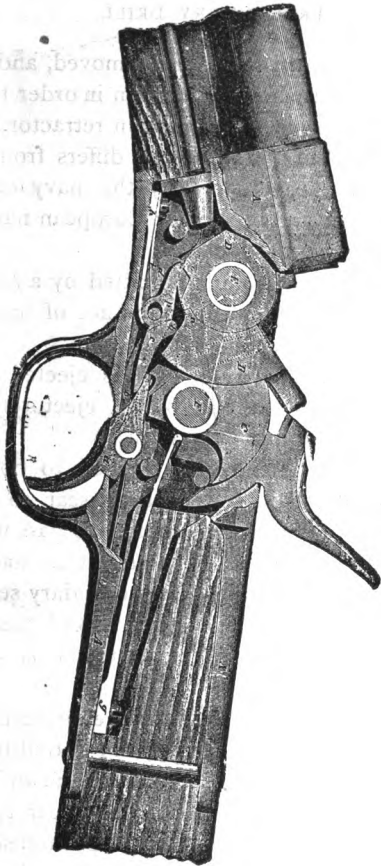
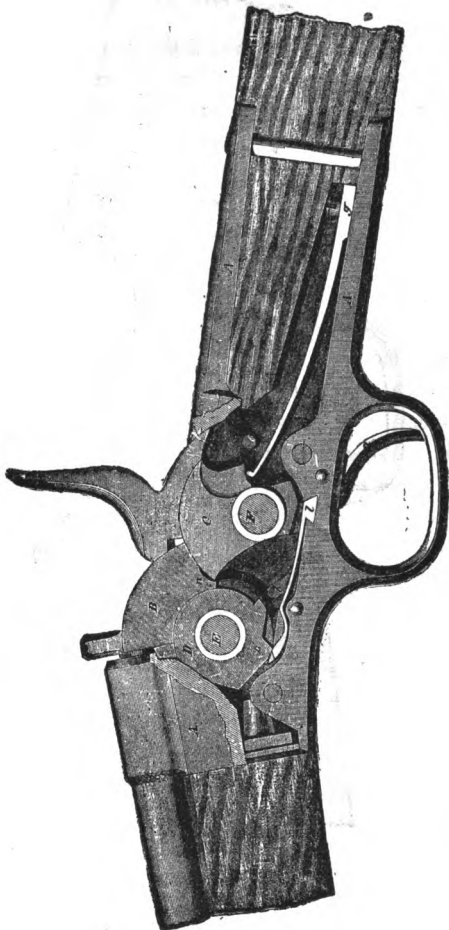


Plate 2.—REMINGTON RIFLE.

Plate 3.—REMINGTON RIFLE.



cartridge, and, upon again opening the block, the firing-pin is withdrawn as before. It is therefore impossible to open the block without retracting the firing-pin. The arrangement of the cartridge-extractor and rejector is shown in *Fig. III*. A flat disk *D* is let into an annular groove in the breech-block and has a motion both with and also independent of the block. A spring *I* let into the side of guard-strap rests upon this disk. When the block *B* is swung back in the act of loading, no movement is imparted to the extractor. By continuing the backward movement of the breech the extractor *D* is carried with it, thereby withdrawing the cartridge-case from the chamber. As soon as the shoulder *o*, on the extractor, passes the end of the spring *I*, it receives a quick accelerated movement from the action of the spring upon the incline *o*, which suffices to throw the cartridge-shell from the chamber.

The arrangement of the hammer with respect to the sear *bb* and secondary sear *c* will be understood by reference to the cuts (*Fig. II* and *III*). The trigger *a* and sear *bb* are pivoted upon the same pin. The sear is formed with an extension forward *bb*, of such length and shape as to ensure the disengagement of the sear from the full-cock notch by the act of swinging back

the block. The secondary sear c is pivoted to the guard-strap and receives a slight angular movement from the act of opening the breech, and is also capable of longitudinal movement limited by the length of the slot p . The spring h serves to retain it in the position shown in *Fig. II*.

In manipulating the arm the hammer is first brought to the full-cock. The breech being then pressed back, its first movement forces down the forward end of the secondary sear c and engages its rear end with the half-cock notch in hammer. By continuing its backward movement, the cartridge-extractor is brought into operation, and finally the sear bb is disengaged from the full-cock notch and the hammer falls against the breech in the position shown in *Fig. II*. The block being then pressed forward, the hammer falls under it as far as the length of slot p will permit, leaving the arm in the position shown in *Fig. III*. In this position the sear cannot be pulled out of the notch, and it is necessary to cock the hammer before the gun can be fired. It is not intended that the arm should be carried in this position ordinarily, as the main-spring is compressed to nearly its full extent. The carrying position is that of the regular "half-cock."

Where the Remington rifle is used, the men will be required to name the important parts of the lock, and state their use 'as follows :

1. (A A A.) The *Receiver* or *Breech Frame*, which unites the several parts to each other and to the barrel and stock.

2. (B.) The *Breech-Block* which closes the chamber.

3. (C.) The *Hammer*, which locks the breech-block and fires the cartridge.

4. (D.) The *Extractor*, a flat disk let into an annular groove in the breech-block, having a motion with and independent of the block.

5. (E F.) The *Breech-Block* and *Hammer-Pins*, respectively; these pins are held in place by a button on the outside of the receiver.

6. (a.) The *Trigger*.

7. (b.) The *Sear*.

8. (c.) The *Secondary Sear*.

9. (d.) The *Firing-Pin Retractor*.

10. (e.) *Projection of Secondary Sear*.

11. (f.) The *Firing-Pin*.

12. (g.) The *Main Spring*.

13. (h.) The *Secondary Sear Spring*.

14. (i.) *Spring*, retaining *c* in recess of breech-block.

15. (k.) *Trigger Spring*.

16. (l.) *Retractor Spring*.

17. The *Guard* is the part to which the trigger, trigger-spring, sear, secondary sear, springs, and main-spring are attached, and is fastened to the breech-block by two side-screws.

18. The *Button*, which partially covers the breech and hammer pins on the outside and secures them in place.

19. The *Button-screw*, which fastens the button to the receiver.

The other parts, not mentioned above, are:

Guard Swivel, Guard Swivel Pin, Sear Spring Screws, Main Spring Screw, Main Spring Stop Pin, Recoil Stud Screw, Recoil Stud Dowel Pin, Tang Screw, Trigger Pin, Trigger Pin Screw.

26. They will then be taught to take apart and assemble the different parts of the piece as follows :

27. TO REMOVE THE BREECH-PIECE AND HAMMER.

1. Loosen the button-screw until the button can be removed from the heads of the breech and hammer-pins.

2. Cock the hammer, push out the breech-pin, take out the breech-piece, let down the hammer as far as it will go (which leaves the main-spring resting upon a stationary pin and obviates the necessity of using a main-spring vice in adjusting the parts)

3. Remove the hammer-pin and take out the hammer.

28. TO REPLACE THE HAMMER AND BREECH-PIECE.

1. Lay the arm down on the right side, press upon the trigger, at the same time replacing the hammer with the thumb-piece forward and downward, until the hole in the hammer and receiver corresponds.

2. Replace the hammer-pin, cock the hammer, replace the breech-piece, insert breech-pin in receiver, and by pressing on the pin, at the same time pressing down the breech-piece and working it back and forth slightly, the pin will enter.

3. Adjust the button and tighten the button-screw.

29. TO TAKE THE ENTIRE ARM APART.

1. Take out the extractor-screw, open the breech, remove the extractor, take out the breech-piece and hammer as above described.

2. Remove the wiping-rod by unscrewing the same, remove the bands, separate the tipstock from the barrel at the muzzle until it is liberated from the stud upon the under side of the barrel, when it may be withdrawn from the receiver, take out the tang-screw, remove the butt-stock.

3. To detach the guard-strap take out the two side-screws, which pass through the guard-strap, always removing the rear screw first.

4. Unscrew the barrel from the receiver, taking care that the extractor has been removed before unscrewing the barrel. This operation, however, should not be done except by an experienced armorer and with proper tools.

30. TO ASSEMBLE THE ARM.

1. Screw the barrel in the receiver until the mark on top of the barrel and receiver correspond.

2. Replace the extractor and screw, place the forward end of the guard-strap in the receiver, putting in the screw.

3. See that the main-spring is in the centre of the guard-strap.

4. Press the rear end in until the screw will enter.

5. Replace hammer and breech-piece as previously described.

6. Replace butt-stock and tip.

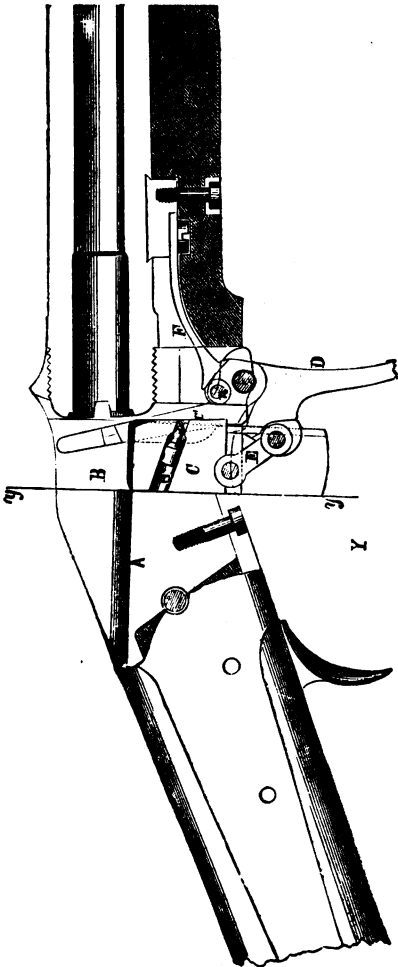
7. In putting on the bands see that the letters upon them are on the same with the band-springs.

8. Replace the wiping-rod by screwing it in.

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SHARPS RIFLE.—Fig. IV.



SHARPS RIFLE.

31.* The operation of the Sharps rifle is shown in Figure IV. When this rifle is used, the men will be required to name the different parts of the piece, as follows :

1. *Barrel.*
2. (c.) *Extractor.*
3. (F.) *Lever Spring.*
4. (n.) *Lever Key.*
5. *Lock.*
6. *Stock.*
7. (A.) *Receiver.*
8. (B.) *Slide.*

32.* DIRECTIONS FOR TAKING APART AND
ASSEMBLING THE SHARPS.

To detach the lever, breech-pin and extractor, throw down the lever, depress the small spur contiguous to the arm of the lever-pin in the right-hand side of the breech-piece, and swing the arm of the lever-pin a half turn, withdrawing it, and the parts are released.

To replace them, put the three parts in the same relative position as they occupied when the lever-pin was being removed, and they will readily move to place and be secured by the lever-pin.

33.* TO DISMOUNT THE ARM.

1. Remove wooden tip from barrel with screw-driver.
2. Remove lever-spring directly under tip with screw-driver.
3. Remove lever key (n.) with fingers, taking out the slide (B.) and extractor (c.).
4. Remove lock with screw-driver.
5. Remove wood butt or stock by taking out screws.
6. Remove barrel from receiver or frame by unscrewing.

34.* TO ASSEMBLE THE ARM.

1. Screw barrel into receiver.
2. Screw on stock.
3. Screw on lock.
4. Put on slide (B.) and extractor (c.) with lever key (n.)
5. Put on lever spring (F.).
6. Put on tip.

SPRINGFIELD RIFLE.

- 35.* The operations of the Springfield rifle, .45, are shown in Figure V., the operation the lock being shown in Figure VI. When this rifle is used, the men will be required

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Fig. VI. SPRINGFIELD RIFLE.

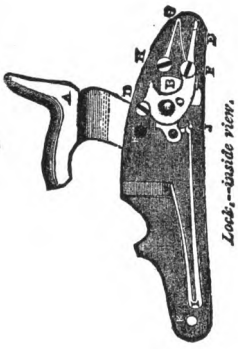
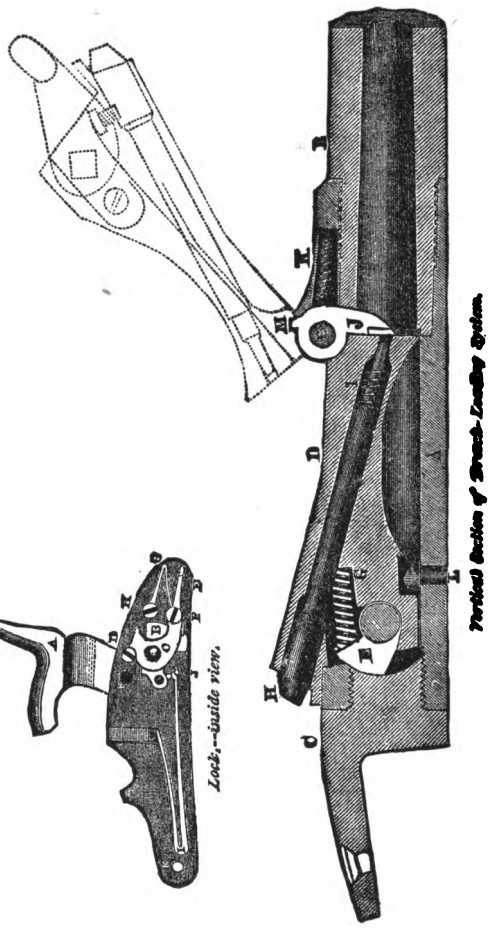


Fig. V.



to name its important parts and state their uses, as follows :

1. (A.) *The Bottom of the Receiver.*
2. (B.) *The Barrel with its screw-head.*
3. (C.) *Breech-Screw.*
4. (D.) *Breech-Block.*
5. (E.) *Hinge-Pin* on which breech-block turns.
6. (F.) *Cam Latch* to lock breech block.
7. (G.) *Cam Latch-Spring* to press the latch into place.
8. (H.) *Firing-Pin.*
9. (I.) *Firing-pin Spring.*
10. (J.) *Extractor.*
11. (K.) *Ejector Spring and Spindle*, to throw out the shell.

PARTS OF THE LOCK.

12. (A.) *The Hammer.*
13. (B.) *The Tumbler* which is attached to the hammer.
14. (C.) *The Bridle*, holding the small end of the tumbler in place.
15. (D.) *The Bridle-Screw.*
16. (E.) *The Sear.*
17. (F.) *Sear-Screw* which holds the sear in place.
18. (G.) *Sear-Spring* which keeps the sear in the tumbler notch.

19. (H.) *Sear-Spring Screw.*
20. (I.) *Main Spring.*
21. (J.) *Swivel.*

36.* DIRECTIONS FOR DISMOUNTING.

1. Unfix the bayonet.
2. Put a plug of soft wood in the muzzle of the barrel.
3. Draw the ramrod.
4. Turn out the tang screw.
5. Take off the lock. To do this, first put the hammer at half-cock; then unscrew partially the side screws, and with a slight tap on the head of each screw with a wooden instrument, loosen the lock from its bed in the stock, then turn out the side screws and remove the lock with the left hand.
6. Remove the side screws, taking care not to disturb the washers.
7. Take off the upper band.
8. Take off the lower band.
9. Take out the barrel. In doing this, turn the rifle horizontally, with the barrel downward, holding the barrel loosely with the left hand below the rear sight, the right hand grasping the stock by the handle; and if it does not leave the stock, tap the plug in the muzzle gently against the ground or floor, which will loosen

the breech end from the stock. This is preferable to lifting the barrel out by the muzzle, because if the tang of the breech screw should bind in the wood, the head of the stock would be liable to be split by raising the muzzle first.

37.* DISMOUNTING THE BREECH-LOADING PARTS.

10. Remove the hinge pin by pressing on its point with the point of the tumbler punch until the end carrying the arm projects sufficiently far to enable it to be grasped and removed by the fingers.

11. Remove the breech-block carefully, so as not to allow the extractor and ejector spring to fall to the ground.

12. Remove the extractor and ejector spring.

13. Remove the cam latch by unscrewing the breech-block cap screw, and loosening the cap with the point of the screw driver.

14. Remove the cam latch spring.

15. Turn out the firing-pin screw, then take out the firing-pin and spring from the breech-block.

The foregoing parts are all that will usually be found necessary to be taken off or dismantled. The soldier should never dismantle the *band, springs, guard, side screws, washers, butt plate,*

or *rear sight*, except when an officer considers it necessary. The breech-screw should only be taken out by an armorer, and never in ordinary cleaning. The lock should not be taken apart, nor the bayonet clasp taken off, except when absolutely necessary in the opinion of an officer. *If proper and regular care be taken of the arm, this will be very seldom necessary.*

38.* The parts which are especially assigned to be dismantled by an experienced armorer will be stated in their regular order following No. 15, viz. :

16. Take out the upper and lower band springs, using a wire punch of proper size.

17. Take out the side screws.

18. Take out the guard, using care to prevent injuring the wood at each end of the guard plate.

19. Take out the side screw washers with a drift punch.

20. Take out the butt plate screws with the largest blade of the screw driver, and remove the butt plate.

21. Remove the rear sight by turning out the rear sight screws with a clamp screw driver.

22. Remove the receiver. In doing this, be particular to see that the extractor is removed beforehand,

23. Turn out the breech-screw by means of a "breech-screw wrench," suited to the tenon of the breech-screw. No other wrench should be ever used for this purpose, and the receiver should be held during the operation in neatly fitting clamps.

39.* ORDER IN WHICH THE LOCK IS TAKEN
APART.

1. Bring the hammer to full cock and clamp the notch of the screw driver over the two branches of the main spring. Remove the spring from the lock plate, being careful not to let it go from the notch of the screw driver

2. Turn out the sear spring screw. Before turning this screw entirely out, strike the elbow of the spring with the screw driver so as to disengage the pivot from its mortise; then remove the screw and spring.

3. Remove the sear screw and sear.

4. Remove the bridle screw and bridle.

5. Remove the tumbler screw

6. Remove the tumbler. This is driven out with a punch inserted in the screw hole, which at the same time liberates the hammer

7. Detach the main-spring swivel from the tumbler with a drift punch.

40.* RULES FOR ASSEMBLING.

The Lock and Rifle are put together in the inverse order of taking them apart.

THE LOCK.

1. Replace the main-spring swivel.
2. Replace the tumbler and hammer.
3. Replace the tumbler screw.
4. Replace the bridle and screw
5. Replace the sear and screw.
6. Replace the sear spring and screw.
7. Replace the main-spring.

Before replacing the screws, oil them slightly with good sperm oil, putting a drop on the point of the screw, also on the arbor and pivot of the tumbler. After the lock is put together, avoid turning the screws in so hard as to make the limbs bind.

THE RIFLE.

1. Insert the firing-pin spring in the breech-block; then the firing-pin, and then replace the firing-pin screw.
2. Insert the cam latch spring in its place.
3. Replace the cam latch and breech-block cap; turn the cap screw well down
4. Insert the ejector spring in its place.
5. Replace the extractor in such a position in

the breech-block that the small recess in the back of the extractor will be in a position to be presented to the point of the ejector spring spindle

6. Insert the breech-block. After seeing that the point of the spindle has entered the recess in the back of the extractor, strike the breech-block over the thumb piece and head of the firing-pin a smart blow with the palm of the hand, forwards and downwards; this will cause it to enter sufficiently to hold it in place. Then press it into position by grasping the block and receiver with the fingers and thumb, the thumb uppermost, and squeeze it home

7. Insert the hinge pin by striking it a sharp blow with the palm of the hand. See that the stud in the arm enters the recess cut for it on the side of the receiver.

8. Drop the barrel into its place in the stock, and squeeze it down with the hand; give the butt of the stock a gentle tap against the floor, to settle the breech end of the barrel against the head of the stock.

9. Put on the bands, with the letter U upwards, being careful not to mar the stock or barrel in sliding them to their places. Apply the thumb to the band springs to see that they work freely.

41.* TO REPLACE THE LOCK.

10. Half cock the hammer, take the lock in the right hand, with the main-spring and sear towards you, holding the stock with the left hand by the swell, with the butt between the knees; enter the lock fairly into the lock-bed, taking care to keep the arm of the sear clear of the trigger. Press the plate well down into the wood, and then turn the rifle over, holding the lock and stock together with the left hand.

11. With the right hand turn in the side screws, after having touched the screw-threads with oil.

12. Turn in the tang screw, after having oiled the screw-thread. Be careful to see that each of these screws is turned firmly home, *but not forced*. Observe that the lock plays freely, without friction, and that no limb is bound by the wood.

13. Return the ramrod.

14. Refix the bayonet, after having oiled the clasp and socket to prevent chafing.

15. To clean the exterior of the barrel, lay it flat on a bench or board, to avoid bending it. Since the arms now issued are browned, abrasive substances, such as emory, tripoli, sand paper, etc., should *never* be used to clean them.

If the browned parts become rusty, they should be rubbed down with a scratch brush, and then oiled.

42.* INSTRUCTIONS FOR REPAIRING BROWNING.

16. If the browning is rubbed off the barrel, dismount the barrel and remove the breech-block and parts of the extractor. Oil the bore of the barrel and stop up each end with a plug. Wash the outside of the barrel with hot soap suds or lye of wood ashes, to remove grease. Wash off with clean hot water. When dry, apply the browning mixture with a sponge or rag. Put the barrel aside to rust in a damp, warm place, from three to four hours. Rub off the coat of rust so formed with a steel scratch brush or card; repeat this three or four times. After each rusting pour on boiling water for several minutes to destroy the acid; finish with the scratch brush as before, and wipe off with an oiled rag.

In case the other parts get worn, a similar treatment should be employed. A mixture of 13 parts of water and 1 part of muriatic acid, by measure, will repair browning, so that the patch cannot be detected. When convenient, the action of the browning mixture can be promoted by laying the barrel in a close box with

a few cloths wet with hot water and spread so as not to touch the barrel; the box should be set in a warm place. The scratch brush should be used lengthwise of the barrel.

PEABODY RIFLE.

43.* The operation of the Peabody rifle is shown in Figure VII.

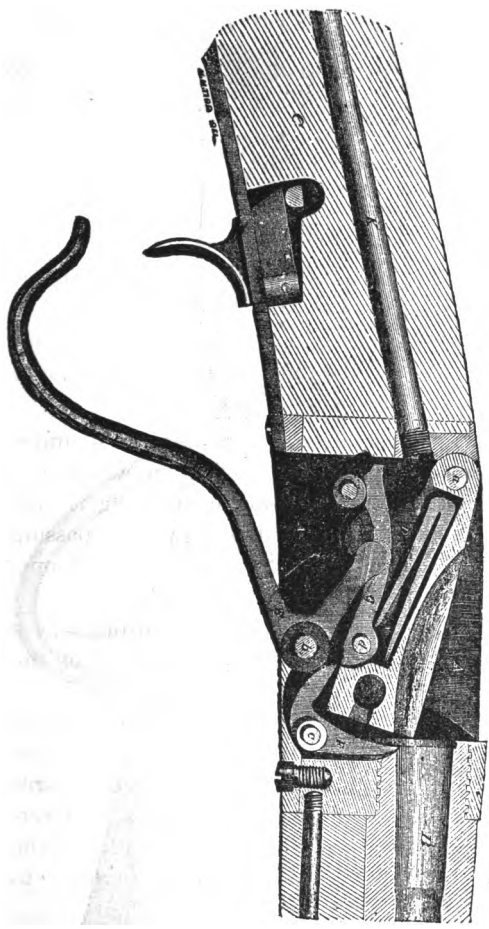
When this rifle is used, the men will be required to name the different parts of the piece and state their use as follows :

1. *A*, the metal *breech-frame*, which unites the *barrel*, *B*, with the *stock*, *C*, in which is a parallel-sided opening for the swinging *breech-block*, *D*, which is pivoted at *a*, by a pin passing through the same, and the sides of the frame, *A*.

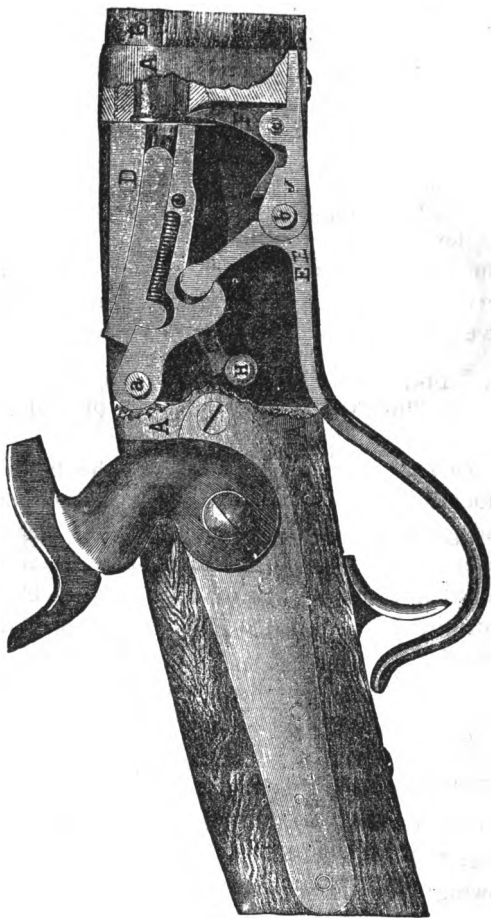
On the upper side of the breech-block is a groove which coincides with the bore of the barrel when in position for loading.

2. *E* is the *guard-lever*, pivoted at *b* by a pin passing through the sides of the frame, *A*; the short arm of said lever being directed towards the fulcrum-pin in the breech-block, and terminating in a notch in the under side of the same, the end of the arm being rounded to allow the necessary play.

PEABODY RIFLE.—Fig. VII.



PEABODY RIFLE.—*Fig. VIII.*



3. *F* is the *extractor*, pivoted drawing the discharged cartridge

4. *G* is a *brace-lever* placed in under side of the breech-block, *d*, in the same. Back of this spring, so arranged as to press the lever firmly upon the *roller*. Combination of the brace-lever, spring serves to fasten the breech-block lever, when the arm is ready to

44.* DIRECTIONS FOR TAKING PLACING THE WORKING PARTS BREECH.

To take them out.—First lower the breech-block to the position for loading, and unscrew the guard-lever screw, taking out the guard-lever. Next remove the extractor by unscrewing out the extractor-base screw. The extractor can then be taken out by withdrawing the breech-block screw.

To replace them.—Return the breech-block to the first; then the extractor-base; then the guard-lever,—fastening each piece by its screw.

GENERAL RULES FOR CLEANING

45.* They will then be instructed in the following rules for cleaning the

parts of the piece, *such rules being applicable to all breech loaders.*

TO CLEAN THE LOCK, ETC.

46. Wipe every part with an oiled rag, and then a dry one; if any part of the interior shows rust, put a drop of oil on the point or end of a piece of soft wood; rub out the rust, clean and wipe the surface dry, then rub every part with a slightly oiled rag.

47. No emery nor powder of any kind should be used, to avoid the danger of removing the case-hardening and thus increasing the liability to rust.

48. In remounting the lock, the threads of the screws, the pins, and the locking-lever should be oiled before being replaced.

49. Only a small quantity of oil should be used, as too much is likely to clog the parts. Sewing-machine or watchmakers' oil is commonly used upon a rifle. Sweet oil should be rejected, as likely to "gum."†

† When a rifle is to be laid aside for a long time mercurial or blue ointment will prevent its rusting. Belmontyle oil is also used for the same purpose, with good results.

TO CLEAN THE RIFLE.

50. A brush should be habitually used to clear the inside of the barrel, dipping it in hot water and afterwards drying and oiling the barrel, as hereafter prescribed. In the absence of a brush the fouling may be quickly removed by holding the rifle muzzle downward at a convenient angle, and pouring hot water through the barrel, being careful to avoid wetting the breech-block or lock.

51. Unless the regulation brush can be obtained, a wooden "wiping stick" should be used whenever practicable. A metal rod, unless particular care is taken to see that its head is entirely enveloped in the cleaning rag, is apt to injure the grooves of the rifling.

52. Place a wet rag (woolen if possible) upon the cleaning rod, *being careful to see that its head is equally covered all around*, press it into the bore first from the muzzle, and (as the ramrod is shorter from than the barrel) afterwards from the chamber, and rub it up and down until the barrel is clean, being careful not to mar the corners of the chamber by the shoulder of the ramrod.

53.* Wipe the barrel well out with a rag or tow as before until it is *perfectly* dry, and after-

wards with an oiled rag. This should always be done as soon after firing as possible. The men should be cautioned that if the barrel be not perfectly clean and dry, it will rust, no matter how much oil is afterwards applied. For this reason, in cleaning, warm water is preferable to cold. After oiling, the rifle should be allowed to stand for a time, and then carefully wiped. The slight film of oil left will protect it better than if a quantity is used.

54. Wipe the surfaces of the hammer, breech-block, firing pin, etc., with a slightly oiled rag. Close the breech-block, and let down the hammer.

55.* Benzine is valuable to remove rust and fouling; but unless particular care is taken to wipe the barrel perfectly clean afterwards, it is apt to corrode it.

56*. *Oil the stock well* with sperm or linseed oil, the latter being the best; let it stand a few hours, and then rub it with a woolen rag until the wood is perfectly dry. Repeat this from time to time, and it will produce a polish which moisture cannot affect.

57. Care should be taken to prevent water from penetrating between the wood and metal of the piece. This can be guarded against by rubbing in a little bees-wax, and the necessity

or taking the barrel from the stock, which is objectionable, may thus be avoided.

58. No attempt should be made to drag a ramrod out of the barrel by extreme force when it sticks fast, as the bore is almost certain to be injured by so doing. When such a case occurs it should be removed by an armorer.

59*. A breech-loader should habitually be wiped from the breech. If the form of the breech mechanism renders this impracticable, the men should be cautioned to use special care not to mar the rifling at the muzzle in wiping, as this is the portion which, if injured, will have the greatest effect upon the accuracy of the rifle.

60.* The hammer should habitually be carried at half-cock, and care taken that the motion of the firing-pin be not obstructed by dust or rust.

61.* Should the extractor cut through the rim of the shell, and thereby fail to withdraw it, draw the ramrod and drive the shell out.

62.* Should the head of a cartridge come off in the act of firing, the best mode of extracting the shell is to take out a ball from a cartridge and reduce it with a knife or by rolling, so that it can be inserted into the muzzle of the barrel. Ram the ball hard with the ramrod when the breech-block is closed; this will upset the ball

and fill the headless shell. Open the breech-block and the ball and shell can be easily pushed out with the ramrod. The ball may be loosened in the cartridge shell, so that it may be pulled out with the fingers, by pounding on the portion of the shell surrounding the ball with a light hammer or a stone.

TO CLEAN THE MOUNTINGS.

63. For the mountings, and all iron and steel parts, use a rag moistened with oil of emery, or emery cloth may be used when rust has set it; but care must be used not to rub off the browning or case-hardening by so doing. For brass use rotten-stone moistened with vinegar or water, and avoid oil or grease. Use a hard brush or a piece of soft pine, cedar or, crocus-cloth. Remove dirt from the screw-holes by screwing a piece of soft wood into them. Wipe clean with a woollen rag, and leave the parts slightly oiled. In cleaning the arms, the aim should be to preserve the qualities essential to service, rather than to obtain a bright polish, which attracts the attention of the enemy and impairs the aim. All rifle barrels should therefore be kept browned. Burnishing the barrels (or other parts) should be strictly avoided, as it tends to crook the barrel.

HANDLING THE RIFLE.

64. The instructor should impress upon the men that not only does their efficiency in service depend upon their understanding how their rifles should be kept in order, but that, if ambitious of becoming marksmen, it is essential that they should understand their construction, and see themselves that they are always in a condition to do them justice.

65. He should explain to them that a well-made rifle is a delicately constructed instrument requiring proper attention, and unless it is kept clean, good shooting cannot be expected from it. That the grooves become filled up, and when it is fired, the bullet "leads," so that its velocity is diminished, and it falls short; that every man must therefore clean out the barrel of his piece as frequently as possible, and never allow it to be put away dirty, as *one night's rusting will do it more harm than a year's use.*

66. He should also make the men understand that notwithstanding any care they may exercise in keeping their rifles clean, they will not be accurate unless they are careful in handling them.

67. He should explain that the barrels of military rifles are made as thin as possible to diminish their weight, and consequently, it is easy to

indent or mar them, and once this is done, they are useless so far as accuracy is concerned. The men should, therefore, be cautioned that in placing the piece in the gun-rack, or in stacking it, it is important that it should be handled gently, and under no circumstances should a man sit on his piece or use it for carrying weights, or for any other purpose than that for which it is intended.

68. The men should be instructed that in ordering arms on parade, the butt should be brought gently to the ground, especially on pavements or hard roads. This will save the mechanism of the lock from shocks, highly injurious to it, loosening the screws and splitting the woodwork.

69. In stacking arms, care should be taken not to injure the bayonets by forcibly straining the edges against each other. The stack can be as well secured without such force being used. No cutting, marking, or scraping, in any way, the wood or iron, should be allowed; and no part of the gun should be touched with a file. Take every possible care to prevent water from getting in between the barrel and stock. If any should get there, dismount the gun as soon as possible, clean and oil the parts as in reassembling.

70. The men should be instructed that they must be careful to prevent the foresight from being bent, blunted, or injured in any way.

71. Also, that if any obstruction should find its way into the barrel, either from running the muzzle into the ground or from a wad lodging, it should be removed before the rifle is fired; for if fired with any obstruction of that character, or even with an air-space between the bullet and the powder, the barrel is liable to burst.

72. Too much care cannot be exercised by officers to see that the rifles of their command are properly taken care of. Where an armorer has charge of the pieces, he should be carefully supervised, to see that the locks and internal parts of the rifles are properly cared for, and that the grooves of the barrel are not injured by the use of iron rods in cleaning, as the accuracy of many pieces is destroyed by this practice.

73. The chamber should be kept clean, and great care observed to prevent cartridges fouled with dirt, and particularly sand, from being inserted or discharged in the piece, as the expansion of the shell presses the sand into the metal and mars the surface of the chamber, and thus causes the shells to stick. Care should also be taken in cleaning the chamber for the same

reason. The shell of an exploded cartridge should not be allowed to remain in the chamber any length of time for fear it may adhere by corrosion. Great attention should be paid to ammunition, not only to see that it is kept in a clean box and free from dirt and sand, but that it is good; as no marksman can succeed with poor ammunition.

74.* As rust is caused by the combined action of air and moisture, a tight-fitting wad or stopper should be placed in the barrel and a greased wad inserted in the chamber when put away (care being taken that it be kept out when on the range, to avoid the liability of injuring or possibly bursting the barrel in firing) to keep the air out of the barrel.

75. Officers will be careful to see that the rifles of their command are kept in a dry room, and on no account against an outside wall, and that they are examined about once a week to see that no rust is found.

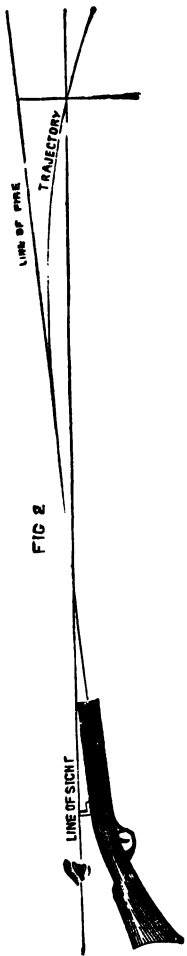
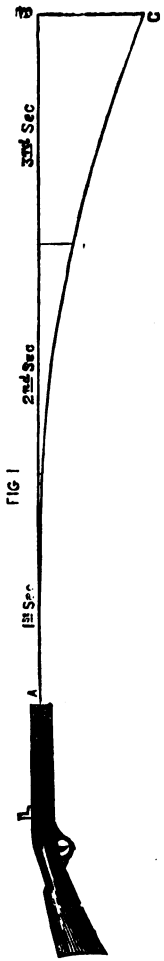
ARTICLE II.

THEORETICAL INSTRUCTION.

76. To become marksmen men must understand the course taken by a bullet when fired

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from a rifle, and the manner in which that course is controlled by using the sights. This is to be explained orally, the instructor being provided with a blackboard and chalk, and being able to draw the diagrams shown in Plate VII.

77. He should first explain that, if a barrel be held horizontally, a ball fired from it proceeds in a like direction, known as the "line of fire" (A. B., Fig. 1, Plate VII.); but that, after it has gone a certain distance, it commences to fall, through gravitation, until it strikes the ground, describing a course (A. C., Fig. 1, Plate VII.) like water out of a hose-pipe, the rule being that an object falls to the earth a certain distance in a second, and does this whether it be simply dropped or thrown horizontally. Consequently the faster a ball is propelled, the further it will go in the time required for it to reach the earth, and therefore the more level its path, or, to use the language more generally employed, the flatter its trajectory.

78. That when the muzzle is raised the ball describes a higher arc, and consequently goes further (Fig. 2., Plate VII.), first rising above the line of sight and then falling below it. Therefore, to hit an object at a distance, the "line of fire" must be laid as much above the

object, as the ball would pass below it if the barrel were horizontal when fired. That this elevation is obtained by raising the rear sight upon which the distances are marked; so that if the marksman be certain of his distance he need not trouble himself about the elevation.†

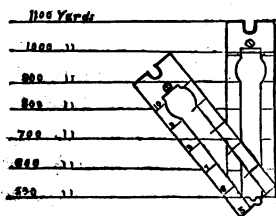
79. The instructor will then explain that if, in aiming, the rear sight, instead of being held upright, is twisted over to one side, it results in not only making the elevation lower than was intended, but also throws the line of the foresight to one side; consequently, a ball fired under these circumstances, invariably strikes low and on the side to which the sight is inclined; and of course the greater the distance the greater the error.

80. To illustrate this, place a breech-loading rifle, or a rifle-barrel with the breech-pin out, upon the (aiming) tripod, turning it so that the sights will be to the right or left; raise the 500 yard sight, and aim at a wafer placed upon the wall, then, without moving the piece, look through the barrel, and place another wafer where the axis of the barrel prolonged would

† The distance the ball will go before striking the earth will be ascertained by the following formula: $k = \frac{1}{2}gt^2$, the velocity being from 13 to 1,600 feet a second, according to the charge.

strike the wall. This will at once show the men the necessity of having the line of sight in the same vertical plane as the axis of the piece.

81. In order to further show the loss in elevation arising from twisting the piece, let a card, marked with a scale corresponding to those upon the back sight be placed vertically in front of the latter, while the piece is resting on the tripod in an inclined position; the men will at once see the amount of elevation lost by any degree of inclination.



82. The men should be taught that the true "point-blank" of a piece is when it is so held that the extreme point of the fore sight is in line with the bottom of the notch in the back sight, and that in shooting at ranges under 100 yards, they should aim a little under the object they propose to hit, at the same time drawing a "fine sight" (as explained at Paragraph 108), for the reason that a slight elevation will necessarily be given, if *any* of the fore sight is seen.

83. The instructor should also impress upon the men the necessity of their being correct judges of distance, so as to be able to adjust their back sights to the proper elevation; and explain that, if this is not done, the soldier, no matter how good a shot he may be at a fixed mark, will be unsuccessful in hitting his enemy in the field, which is the object of all his training.

The men must, therefore be thoroughly trained to judge of distances by the eye alone.

84. To assist in these explanations the following tables are given to show the trajectory of a military rifle when fired at different ranges with the proper elevation :

85. The trajectory in firing at 300 yards is as follows (Remington rifle, 50 calibre) :

| HORIZONTAL DISTANCE FROM MUZZLE. | 50 yds. | 75 yds. | 100 yds. | 125 yds. | 150 yds. | 175 yds. | 200 yds. | 225 yds. | 250 yds. | 275 yds. | 300 yds. |
|--|------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Height of trajectory in inches above line of sight. | 14.2 | 21 | 26.5 | 33.5 | 35.5 | 36 | 32.5 | 27 | 20 | 11.7 | 0 |

86. And the "dangerous space" for an infantry man is as follows—being calculated upon the assumption that the gun, when fired, is 56 inches from the ground, that it is aimed at a

point 34 inches from the ground, and that the stature of a man is 68 inches.

DANGEROUS SPACE.†

| HORIZONTAL DISTANCE. | RISING BRANCH OF TRAJECTORY. | FALLING BRANCH OF TRAJECTORY. | | TOTAL. |
|----------------------|------------------------------|-------------------------------|--------------------|----------|
| | | Before the object. | Beyond the object. | |
| 200 yds. | 75 yds. | 125 yds. | 62 yds. | 262 yds. |
| 300 " | 35 " | 82 " | 55 " | 172 " |
| 500 " | 19 " | 42 " | 35.5 " | 96.5 " |
| 700 " | 10.5 " | 26 " | 22.8 " | 59.3 " |
| 900 " | 7.5 " | 10.5 " | 9.5 " | 27.5 " |
| 1050 " | 4.5 " | 3.5 " | 3.5 " | 11.5 " |

87. Thus the dangerous space in firing at a man's waist at 100 yards is 205 yards—the distance the ball would travel before striking the ground. If the enemy were to advance to the muzzle of the rifle or retire to the latter distance, he would still be hit in the body or feet. It will also be seen that in firing at an object with the sight elevated for 700 yards, the bullet after going 10.5 yards rises into the air, and does not descend low enough to hit a man until it reaches the distance of 674 yards, and strikes the ground at the distance of 722.8

† This is calculated for 50 cal. with 70 grains of powder. With a smaller calibre or heavier charge the dangerous space is greater.

yards. Consequently it will strike some distance above the mark if it should be 670 yards off, and several feet under it, if it should be distant 725 yards; and the greater the distance the greater the necessity for knowing it accurately.

88. The men should therefore be instructed, when not certain of their distance in the field, to fire under rather than over the correct one, so as to form an opinion of the distance by observing the dust thrown up by the bullets striking the ground. They should also be cautioned that a side wind will carry the bullet in the direction in which it is blowing, while a front wind, by reducing the speed of the bullet, diminishes the range, a rear wind having the contrary effect; that this is to be guarded against by aiming to one side or the other or above or below, but that the allowance necessary to be made can only be ascertained from experience. (See Appendix page 244.)

89.* In firing, at an object in motion, the instructor should explain that the best way is to aim in the usual way, and then, without dwelling an instant on the aim, move the rifle laterally in the direction and to the extent required, by simply turning on the hips, the arms and eye being kept perfectly steady. If the object be

approaching, the aim should be low; if receding, high. This must be decided by the distance and the speed of the object fired at, and is a matter of judgment as to the distance it will have passed over during the flight of the bullet.

90.* In battle, and particularly in the attack or defence of entrenchments, when the fire is at a large mark and the distance is known, but the sight is obscured by smoke or darkness, the aim should be taken at the top of a stick planted in the ground a few yards in front, on a line with and as high as the point at which aim would ordinarily be taken. By this means a very destructive fire may be maintained.

91. The instructor should also state that when the sun is shining from one side, it lightens up that side of the front sight and the opposite side of the notch of the back side; and that the marksman, in taking aim, is apt to take these brilliant spots for the real centres of the sights, and consequently to shoot towards the side away from the sun.

92. As some rifles carry higher and some lower than the average, the men must be instructed that this is to be remedied by taking a fine sight (see Paragraph 108) with a piece that carries high and a coarse sight with one that

carries low, as they find by experience that their rifles do not shoot correctly; and that, if the sights should be so placed as to make the piece carry to one side, they must make such allowances as they find are required to make up for it. If in doubt in regard to the accuracy of their rifles, they should be permitted to test them by firing from a fixed rest.

93. The instructor should state that the grooves cut in the barrel constitute what is known as the rifling; that these are cut in a spiral direction in order that the bullet following them will, when it leaves the piece, spin on its own axis (like a top) in its passage through the air, thus keeping its pointed end in front; that this point, offering less resistance to the air than a round bullet, gives it a much greater range; also that, as the bullet from a rifle is constantly revolving, an inequality in its shape which would deflect it from its course, if fired from a smooth bore, ceases to influence it, as, from its rotation, the effect is equally felt on all sides.

94.* During the explanation upon this point, the instructor will cause the men to look through a rifle barrel and notice the grooving, calling their attention to the fact that the groove which is on one side of the breech is on the

opposite side of the muzzle, passing over from left to right. He will then refer to the fact that this twist, causing the ball to constantly revolve towards the right during its flight, results in a slight deviation in that direction, which is known as "drift," and which must be allowed for in aiming at long ranges. (See Appendix page 247.) He will, during this explanation again impress upon the men the necessity of keeping the grooves of their rifles clean and uninjured, if they desire to have them shoot accurately.

95. The explanations upon these branches of the subject should be made clearly and plainly until thoroughly understood, the men being frequently questioned as the instructor proceeds, as well to secure their attention as to ensure their comprehending his remarks. These explanations should also be repeated at least once a year, and it should be the endeavor of all instructors to make themselves masters of the subject so as to explain the principles upon which a rifle is constructed and used, to an extent beyond the limits of this work, both by study of the various works on the subject and by frequent practice on the range.

ARTICLE III.

SIGHTING DRILL.

96. In this exercise the men are to be instructed how to properly adjust the sights of their rifles in aiming.

97.* The "Vose tripod," used by the National Guard of the State of New York, possesses so many advantages over the ordinary sand-bag that it should always be used when practicable. It consists of a tripod, arranged to be raised or lowered to suit men of different heights. Upon this is placed a clamp which holds the rifle and turns upon a ball and socket joint, held in place by a spring, controlled by the pressure of the foot in a stirrup.

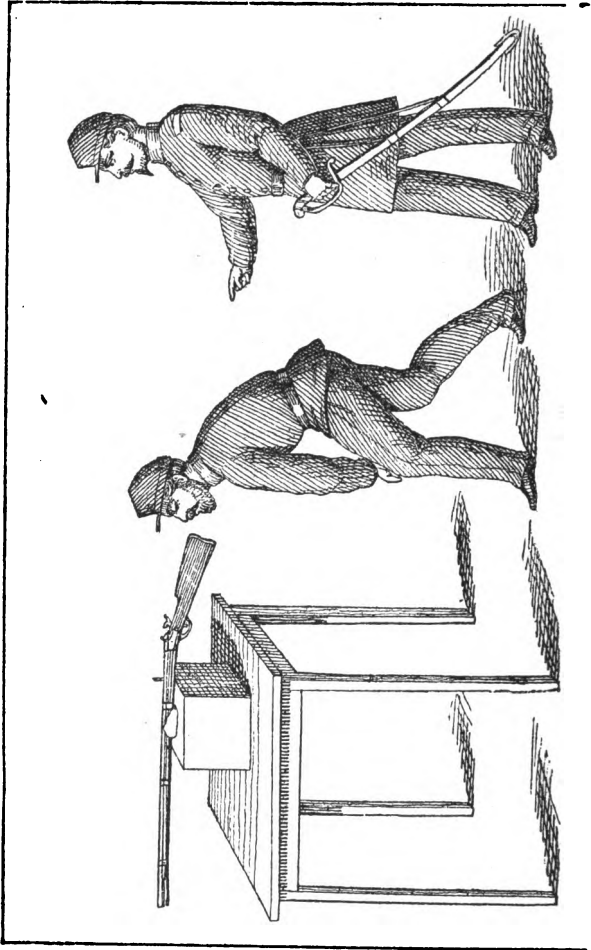
98* (1878.) In aiming, the piece should be held firmly to the shoulder (as in firing) and the spring should be released gradually and without jar.

99.* As the raising of the foot has a tendency to disturb the aim in those unaccustomed to the use of this tripod, the instructor, in the first instance, should place his own foot in the stirrup,



VOSE'S IMPROVED AIMING TRIPOD,

Invented by Col. RICHARD VOSÉ, Commanding 71st Regiment, N. C. S. N. Y.



moving the latter for that purpose to the right. When each man is satisfied his aim is correct, he should be directed to say "SET," whereupon the instructor should free the spring by raising his foot.

100.* The drill with the Vose tripod will be in all other respects as hereinafter prescribed.

101. Where the Vose tripod cannot be obtained a bag of sand will be used. This will be placed on a rest, either a table or a tripod composed of three stakes tied near the top, and so as to be $4\frac{1}{2}$ feet from the ground.

102.* The men are to be formed in single rank, in squads not to exceed ten men in each.

103. The instructor will then flatten the sand-bag with the back of his hand, and lay a rifle on it aimed at some small object (as a wafer on the wall) at as great a distance as the drill-room will permit, and explain to the men the following simple rules:

104. That the sights should not incline to the right or left.

105. That the line of sight should be taken along the centre of the notch of the back sight and the top of the fore sight, which should cover the middle of the mark aimed at.

106. That the eye should be *fixed on the*

mark, and not on the fore sight. Particular attention should be paid to this rule, as beginners are apt to fix the eye on the fore sight, and not on the mark, which prevents the latter from being distinctly seen, and greatly increases the difficulty in aiming.

107. The instructor should also explain the different kinds of sights, viz. :

FINE SIGHT.

108. When the point of the forward sight is just seen through the notch of the breech sight, the effect of which is to shoot low.



FULL SIGHT.

109. When the whole of the wedge-shaped portion of the front sight is displayed through the notch on the breech sight, the effect of which is to shoot high.



HALF SIGHT.

110. When but half the fore sight is seen, which is the kind of sight that should generally be adopted by beginners.



111. It should be impressed upon the men that the wedge-shaped part of the front sight

is all that should appear through the breech sight, and that beginners are much more apt to show too much of this than too little, and consequently generally shoot too high.

112. When the foregoing rules have been clearly explained, and the men have been questioned in regard to them, the instructor should direct each man in succession to adjust the rifle upon the bag to the proper aim at the mark, and then to step aside.

113. He will then examine it, and, if he discovers any defect, call up another man, who is to look along the sights and explain the error. The instructor will then explain what the consequence would have been, if actually firing at an object, and cause the man to aim again.

114.* In addition to practicing this exercise in the drill-room, it should also be performed in the field, at different distances, so as to perfect the men in the use of their sights and in aiming; for the difficulty of correctly aligning the fore sight increases with the distance.†

† Whenever practicable an indicator should be used in sighting drill, as prescribed on page 193.

ARTICLE IV.

POSITION DRILL.

115. Position and aiming drill are but modifications of the same exercise, the former being intended to exercise the muscles and teach the proper method of holding the piece; and the latter, in addition to exercising the muscles, being designed to teach steadiness and that uniform, instantaneous action of hand and eye which constitutes marksmanship.

116.* Before entering upon this drill, the instructor should explain to the men that the reason why long practice is usually required to constitute a marksman, when nothing but experience is relied upon, is that, in firing, the smoke and flash of the explosion prevent any movement of the piece from being observed; so that the learner, seeing simply that he has missed his mark, without understanding how he came to do so, is only able to ascertain and correct his faults (if he ever does), by degrees, and after a great waste of ammunition. That by practice in this v will become accus-

tomed to the position necessary to avoid the heavy recoil of a military rifle†, get their finger and eye to work together; and, by close attention to their sights, can tell if they lose their aim in pulling the trigger much better than if they were firing with ball cartridge, as the ball will be sure to go wherever the sights are ranged when the trigger is pressed. *That in consequence aiming drill is the most important part of rifle practice.*

117. These drills will be conducted in the company quarters or drill-room. For this purpose a series of black bull's-eyes, the size of a silver quarter dollar, on a white centre about an inch and a half in diameter, should be painted upon the armory wall (red and white notarial seals form a good substitute). They should be elevated three feet from the floor, and a similar distance apart.

118.* When the drill is by gas-light, these bull's-eyes should be placed so as to afford a good light, not only upon the targets, but at the firing-point, so that the men can see both

† The Remington rifle, weighing nine pounds, loaded with 70 grains of powder and a ball weighing 450 grains, is found, on being tested by a spiral spring applied to the butt, to recoil with the force of 95 pounds. The recoil of the Springfield .45 calibre is 174 pounds.

their sights without being dazzled. (See paragraph 207.)

119. No piece should be allowed to have a trigger pull of less than six pounds.

120. The men should be divided into squads of not more than twelve to each instructor. Each squad should be formed in single rank, one pace apart, and be placed at first, about twenty feet from the marks to be aimed at (the distance being gradually increased according to the light and the size of the room), and "dressed" so that each man shall be opposite a target. It will be found that this practice is calculated to strengthen the sight, and after a time the men will easily discern the sights at double the distance.

121.* The practice should occasionally be executed in marching order, and frequently with fixed bayonets. The men will not be permitted to shoot from the left shoulder during drill.

122.* The squad having been formed as above directed, with their pieces at a "carry," the instructor having first cautioned the men not to cock their pieces, will command :

1. *Squad as skirmishers.* 2. READY.

(*One time and two motions.*)

123.* Execute the first motion of *about face*,

the left knee slightly bent, at the same time drop the piece into the left hand behind the lower band (or at its balancing point), the elbow against the body, the muzzle the height of the chin, the thumb extended along the stock, the small of the stock two inches below the right breast, the butt below the right elbow.

124.* (*Two.*) Carry the right foot from twelve to eighteen inches to the rear (according to the size of the man), the right heel a little to the right of the prolongation of the left, the left shoulder well to the front, the body equally and firmly balanced upon both feet, head erect, eyes open and fixed upon the mark, the right hand at the small of the stock, the fore finger on the trigger, the thumb bent obliquely forward so that, if possible, it shall rest upon the end point of the middle finger, both hands holding the rifle firmly, but not so tightly as to impart motion to it from the pulsation of the body, the whole position being as easy and natural as possible.

125.* The instructor will caution the men that they are to keep the toes and knees slightly turned inward, and to keep the latter pressed backward by a slight tension of the calves, so as to secure a firm hold for the feet (every part of which should be placed upon the ground);

also that, while the body is to be carried naturally upon the hips, they must avoid drawing in the stomach, raising the breast, or bending the small of the back; †

The instructor will then command :

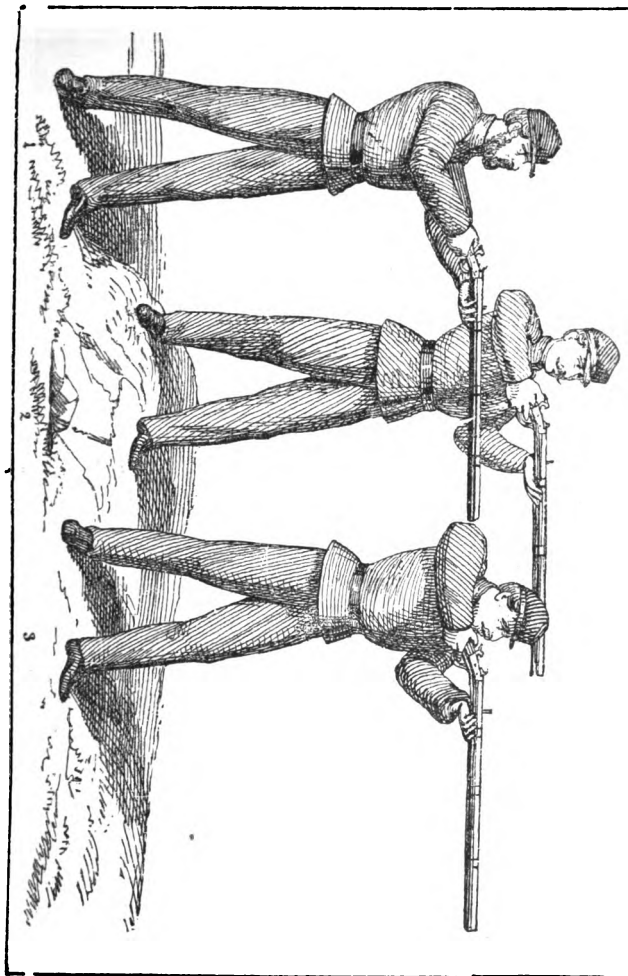
1. *Position Drill, by motion.* 2. ONE; 3. TWO;
4. THREE.

(*One time and three motions.*)

126.* Raise the rifle smartly in front of the right shoulder to the full extent of the left arm, without moving the body, head, or eye; the arms to move close to the body, the breech sight to be upright, barrel nearly horizontal and pointing a few inches below the mark; the eyes are fixed upon the forefinger inside the trigger-guard, both elbows inclined downward.

127.* (*Two.*) Press the piece smartly with both hands against the hollow of the shoulder, which must neither be allowed to give way nor pressed forward or raised to meet it; the left elbow at the same time being brought as far under the rifle as is possible without assuming an unnatural position, the right elbow slightly advanced, being nearly square with the right shoulder. The

† This is a point upon which particular stress is laid in the Prussian regulations.



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centre (or rather the upper than lower) part of the butt to be pressed firmly against the shoulder with the left hand without touching the collar-bone, the top of the butt being as nearly as possible with the top of the shoulder. The forefinger will be placed around the trigger like a hook, but without pressing it. The head and body will be kept perfectly perpendicular the whole time, no attempt being made to look through the sights.

128.* (THREE.) Bring the piece smartly to the position of "*Ready*," the position of the feet and body remaining unchanged.

129. Whenever the instructor wishes to suspend the exercise, he will command :

1. *Carry.* 2. ARMS.

(*One time and two motions.*)

130.* (*One.*) At the second command resume the carry with the right hand, and face to the front.

131.* (*Two.*) Drop the left hand by the side.

132. The instructor will cause these movements to be practiced kneeling. For this purpose he will cause the squad to be formed as directed in paragraphs 120 to 122, and (having

cautioned the men not to cock their pieces), will command :

1. *Fire kneeling.* 2. KNEEL.

(*One time and one motion.*)

133.* At the second command each man will bring the left toe square to the front, and plant the right foot so that the toe shall be about twelve inches to the rear and twelve inches to the left of the left heel, the feet at right angles. Kneel on the right knee, bending the left, the right foot nearly perpendicular, the weight of the body resting firmly on the right heel; drop the muzzle to the front, and support the piece with the left hand at the lower band, the forearm resting on the left thigh, the right hand at the small of the stock, muzzle the height of the chin.

134.* If formed in two ranks, at the first command the rear rank men will take a side step to the right. After rising they take a side step to the left and cover their front rank man.

135. The instructor will then command :

1. *Position drill, by motion.* 2. ONE. 3. TWO.

4. THREE.

(*One time and three motions.*)

These movements will be performed as above



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described, except that at the command *Two*, the left elbow, supporting the rifle, will be rested upon the left knee, the elbow a little in front of the knee-cap.

136.* When performing the exercise kneeling, to cause the men to resume their position in the ranks, the instructor will command :

1. *Squad.* 2. RISE.

At which the men rise, face to the front, and resume the "*Carry.*"

137. When the squad are familiar with the movements, and have become accustomed to the prescribed positions, they will be exercised without the motions, both standing and kneeling. For this purpose, the instructor having caused them to come to a "*ready,*" as above prescribed, will command :

1. *Position drill.* 2. ONE.

(*One time and three motions.*)

138. At the second command the squad will proceed with the motions consecutively, observing a pause between each.

139. The instructor will habitually cause the "breech sight" of the pieces to be kept upright during the "position drill," so as to observe that the pieces are not twisted to the right or left in aiming. He will also see that the men

place the butts of their pieces properly and firmly against the shoulder—a habit which is indispensable to prevent the jar of the recoil; also that they hold their heads up, without attempting to aim. For this purpose, he will frequently pass down the front and rear of the line, correcting the position of each man.

140. Whenever he observes a defect upon the part of any man, he will command, "*As you were,*" and cause him to go through the motions several times in succession to correct the defect.

141. This practice being designed to accustom the soldier to handle his rifle expertly—to strengthen his left arm so as to give him perfect command over his piece with his left hand—and to habituate him to raise it to the shoulder in the direction the eyes are fixed upon without moving the body, is to be continued until these points are accomplished. No defect, however trivial, is to be overlooked, and the instructor is to be careful to explain all errors and the bad effects which would result from them in firing with ball.

ARTICLE V.

AIMING DRILL.

142. The squad having been sufficiently instructed in the position drill, will be exercised in aiming. For this purpose, the instructor having formed them as before, with their pieces at a "carry." will command:

1. *Squad, as skirmishers.* 2. READY.

(*One time and three motions.*)

143.* (*First two motions.*) Assume the position of *ready*, as described in paragraphs 123 and 124, except that the right thumb is on the head of the hammer, the fingers supported against the guard and small of the stock.

(*Third motion.*) Cock the piece with the thumb and seize it with the right hand at the small of the stock as directed in paragraph 124, without deranging the position of the butt.

The instructor will then command:

1. *Aiming drill, by motion.* 2. ONE. 3. TWO.

(*One time and four motions.*)

144. At the second command, the squad will execute the first two motions of the position

drill, except that now the head is bent slightly forward and to the right, without straining the neck, the left eye closed, and the right directed through the notch of the back sight, at a point about a foot underneath the bull's-eye, and the point of the foresight aligned on that spot.

145.* (*Two.*) Place the *middle*† of the forefinger upon the curve of the trigger. Draw a moderately deep inhalation, and restrain the breathing until the trigger is pulled. Each man will then *without further command*, raise the muzzle with the left hand with a steady, perpendicular motion till the point of the fore sight covers the centre of the object and is in line with it and with the notch of the back sight. At the precise instant when each man feels that the line is true, he must *pinch* or press the trigger with a steady contraction of the finger, keeping his eye still directed upon the bull's-eye, *and observing what movement, if any, he has imparted to the piece by the pull of the trigger.* The rifle will then be brought to a "*ready*" without further command.

146.* Aiming drill, kneeling, will be performed in the same manner from the kneeling

† See Appendix page 231.

position, the squad being first brought to the kneeling position, as prescribed in paragraph 132 and 133, and then brought to a "ready," as in paragraph 143.

147. The instructor will observe during these drills that the sights of each piece are always kept in an upright position, that the rifle is held steadily in the hollow of the shoulder, that the middle of the forefinger is on the trigger, that no jerk accompanies the pull of the trigger—the forefinger deriving no aid from the hand or arm—and that the fall of the hammer produces no deflection of the muzzle. He will instruct the men that the piece is to be controlled by the left arm alone, and without movement of the small of the back or backward motion of the body. Also that in aiming the right eye must be brought directly at a level with the two sights and glanced *through* them *at* the target; and that if it be intently fixed upon this, the muzzle sight will cover it almost without an effort, while if an attempt be made in the ordinary way to look *from* the muzzle sight to the object, it will not be so readily seen, and the difficulty of aiming will be greatly enhanced. He will also notice carefully those men who have a tendency to wink the right eye as the

hammer descends, and see that they overcome it by practice before proceeding further.

148. He will cause this drill to be often practiced with the rear sight elevated, and will frequently pass down the line, correcting each man individually; and while seeing that the men do not let the piece "hang" too long when the proper sight is once obtained, will take care that they do not fire so quickly as to overshoot.

149. The position in ranks will be resumed, as described in paragraphs 129 or 136, except that at the first command the piece will be brought to half-cock. *This rule is habitual for all cases where the piece has been previously cocked.*

150. The squad being well grounded in the foregoing practice, will be exercised without the motions, with their sights at different elevations. For this purpose, the instructor will command :

1. *Squad, as skirmishers.*

2. *At 300 (or 500) yards.* 3. **READY.**

(One time and four motions.)

151.* The *First and Second motion*, will be performed as above described.

(Three.) Hold the piece firmly with the left

hand, and with the right regulate the sight for the distance required.†

(FOUR.) Cock the piece and seize it at the small of the stock.

152. The instructor will then command :

1. *Squad.* 2. AIM.

(*One time and four motions.*)

153. At the last command each man will go through the different movements as above prescribed, performing the motions regularly (without hurry) in his own time, and returning to the "ready."

AIMING DRILL—LYING.

154. After the men have been practiced in the foregoing exercises, they will be instructed in aiming lying.

155. For this purpose, the instructor will cause the squad to be formed as above prescribed, and will then command :

1. *Fire lying down.* 2. LIE DOWN.

156.* At the second command each man drops on his knees, places his left hand well forward on the ground, and lies flat on his belly; the piece is lowered at the same time

† This is done by the Prussians when at an "aim."

with the right hand, the toe and muzzle resting on the ground, the barrel up, the left hand at the lower band, the left elbow on the ground, the right hand at the small of the stock, opposite the neck.

157. The instructor will then command :

1. *Squad.* 2. AIM.

158.* Cock the piece, curve the body very slightly to the left and the legs rather more so, raise the piece, and press it *firmly* against the shoulder with both hands, the elbows on the ground, the left elbow nearly under the rifle, and the right rather close to the body than otherwise, the head elevated as high as convenient; and in this position aim and fire as prescribed in paragraph 146, and return to the position of "*ready.*"

159. The instructor will caution the men that the object of curving the body and legs to the left is to prevent the recoil from forcing the piece against the collar-bone, and that as this recoil is felt more in this position than in any other, they should be careful to hold their rifle firmly and closely against the shoulder.

160.* To load the piece in this position, steady it at the lower band with the left hand, the toe and muzzle resting on the ground, open the

breech-block, insert the cartridge, and close the breech-block with the right hand.

161. To cause the men to resume their position in the ranks, the instructor will command :

1. *Squad.* 2. RISE.

162.* Draw back the piece slightly ; grasp it at the lower band with the right hand, and bring it to a vertical position, barrel to the rear, the butt opposite the neck ; with the aid of both hands raise the body to a vertical position on the knees ; bring back the piece, the toe on a line with the right knee ; throw the weight of the body backward, rise on the balls of both feet, and return to the position of *Order arms*.

163. As the position of the skirmisher lying affords the greatest safety to the men while enabling them to obtain a greater certainty in firing, they should be cautioned to adopt it in actual combat whenever practicable, when acting as skirmishers.

164.* Inasmuch as correct aiming becomes impossible after the left arms of the men have become too tired to hold the piece steadily, the instructor, during the position and aiming drill, will allow them to carry their pieces when at a "*ready*," in an unconstrained position, without paying particular regard to the tactical position.

He will also allow short rests from time to time, and occasionally bring the men to "*attention*," and exercise them in the manual or in marching.

165. He also will not insist upon the different motions being performed with the cadence required for the other parts of the manual of arms, but use them more to secure a thorough performance of his instructions than mere mechanical uniformity.

166. Every man in these drills is to judge himself when he shall pull his trigger, and all undue precipitancy should be discouraged.

167.* Although some of the prescribed motions may seem unnecessary or monotonous to the men, they must be executed precisely as directed, special care being taken to detect and correct the variations from the prescribed motions. Steadiness of position, and particularly of the eye, head, and shoulders, cannot be too strongly insisted upon. The piece should be thrown forward smartly, yet without jerk, and raised with a steady, perpendicular motion, the trigger being gently pressed the instant the sights are in line with the mark. If this upward motion be regular, there will be no side vibration; but if the sights are allowed to "hang" on the mark, the shooting is sure to be

wide. Particular care must be taken that the barrel be not raised *too* rapidly. *Beginners almost invariably shoot too high and to the right, from raising the rifle too precipitously and pulling too hard on the trigger.*

168.* These drills are the most important part of rifle practice, and the instructor will constantly watch the position of every man while it progresses, particularly to see that the sights are upright, that the rifle is pressed firmly to the shoulder with the left hand, that the trigger is pressed steadily without the slightest motion of the hand or arm while the muzzle of the rifle is being raised and until the hammer falls; and that the eye is fixed upon the mark during and after snapping. The instructor is to scrutinize each man in succession during the time the squad is practicing, pointing out and correcting any errors he may discover. He should also occasionally place himself in front of each man, and cause him to aim at his eye with a view to ascertain if he obtains the alignment quickly and readily, and does not lose his aim in pressing the trigger.

169. Commanding officers are to make arrangement for the position and aiming drill—of which there cannot be too much if well executed—being *frequently carried on* by every

company, under the close personal supervision of the officers, assisted by the regimental Inspector of Rifle Practice, and a return required of the number of times it is performed.

170. They should also encourage the men to engage in these practices at other times than when under drill, but cautioning them against ever bringing a rifle to an "aim," unless they have first selected some object to sight it at. (See Appendix, page 222.)

LOADING.

171.* When the men are formed in *two ranks*, to come to a *ready*, the cautionary command "*As skirmishers*" will be omitted, and the position of the feet will be as prescribed in Upton, the men of the front rank being as in "*about face*" (their position in other respects being as prescribed in paragraphs 123 and 124), and the movement will be executed in a single motion, the rear rank carrying the right foot eight inches to the right, toward the left heel of the man next on the right, inclining the upper part of the body forward, and bending slightly the right knee.

TO LOAD WITH REMINGTON RIFLE.

172.* When the Remington rifle is used, to

load with cartridge the instructor will command :

1. *Squad.* 2. LOAD.

173. (*First motion.*) As in paragraph 123.

174. (*Two.*) As in paragraph 124, except that the thumb of the right hand will be placed on the hammer, the fingers underneath the guard.

175. (THREE.) Look toward the chamber, cock the piece, and throw open the breech-block smartly with the right thumb (if there be an empty shell in the chamber it will be removed by the extractor), carry the right hand to the cartridge-box, and take a cartridge between the thumb and forefinger.

176.* (FOUR.) Enter the cartridge in the bore, pressing it in with the right thumb as far as the extractor, at the same time with the forefinger of the right hand closing the breech with a turn of the wrist, and seize the piece at the small of the stock with the right hand, as in paragraph 124.

177. Should there be any difficulty in closing the breech-block, it is probable that the rim of the cartridge is too thick; *it should be withdrawn and another tried.* This rule applies to all breech-loading rifles.

178.* If, after firing, the instructor should not wish to reload, he will command :

1. *Carry.* 2. ARMS.

179.* At the command *Carry*, drop the piece to the position of the second motion of load; cock, open the chamber, remove the cartridge case, close the chamber, let the hammer down to half-cock, and grasp the piece with the right hand at the small of the stock. At the command *Arms*, resume the carry with the right hand, and face to the front. (*Two.*) Drop the left hand by the side.

180.* To fire directly after loading the command will be given :

1. *Squad.* 2. AIM.

At which the piece will be full cocked, and then aimed as previously prescribed.

181.* TO LOAD WITH THE SPRINGFIELD RIFLE.

When the Springfield rifle is used the loading will be as in Upton's Tactics, except that the position of the body will be as directed in paragraphs 123 and 124, and that the men (when the command "*As skirmishers*" is given) will step off with the right foot as therein prescribed.

182.* TO LOAD WITH THE PEABODY RIFLE.

When the Peabody rifle is used the loading will be as follows :

1. Squad. 2. LOAD.

183.* (*First motion.*) As in paragraph 123.

(*Two.*) As in paragraph 124, except that the right thumb will be placed on the head of the hammer.

(*Three.*) Half cock the piece, place the ball of the thumb of the right hand on the guard-lever immediately in front of the trigger, and throw open the breech by a smart downward jerk on the guard-lever, steadying the piece against the side with the right forearm.

(*Four.*) With the left hand depress the muzzle, and bring the comb of the stock under the right armpit, left forearm horizontally across and against the body; carry the right hand to the cartridge-box and seize a cartridge with the thumb and first two fingers.

(*Five.*) Carry the cartridge to the breech, insert it in the bore, pressing it home with the thumb, and then place the fingers of the right hand closed under the guard-lever, the thumb over the stock in rear of the hammer. Shut the breech by quickly closing the right hand, and

place the right thumb on the head of the hammer.

(*Six.*) Raise the muzzle to the height of the eye, the butt under and against the right elbow, small of the stock two inches below the right breast.

(*Seven.*) Full-cock and seize the piece with the right hand at the small of the stock.

184.* If, after firing, the instructor should wish the men to load in three times, he will command:

1. *Load in three times.* 2. **LOAD.**

At this command the men will execute the times separately, waiting for the commands "charge cartridge," &c.

The first time ("load") will be executed in four motions, viz., as in first four motions of paragraph 183.

185.* **TO LOAD WITH THE SHARPS RIFLE.**

When the Sharps rifle is used it will be loaded as above prescribed for the Peabody, omitting depressing and raising the muzzle.

186. When the men have been thoroughly practiced in the loadings by motion, the instructor will command:

1. *Load at will.* 2. **LOAD.**

187. At the second command the squad will load with the greatest promptitude and precision, without slighting, slurring over, or omitting any of the motions.

ARTICLE VI.

INDICATOR AND CANDLE PRACTICE.

188.* (1878.) As soon as the men are sufficiently instructed to understand the proper method of aiming they should be practiced with Wingate's Indicators, as prescribed in Par. 458.

When these cannot be procured candle practice may be substituted. For this purpose a series of candles should be placed in sockets placed opposite to each bull's-eye used for aiming drills, and the men drawn up in front of them in a single rank, as above prescribed, and dressed so that the muzzles of their pieces when at an "aim" will be three feet from the lights.

189. If the room is exposed to drafts of air, the candles should be placed in a small box.

with the front and top out, and provided with a hook on the back to fasten against the wall. This arrangement will also prove convenient both in protecting the wall and in handling the candles.

The sergeants should be provided with means to promptly relight extinguished candles.

190. After every discharge each man who has extinguished his candle should come to a "support," and his name be checked by the commanding officer in a list provided for that purpose (Form I.), each candle extinguished counting one, and a miss zero; the aggregate score of each man being announced at the close of the firing. Not more than ten shots should be allowed at each drill—seven standing and three kneeling.

191. To insure accuracy, the firing at these candles, or with ball cartridge should not be practiced immediately after an extended "position" or "aiming drill" or marching in "double time."

192. In cases where several squads are drilling simultaneously, and it is an object to avoid the time and labor of cleaning all their pieces, a certain number may be devoted to this practice, each squad stacking them after completing their exercise.

193.* As the gas arising from the explosion of a cap or primer is very corrosive, special care must be observed to see that the pieces are thoroughly cleaned after using them in candle practice.

194.* As the friction of the air ejected from the barrel by the primer is great, and the force applied small to insure accuracy, the barrel must be kept clean.

195.* This practice can be carried on with breech-loaders by using empty shells with a primer. This should contain an extra amount of fulminate. (See Appendix, page 200.)

196.* If this practice is carried on at night, care should be taken to arrange the lights so as to prevent the men from being dazzled. (See Paragraph 207.)

ARTICLE VII.

BLANK FIRING.

197.* Before the men are permitted to fire with ball, they should be practiced to fire blank cartridges with a view to give them steadiness, and accustom them to the recoil which follows the explosion of the powder.

This practice will be confined to recruits :

5 rounds to be fired singly, standing.

5 rounds to be fired singly, kneeling.

198. The position of the body, arms, and hands, the manner of pressing the trigger and holding the head, in taking aim, should be duly watched in this exercise, in order to discern and correct those errors which are fatal to good shooting, but which cannot be so successfully corrected when firing with ball.

199. The instructor will be careful to explain that the recoil caused by the explosion of the powder is to be guarded against by pressing the butt firmly into the hollow of the shoulder. This is of great importance, as the more confidently a man "stands up to his rifle," the less likelihood there will be of random shooting, and the better the results of the firing.

200. The instructor will also make the men understand that the centre, not the toe of the butt, is to be pressed against the shoulder, as the direction of the recoil is downward, and its consequent tendency to throw the muzzle up.

ARTICLE VIII.

ARMORY TARGET PRACTICE.

201.* Where cartridges containing a full charge are used in this practice, the noise and smoke are extremely objectionable. To avoid this inconvenience, as well as to reduce the expense, special cartridges should be prepared or a sub-calibre rifle used.

202.* Round balls are sometimes used instead of conical for armory practice, being but half the weight of the latter, and not upsetting with a small charge; but unless the barrel is frequently wiped it soon fouls with a round ball, from lack of lubrication, and the reduction in the charge is not sufficient to cause their use to be recommended.

203.* A charge of from 30 to 35 grains of powder will be sufficient for a range of 150 feet with the usual conical bullet.

204.* The ball in all cases should be pressed home on the powder. Shells containing an air space between the ball and powder have been found inaccurate. An improvement has been found to result from filling the space with wads

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having sawdust between them; but it is preferable to have the ball pressed home.

205.* The sub-calibre rifle used in the National Guard of the State of New York consists of a small rifle barrel, 20 inches in length, inserted into the barrel of the regular Remington .50 calibre (or any other rifle where the breech mechanism will permit its entry from the rear), and for a No. 1 or .22 calibre rim-fire cartridge. This cartridge is ejected by an extractor operated by the extractor of the rifle. A brass tube, passed down the muzzle, and secured by a bayonet clasp over the sight, receives the fouling, which would otherwise accumulate in front of the short barrel. Whenever this accumulates so as to affect the shooting, the tube should be removed, wiped and replaced.

This rifle makes but little noise or smoke, and is perfectly accurate up to 200 feet. It requires no special cartridge, and the cost of those for which it is adapted is very slight.

206.* All military rifles are sighted so as to overshoot at the short ranges available in armories. Unless the charge used is graduated with care to avoid this, the men should be cautioned to aim low. It is preferable to use a few pieces specially for this practice with the sights filed so that aim can be taken directly at

the mark as would be the case on the range. With the sub-calibre rifle the interior barrel is so bored as to counteract the oversighting of the piece.

207.* The arrangement of the lights in this exercise, as in aiming drill and candle practice, is a matter of importance. A strong light should be thrown upon the target, but the fewer between that and the firing point the better. The light at the firing point need not be very strong. If it be shaded so as to be thrown entirely upon the front sight of the rifle, leaving the rear sight and the face of the firer in shadow, the aiming will be greatly helped. Light preceding from directly overhead, or, in default of that, from the rear, is preferable to a front light. Unless the lights are arranged so that the men can see their sights clearly and without being dazzled, accurate shooting is impossible.

208.* All sights should be smoked or otherwise blackened to prevent reflection, both for practice in armories and at ranges.

209.* The targets for armory practice should be of paper, printed or marked in stencil of different sizes, so as to present a corresponding appearance at the distance at which they are placed, as the regulation targets do at different distances upon the range. This is a matter of

calculation depending on the distance. At the same time the difference between gas-light and day-light is so great that, unless the targets are made considerably larger than required by a correct calculation, they will appear too small and the practice at them less accurate than at the range.

210.* As the greatest improvement is to be obtained from the use of a target sufficiently large to enable even a poor shot to make hits, and thus learn and correct his errors, care should be taken to use targets of ample size in this practice.

211.* Targets composed of iron plates, though possessing some advantages, yet require special protection to prevent injury to the marker from the splash of the bullets striking them; and when the special cartridges or a sub-calibre rifle is not used, they are heavy and expensive. A wooden target is better and lighter. It also avoids all "splash." This should be made of pieces of joists a foot long and about four inches square, laid one upon the other, the ends resting against the wall, and held in place by an iron band encircling them, fastened by screws at the corners; the whole target presenting the appearance of a section of Nicolson pavement. Bullets striking this bury themselves in the grain of the wood

without splitting it, and there is hardly any limit to the quantity that can be shot into it without injury. The target for an armory should be about eight feet high by six wide. It should be backed with iron, as shots will occasionally work their way through a crevice. As the blocks become worn away they should be replaced from time to time.

212.* The paste-board targets used should be placed in front of the main target, attached to a small slat supported by cleats on each side of the main target. As shots strike this they are signalled by discs two and a half inches in diameter, attached to each end of a slight rod. The sides of each disc being painted differently so as to enable the "bulls eye," "centre," "inner" and "outer" to be signalled with the same rod. After several shots have struck, the marker, who sits on one side of the target behind a shot-proof barrier, seizes one end of the slat lifts it out of the cleats, and places it on a table in front of him, replacing it at once by a target previously attached to a second slat. He then obliterates the bullet holes in the target first used by pasting patches over them, and places it in readiness to be substituted for the one in use, if required. By this process the danger of

accident is reduced to a *minimum*, the marker never coming out from his shelter.

213.* An iron plate is sometimes preferred where light charges are used, from the shot making a more distinct mark upon it than upon a pasteboard target. It requires, however, a protection for the marker, as there is some danger from the "splash," although less than if a heavy charge was used, and is not recommended.

214. Iron targets should be painted with white lead and oil made thick, the divisions being marked with a stencil plate. The marking should be with discs, as upon the range.

215. To prevent stray shots, a shield may be provided about the size of the target, and having an aperture in the centre a foot by eighteen inches wide. This should be placed between the target and the firing point, at such a distance from the latter that the man standing there will see almost all the target through the hole and nothing outside of the target. If necessary, a side shield can also be prepared. The thickness of these must depend upon the charges to be used. With the regulation charges, the centre shield should be of tough wood at least two inches thick, plated with sheet-iron on the side toward the target, so that a stray ball will be

arrested there, after passing through the wood, without glancing. The side shield need not be so thick, nor will it require plating. If the room will admit, these can be hinged from the ceiling and arranged with a pully to be lifted out of the way when not in use. If this is impracticable, they can stand on a bottom piece provided with rollers, and be run up against the wall when not wanted.

216.* A barrier of sixteen inches of dry sand between three inches of spruce will be found amply sufficient for this purpose, as well as for a protection for the marker, and is preferable when a permanent shield is desired.

217.* When the aperture in the shield is small, three small platforms, each three feet square and three inches high, will be found advantageous, in allowing men of different stature to fire through the aperture without inconvenience.

218.* This practice should be limited to those who have attained some proficiency at aiming drill and indicator practice, and all squads will be required to be under the command of a careful officer.

219.* In all cases the marker must display a danger signal in front of the target before

leaving his shelter, and all firing must be suspended until it is withdrawn.

220.* The regimental inspector of rifle practice will establish such special regulations as are necessary to secure safety, conforming as far as practicable to the regulations prescribed for practice upon the range.

The following rules will be observed in all cases :

1. That the squad shall stand at least three paces in rear of the firing point.

2. That the men are called up singly, and fire all their shots in succession, except when there is room for two at the firing point, when they will be called up by files and fire alternately.

3. That no rifle is loaded, except at the firing point, nor until the instructor commands "All clear."

4. That, if the danger signal is displayed, the command *Danger* is at once given in a loud voice; and that the man about to fire shall thereupon come to a "ready" and *open the breech-block of his rifle*.

5. That at each hit the name of the firer and the value of the hit is announced.

6. That the records of such practice are preserved for future reference.

221. This practice should be encouraged by all commanding officers, being a good preparation for field firing, in making both officers and men familiar with the details required to secure safety, together with rapidity and precision of firing.

222. Before firing the squad should go through the aiming drill, as skirmishers, standing (paragraph 144), several times.

This rule is general in all cases of practice with ball cartridge.

ARTICLE XI.

JUDGING DISTANCE DRILL

223. In this drill the men are taught to note the size and appearance an enemy will present at different distances.

In target practice the distance is measured, but in action, the distance being unknown, it becomes necessary that it should be quickly and accurately estimated, for (as explained in paragraph 86), no accuracy can be attained in firing at more than 200 yards unless the proper elevation is given.

224. Commanding officers will therefore see that, in all cases where circumstances admit, not only the men but the officers under their command, are exercised according to the following rules, and they will impress upon the latter that they should be able to correct any error in estimation which may be made by their men, in order to conduct and regulate their fire in presence of an enemy.

225. The method of instruction will be as follows: The instructor will cause the company to be assembled fully equipped as for drill, and divided at least into three squads, or as many as there are company officers present. Each officer is provided with a cord, upon which the distances will be marked in divisions of five yards.

226. The instructor will measure on the ground a right line, which will be marked off into distances—0, 50, 100, 150, 200, 250, and 300 yards, marking these distances as measured with a stake, stone, or line, on the ground. He will now direct each man of his squad to pace off the measured distance of 100 yards, cautioning them to be careful and preserve their natural gate without attempting to increase or diminish the length of their step, and to count the number of steps they take in passing over

the distance of 100 yards. This is to be repeated at least three times by each soldier, who reports each time the number of steps taken by him in passing over 100 yards. The ratio which this step bears to a yard having thus become known, the instructor will inform each soldier the number of steps it will be necessary for him to take to pass over ten yards. The soldier, now knowing the number of steps he must take to pass over 10 and 100 yards, it will be easy for him to measure any distance with sufficient accuracy for all practical purposes when firing.

227. The men having thus learned to "pace off" correctly, will be practiced in judging distances.

228. For this purpose the instructor will form his squad at one of the extremities of the line, which has been measured in such a way that the line measured shall be perpendicular to the front of the squad. He will then place a man at the distances of 50, 100, 150, 200, 250, and 300 yards, facing the squad, and at an "*in place, rest.*" The men selected should be as near the same height as practicable, and should be posted eleven paces to the right (or left, as directed) of each other, and should maintain an erect position unless otherwise directed.

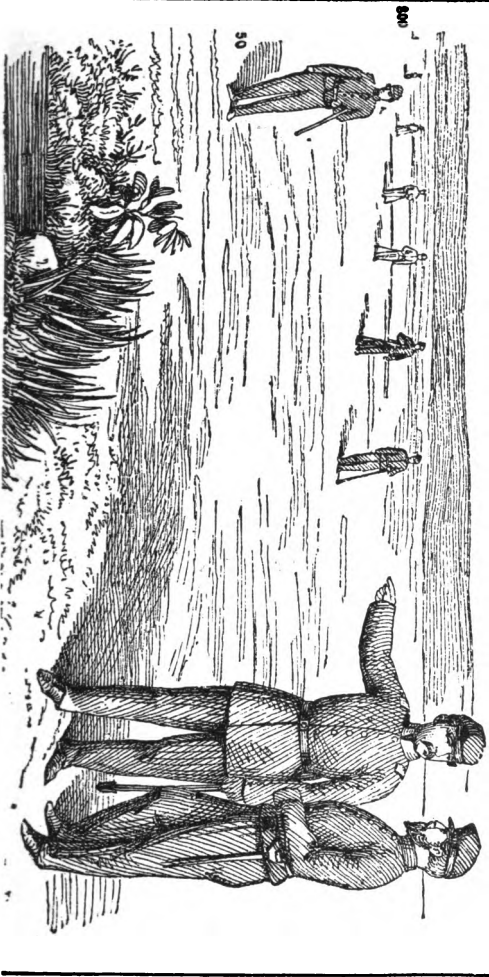
229. The instructor should then call the attention of the squad to the state of the sun, the atmosphere, and the back-ground, so that they may be accustomed to the changes made in the appearance of the several objects under altered circumstances.

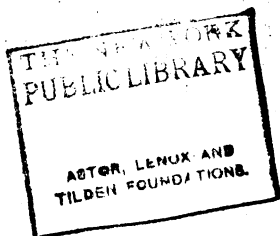
230. He will now direct the attention of the squad to the different parts of dress, arms, equipment, and figure of the men on the line—such as can be easily distinguished and recognized at 50 yards, and such as cannot be readily recognized at this distance.† He questions each man of his squad on these points, not expecting all to answer alike, since the eyesight of men will generally differ.

231. The instructor will now call the attention of the men to the soldier placed at 100 yards distance, and cause them to make similar observations upon this man as those already prescribed for the soldier at 50 yards, and will again question the men, being careful to point out to them the difference that exists between those two distances, as illustrated by the different appearance of the same markers, directing the squad to notice that men appear smaller the further they are off, although in reality they are nearly the same height.

† See remarks on page 207. Appendix.

500 yds. 300 200 150 100





232. The men stationed at the different points will be frequently replaced by others, who have made their observations, for which reason the squad should consist of, at least double the number of men employed as markers.

233. Should the party be very large, markers may be thrown out in opposite directions, so as to afford a view of the markers in two aspects.

234. When the men of the squad have made a sufficient number of observations upon the six distances above indicated, and when these observations are well impressed on their memories, the instructor will cause the squad to estimate intermediate distances between 50 and 300 yards.

235. For this purpose he will cause the markers to be called in and march his squad to a different part of the ground from that in which the distances were measured in the first place. He will then send out one man directing him to halt at a given signal. The instant this man steps off, the squad is faced about, in order that the men may not count the steps taken. When the man proceeds a sufficient distance, he will be halted, facing toward the squad. The squad will now be faced to the

front. The men will estimate the distance which separates them from the soldier. The instructor cautions the squad to recollect the observations made by them upon the men placed at the measured distances. He will then place himself a short distance from the squad, and call each man to him in turn, and question him as to the distance, noting down his answer, which must be given in divisions of five yards, and in a low tone of voice, so as not to influence the judgment of others.

236. When the party is large it will be divided into squads, and the answers of the men of each squad will be received and recorded by the non-commissioned officers.

237. No talking will be allowed while the answers are being given, and every man will adjust the sight of his rifle for the distance estimated. When all the men have given their answers, they will be read over to them by the instructor, who will then cause the distance to be measured, and, at the same time, stepped off by the men, placing himself in the centre to count the steps. Each man having then stated the distance as paced by him, the instructor will insert the same by the side of the distance as estimated, and will announce the real distance.

238. The instructor now points out to the men what errors, if any, were committed in estimating the distance. In order to do this more distinctly, he may send a man to the point from which the squad started, pointing out all errors by observations on this man.

239. The instructor will repeat this exercise as often as in his judgment is necessary, but at not less than four drills, taking care each time to choose a different distance, but always between the limits above indicated.

240. When the instructor judges that the men of his squad—who should, if possible, be the same during these exercises—have acquired a sufficient accuracy in estimating distances comprised between 50 and 300 yards, he will proceed to estimate distances comprised between 300 and 600 yards.

241. To accomplish this, he will cause to be measured a distance of 600 yards, and mark upon the right line, so measured, distances of 300, 350, 400, 450, 500, 550, and 600 yards.

242. He will then direct two or more men to place themselves at every fifty yards, from 350 to 600 yards, as above explained, and will cause his squad to remark upon the appearance presented by these markers, as above prescribed for distances under 300 yards.

243. In estimating distances over 300 yards, the observations should be upon groups of men, which should number at least eight, and be placed in single rank.

244. For this exercise the stadometer† should be used. If there be none, a cord should be provided of the length required, divided into divisions of five yards, with the distance of each division from the end so marked as to be distinguished on a close inspection.

Having caused this cord to be stretched to any distance that is deemed desirable, the instructor should send forward a group of markers under charge of a non-commissioned officer, who should be ordered to halt on arriving at a specified distance marked on the cord, which distance should be a division of five yards. Where the party is large, half of it may be thus sent out. On arriving at the specified point, the markers will be halted and faced as above directed, being kept ten paces from the cord. Each officer and man in both parties will then be required to estimate the distance by their respective commanders, as above prescribed, which will be recorded and read over to them, after which the correct distance will be an-

† See Paragraph 265.

nounced and recorded. No alteration of any answer is to be made after the correct distance is announced, and special care is to be taken that the men do not hear each other's estimates.

245. Where no cord is used, the party of markers will be halted by its commander at any distance between 300 and 600 yards; and after the men of both parties have estimated the distance, it will either be measured by a cord and the distance announced by the drum or bugle (a roll or long note standing for each hundred, and a tap or short note for ten), or the two squads will advance together, counting the paces, which added together will give the result. The latter is to be preferred, as saving time and walking.

246. In each practice the men are to be exercised at six different stations, which are to be alternated in such a manner as to preclude any clue to the actual distance being gained.

247. Every judging distance drill should consist of observations made upon men at *known* distances, and of three answers given on men placed at *unknown* distances immediately afterwards.

248. Estimating distances should take place under different conditions of the atmosphere—

cloudy, foggy, etc.—and, if the locality permits, squads should be drilled on ground the outline of which is diversified by hills, ravines, etc.

249. At the conclusion of each drill the number of points obtained by each man is to be announced to the class and recorded, and the register signed by the officer keeping it and instructor. No erasure is to be made in the register, and all corrections are to be initiated by the officer making them. A neglect of this will invalidate the register.

250. Instruction will be given, if possible, so as not to interfere with other parts of the soldier's drill. It will *always, however, accompany ball-practice*, being carried on at the same time, so that when one squad is occupied in firing at the target, the remaining squads will be exercised in estimating distances.

251. The preliminary course for recruits in this exercise will consist of eight drills, † four at known and unknown distances up to 300 yards, and four from 300 to 600 yards, the time being discretionary with the instructor.

252. After completing this practice, both recruits and drilled soldiers will be exercised in the annual course of judging distance for classification.

† See remarks, Appendix, p. 207.

253. This course consists of three periods, each consisting of two practices, or twelve answers, which is to be annually performed by every command, to keep the men in practice.

254. All will commence in the third class, and estimate as far as 300 yards, the value in answers being—within 5 yards, 3 points,

“ 10 “ 2 “

“ 15 “ 1 “

All those who make 14 points will pass into the second class.

255. The second class will estimate distances between 300 and 600 yards, the value of the answers being—within 20 yards, 2 points,

“ 30 “ 1 point,

when all making 14 points will pass into the first class.

256. The first class will estimate between 600 and 900 yards, the value of the answers being—within 30 yards, 2 points,

“ 40 “ 1 point,

when the man making the greatest number of points will be the “best judge of distance.”

257. After each classification those who do not succeed in securing sufficient points, will again go through with the exercise of their class until the prescribed drills are completed; and if they succeed, on such renewed attempt,

in making the necessary points, will be promoted accordingly.

258.* This exercise will be discretionary with commanding officers, as it can only be practiced in the field.

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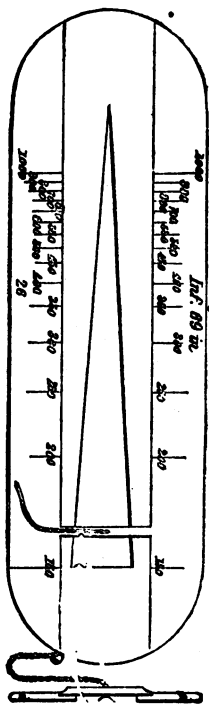


Fig. 2.

PART IV.



ARTICLE I.

INSTRUMENTS FOR ESTIMATING DISTANCE.

259. For estimating distance, the stadia and stadometer are used.

260. The former is a piece of copper or other material, with an isosceles triangle cut out of it. The upper and lower sides are graduated, and a slide works from left to right. The base of the opening is perpendicular to the sides of the instrument, and represents the apparent height of a man at a given distance, when the instrument is held horizontally at a certain distance from the eye.

261. The base of the opening, when held vertically at a distance, say 26 inches, from the eye, represents the apparent height of a foot-soldier with his cap on, at say 150 yards.

262. In order that the instrument shall always be used at the same distance from the eye, a

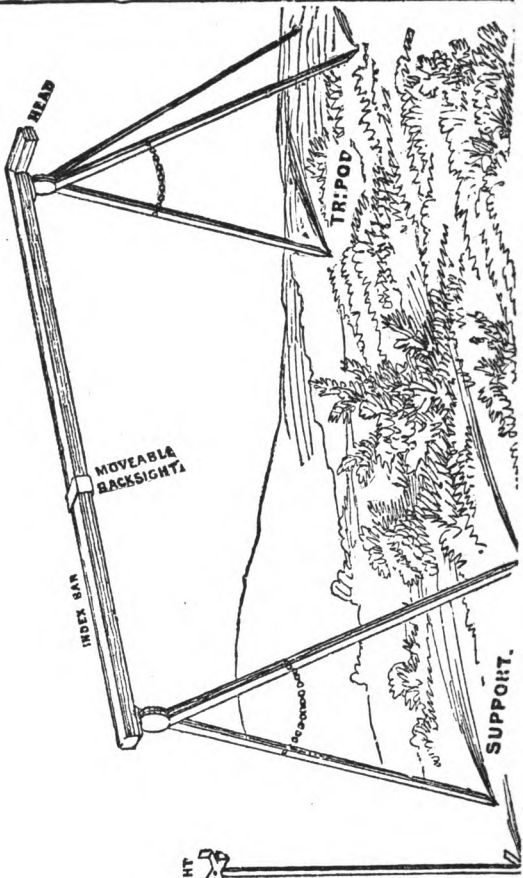
string or chain is attached to the slide. The graduation of the sides of the instrument is made by observation or by calculation, assuming the average height of an infantry soldier to be a certain number of inches.

263. To use the instrument, hold the knot at the end of the string or the ball of the chain, between the teeth, stretch the string or chain by extending the arm, keeping the base of the opening vertical, pass the instrument from right to left across the field of sight, and move the slide until the figure estimated at is contained within the remaining space, and read off the distance marked on the scale.

264. This, however, like various other ingenious instruments for measuring distances, has not been found to meet the practical requirements of the service; and it is generally admitted that numerous trials and prolonged observations in the appreciation of distances, can alone form the habit or *coup d'œil* which enables the soldier to estimate distances with sufficient accuracy.

265. The stadometer is based upon the mathematical proposition that in similar triangles similar sides are proportional. It is intended for the drill-ground, to save measuring in estimating distances, and, as its results are certain,

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HEAD

TRIPOD

MOVEABLE
BACKSIGHT

INDEX BAR

SUPPORT.

SIGHT

CROSS STAFF.

is a valuable instrument. It consists of a bar 5 feet 2 inches long, marked with an index having a sliding sight and a cross-head at one end extending at right angles to its length, and is supported at a convenient height by legs at each end. Two foresights, one at two inches and the other at four, are placed on the head.

266. In using this instrument the sight on the index bar is aligned upon the desired point. A flag is then placed at 40 yards at right angles from that point (the angle being obtained by the use of a cross staff having two sets of sights), and the sliding sight on the index bar slipped down until the foresight on the head is aligned on the flag, when the scale will show the distance, as every four inches represents 40 yards.

267. To measure over 600 yards, the inner foresight on the head is used, and the distance on the scale doubled, as at that angle every 2 inches would represent 40 yards.

268.* The telemeter is an instrument for measuring distances based upon the difference that exists between the velocity of light and sound, and measures the distance of the adversary by observing the interval which elapses between the smoke or flash and the report of his piece. It is a glass tube graduated along its length into divisions which represent dis-

tances (Fig. 1, 2, 3). This tube, closed at both ends, is filled with liquid, through which moves a metal index formed of two discs united by a central stem. The diameter of these discs is somewhat smaller than that of the tube, so that, when the latter is vertical, the index slowly descends with a uniform movement. The glass is protected by a brass casing, having an aperture which discloses the scale and index.

269.* To use the telemeter hold it horizontally in the hand, the index at the origin of the scale, and attentively regard the enemy's position. At the instant the smoke or flash is perceived quickly turn the wrist so as to bring the instrument into the vertical position, when the index descends; upon hearing the report return it to the horizontal, and the index stops. The number on the scale corresponding to the lower disc, which serves as marker, is the distance sought.

270.* To render the instrument reliable during different temperatures, the volume and density of the index and the density and dilatibility of the liquid are combined so that the velocity of the index is influenced by temperature in the same proportion as is the velocity of sound, consequently the readings are always correct.

Distilled water alone, with a small proportion

BOULENGÉ'S MILITARY TELEMETER.

FIG. 1.—FOR INFANTRY.

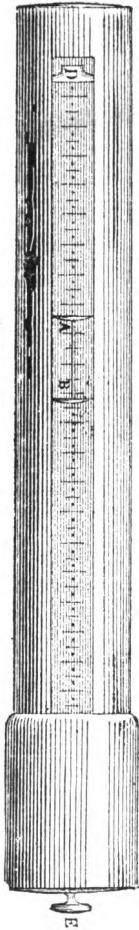
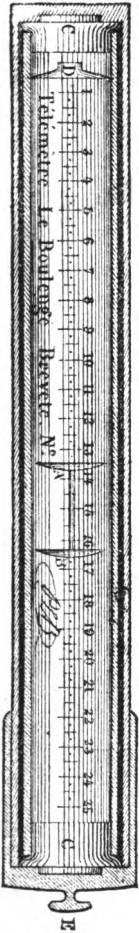


FIG. 2.—SECTION.



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of alcohol, fulfills the conditions desired. This liquid should be used with a silver index of very small size; aluminium and platinum do not offer the same advantages with regard to density and expansibility. A slightly convex form of index has been found to work the best. To insure a uniform movement of the index the glass tube must be perfectly cylindrical throughout its length—a condition which demands especial care in its fabrication and calibration.

271.* A velocity 1-25000 that of sound has been adopted for the index, so that a millimetre on the scale represents twenty-five metres of distance. Each degree of the scale represents twenty-five metres, and with the eye the fifth of a division can be estimated.†

The scale is printed on paper, and pasted on the face of the tube opposite the opening in the brass casing. To facilitate the reading, hundreds of metres are distinguished by a long mark with figure, the divisions twenty-five and seventy-five by a dot, and the division fifty by a shot mark. The scale can be made in any other unit of length, such as the pace, yard, etc., as may be desired. The cap is of a special form, and bronzed, so that there may be no

† A millimetre is .06 of an inch, a metre 39 1-3 inches.

hesitation as to the proper manner of grasping the instrument. To prevent the possible entrance of air, the tube is closed by two rubber plugs compressed in the casings. Yet, as it is probable that in the course of time bubbles of air may get in, this contingency has been provided for in the following manner: An air chamber is formed in front of the plug at the origin, of a silver funnel-shaped disc set into the glass. Air imprisoned in this chamber can escape only with great difficulty, while it may enter with ease. Should then a bubble appear in the fluid, it is only necessary to hold the instrument vertical, and to give it several slight taps during the descent of the index, so that the bubble may pass it, when it is caught immovably in the disc. It is preferable, however, to leave a little air to facilitate the expansion and contraction of the liquid. Instruments made in this manner will stand, it is believed, at least ten years' service. Owing to the air chamber, the tube may be hermetically sealed, but the method already described is esteemed better, as it makes the instrument stronger and more compact.

272.* The telemeter used to regulate musketry fire is 3.74 inches in length, and indicates distances up to from 1,500 to 1,800 yards.

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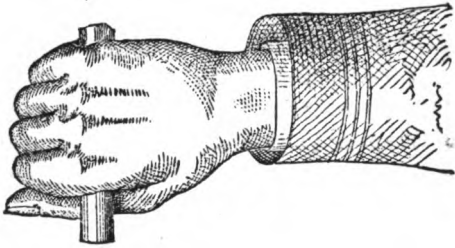


FIG. 4.—1st Position. (Preparing.)

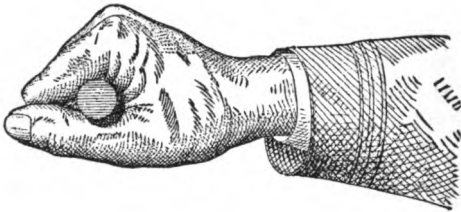


FIG. 5.—2nd Position. (Waiting.)

POSITIONS IN OBSERVING.

PRACTICAL DIRECTIONS FOR THE USE OF THE INSTRUMENT.

273.* Hold it in the right hand (Fig. 5) [the arm extended without stiffness, the cap to the right, the aperture toward the observer], between the joints of the fingers rather than in the hollow of the hand, more tightly grasped toward the fore than the little finger, so that, in turning the wrist, the tube may be as vertical as possible. Begin by turning the wrist to the left to bring the index to the origin (Fig. 4), then hold the instrument horizontal (Fig. 5), the eyes fixed upon the point to be observed; mark the flash or smoke by turning the wrist to the right (Fig. 6), by a quick but gentle movement, and the report by the opposite movement of the wrist (Fig. 5), made as nearly as possible in the same cadence. Bring back the hand, keeping the tube horizontal, and open the fingers to read the indication (Fig. 7). Practice bringing the telemeter into the horizontal and vertical without hesitation by a cadenced movement until it is done instinctively. Even if the instrument be held slightly inclined during the descent of the index, the resulting error is generally inappreciable. If the instrument has not been in use for some time, the index should be

made to travel up and down several times before use. Unless this precaution be taken, its course might be slightly retarded, probably due to the liquid losing its fluidity by quiescence.

274.* The telemeter being intended for carriage in the pocket or hand, its temperature even in cold weather, will not fall below about 60 degrees. This condition has been considered in its construction, and therefore it is recommended that in cold weather it be continually kept in the pocket of the trowsers or carried in the hand, so that the temperature of the liquid may not fall too much, in which case the readings obtained will be a little too small. In summer no especial precaution is necessary.

275. A great number of trials have been made of this telemeter. When proved by the vibrations of a pendulum or the beats of a watch it is absolutely true, while the exactness of its indications in measuring distances depends upon the aptness of the observer. The shorter the distance the greater the difficulty of measuring it accurately, as the flash and report are close together. At distances exceeding 300 yards the accidental error committed by the ordinary observer does not generally exceed fifty metres; with practice this is diminished to twenty or twenty-five metres. Every one has

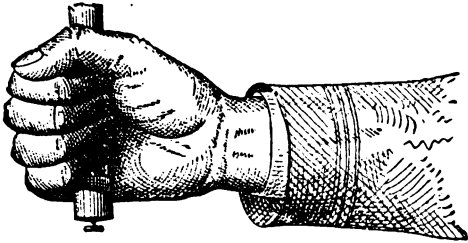


FIG. 6.—3rd Position. (The flash.)



FIG. 7.—4th Position. (Ready to read.)

POSITIONS IN OBSERVING.

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his own personal equation, and this should be known to derive all possible advantage from the instrument; though it varies little among observers, and on the average lessens the distance fifty metres, the report being noted more quickly than the flash or smoke. This mean equation is corrected on the instrument itself by making the origin of the scale correspond not to zero but to fifty metres. It is an advantage always to use the same telemeter in order to unite in the personal equation the slight error which may exist in the graduation. An observer is liable to commit very great errors in his first attempts, because, unaccustomed to the duty, he is surprised by the flash or smoke and does not promptly note it. The error is independent of the distance, hence the personal equation decreases slightly with the distance.

PART V.



ARTICLE I.

TARGET PRACTICE IN THE FIELD.

276. Target practice affords proof of the attention bestowed upon the preliminary drills; —the more carefully the latter have been performed the better will be the results of the former.

277. The full course of this practice is—

- | | | | |
|--|---|---|------------|
| 1. Firing singly, | - | - | 30 rounds. |
| 2. Volley firing, | - | - | 10 “ |
| 3. File firing, | - | - | 10 “ |
| 4. Skirmishing (or firing at unknown distances), | - | - | 10 “ |

In addition, squad or individual practice should be encouraged as much as possible.

278.* (1878.) Firing at all distances up to 300 yards is to be performed standing; from 300 to 400 yards, kneeling; over this distance, lying. Firing from the left shoulder is not allowed, ex-

cept in case of defective vision of the right eye, and not then in the volley firing.

To secure uniformity, the targets shall always be of the regulation size.†

279.* In all these practices, each soldier shall load and fire his own piece, using the regulation cartridge as issued.

280. In all firings in ranks, the front rank will be made frequently to change positions with the rear rank, and, before firing with ball, the men will be briefly practiced in simulated firings, when the hammer will be allowed to fall as in aiming drill.

ARTICLE II.

FIRING SINGLY.

281.* In this branch of individual firing, the recruits (See paragraph 16) begin in the third class, by firing five rounds at 100 and 150 yards at a third-class target, ‡ and after having passed through the course so as to be known as "drilled soldiers," are to fire annually a like

† See description of targets, page 165.

‡ *Id.*, page 165.

number at 150 and 200 yards, that being the third-class practice of the "annual course."

282.* When the squad or company has performed this "period," the points obtained by each man at the several distances will be added together, and a classification made. Those who have made 25 points are then formed into a second class, and those who have not are to fire again in the third class.

283.* In the second period the third class will practice as before. The second class will fire at a second-class target; the recruits kneeling at 300 yards, and lying at 400 yards, and the drilled soldiers kneeling at 400 yards and lying at 500 yards, five rounds being fired at each distance.

284.* A second classification will then be made, and those who have made 25 points will be promoted, those of the second class into the first, and those of the third into the second, the others to remain in the second and third classes respectively.

285.* (1878.) In the third period the second and third classes will practice as before. The first class will fire at 200 yards standing, and 500 yards lying; five shots (*without sighting shots*) being fired at each distance.

286.* A final classification will then be made

in each class. Those who have made 25 points or over in the first class will be designated "Marksmen." Those who have made 25 points in the second and third classes will be promoted as before.

287.* The practice for the "Marksman's Badge" is to be under the direct supervision of the Regimental Inspector of Rifle Practice, who will certify to the scores.

288. (1878.) Regimental Inspectors of Rifle Practice are authorized to permit those whom they consider to be sufficiently skilled to compete for the Marksman's Badge without shooting in the second or third classes.

They are also authorized to accept official scores made in a military match of a regular Rifle Association, at the prescribed distances and with the regulation rifle, by those who have not become marksmen previously in that year, as a qualification for the badge. *Men who have qualified in any class must stand upon their first scores.* Winners of the Marksman's Badge are exempt from firing in the second or third classes.

289.* (1878.) Applications for permission to practice directly for the "Marksman's Badge" must be made by or through company commanders, and must be approved by them.

No man, with the exception of those thus

authorized to shoot for the "Marksman's badge," is to be allowed to shoot in any class to which he does not belong.

290. A list of each company, arranged in classes, will be kept in its quarters until new lists are formed at the next annual course.

291.* The names of all Marksmen, with those of the first class, and the points they have obtained, will be read upon parade, and announced in regimental orders.

CAVALRY PRACTICE.

292.* Cavalry armed with carbines will fire as follows :

1. Third class, as prescribed for Infantry.

2. Second class to fire at a second class target at 250 and 300 yards, five shots kneeling at each distance, all making 25 points to pass into the first class.

3. Competitors for the "Marksman's badge" will fire with carbines at 200 yards, standing, at a third-class target, and at 300 yards, kneeling, at a second-class target, five shots at each distance, and all making 25 points and upward will be considered "Marksmen."

293.* Mounted practice by cavalry will be frequently performed, as follows :

The men will fire to the left and front.

A manège is to be marked out at the firing-

point, and the men file around to the right, keeping a horse-length apart.

294. Each horse is to be halted when opposite the target, the man firing and walking on a horse-length, and halting until the next man has fired, to prevent the horse hurrying after those in front.

295.* At every third round the command will be given "*Down the centre,*" when the men will head straight toward the targets, halt at the firing-point, and fire to the "*front,*" turning to the right after firing as above prescribed.

296.* (1878.) The men will be cautioned that in firing with carbines the shortness of the barrel and the disproportion between the weight of the piece and the charge causes the muzzle to "jump" upward; that this is to be avoided by pressing the carbine against the shoulder with a firm grasp of the left hand; and that as they must control their aim by drawing a fine or coarse sight,† they must be careful to always aim with such a sight as they find by experience is required at the different distances. Firing from the saddle is uncertain and should never be allowed in battle if it is possible for the men to dismount. More attention should therefore be paid to instructing the men in firing on foot than when mounted.

† See Appendix, page 249.

ARTICLE III.

VOLLEY FIRING.

297. (1878.) In this practice, ten rounds of ball ammunition are to be expended by the recruit, and once a year by the drilled soldiers of every company at 200 yards, both ranks standing.

298. It should be observed, however, that this is but an occasional practice in the course of instruction, and one of the last taken. While valuable to accustom the men to delivering an effective volley, it does not assist learners in marksmanship, and should be avoided except with those who have passed through the course.

299. The targets used for this, as well as for "*file firing*" practice, are composed of six targets placed close together, across the centre of which is to be colored a black mark two feet deep. This constitutes "the bull's-eye," the "centre" being the space one foot above and below the bull's-eye, and the "outer" the remainder of the target.

300. The strength of the firing squad in this and the following exercise should not exceed twenty nor be less than five men.

301. In the volley firing, if a man's rifle misses fire, he is not to fire at the target singly. Every miss-fire in a volley is to be counted as a round expended. No man is to be withdrawn from the practice after having commenced it; and whatever may be the result of the fire in each volley, the average to determine the result of the practice is to be ascertained by dividing the number of points (obtained by the hits on the targets by the number of men in the squad.

302. In the "*volley*" and "*skirmishing*" practicing, care is to be taken that the men of the third class who have not fired beyond 300 yards adjust their sights to the proper elevation.

303. In this and all other firing in ranks the men will be made to take the positions laid down in the "School of a Soldier," as applicable to those different firings. They will also be accustomed to regulate the sights in ranks, putting in practice as much as possible, when firing in ranks what has been prescribed for individual firing.

304. The proper execution of "*volley*" firings depends in a great degree upon the commands of the officer. If he does not allow a sufficient interval between the commands "*Aim*" and

"*Fire*," the men will not have time to aim and to obey the command properly, the trigger will be pulled too suddenly. The result will be that much of the efficacy of the fire will be lost, and a simultaneous fire, upon which a great deal depends will not be obtained; for experience and reasoning demonstrate the fact, everything else being equal, that platoon-firing is more effective in proportion as it is executed together.

305. When the officer leaves a suitable interval between the commands "*Aim*" and "*Fire*," the men have time to adjust the piece to the shoulder, to place the finger in front of the trigger, and to exercise a slight pressure on the trigger when awaiting the command "*Fire*." They are then ready to fire the moment the command is given, thus obtaining a simultaneous and effective fire.

306. But, if the officer superintending the firing should be careful to leave a sufficient interval between the commands "*Aim*" and "*Fire*," he should no less avoid the other extreme. If he keeps the men aiming too long, they will become fatigued, will lose their aim, and will not be able to obey the command when given.

307. It is only by commanding and seeing

platoon and company firing executed with ball cartridge, and judging of its effects by the number of balls put into the target, that officers can appreciate the influence of a command properly given, and acquire the habit of thus giving their commands.

308. When firing by file or by volley, the officers will indicate in their command the distance which separates the company from the object to be fired at, as soldiers in ranks are necessarily more or less constrained in their movements, and, being occupied, moreover, in loading their pieces, may not be able to judge correctly the distance which separates them from the enemy.

309. The most suitable moment to indicate the distance will be immediately before the command "*Aim*" is given, as the men will then be in a position to regulate the sights. To direct the fire of a company upon an enemy, for example, at 400 yards, the officer will command :

1. *Fire by Company.*
2. *Company.*
3. READY.
4. *At 400 yards.*
5. AIM.
6. FIRE.
7. LOAD.

ARTICLE IV.

FILE FIRING.

310. The object of this exercise is to accustom the men to such use of their arms as would be required in the ranks in actual combat, and to combine rapidity with accuracy—the latter, however, never being sacrificed for the former.

311.* (1878.) The firing in this drill is at 200 yards (which with drilled soldiers may be increased to 300) and should be confined to the first class, who should fire ten rounds annually.

When this firing is at 300 yards, the men should be practiced in shooting without raising the rear sight, the aim being taken through the flanges and the elevation estimated.

313.* (1878.) To cultivate coolness and deliberation, and prevent waste of ammunition in battle, the number of shots should be specified in giving the command, as 1. *Fire by file*, 2. *Two (or more) shots*, 3. *Commence* FIRING.

314.* The number of shots prescribed should be fired as rapidly as is consistent with accuracy. The time should be reckoned from the last command and should be returned with the scores.†

† With practice, 12 to 13 rounds a minute can be fired with the Remington rifle, loading from the cartridge-box.

315. In this practice, the distance will be announced immediately before the command "*Commence firing,*" and after the command "*Ready.*"

316. When firing in the open field, *at ranges beyond 300 yards*, and at *all distances* where firing from behind parapets or under cover of any sort, the back sight is to be carefully adjusted, and a true alignment taken through the notch upon it, at the object aimed at.

ARTICLE V.

SKIRMISHING, OR FIRING AT UNKNOWN DISTANCES.

317.* Commanding officers are authorized, in their discretion, to require ten rounds to be fired annually by the drilled soldiers of every company, in skirmishing order, according to the tactics; five rounds in advancing from 400 to 200 yards, and five in returning from 200 to 400 yards, each man judging his own distance and arranging his sight accordingly; and also taking advantage of any cover afforded by the ground, as if in actual battle.

318. In this practice, six or eight single targets (6x4 ft.) should be placed with intervals of six paces between them. Each target is to have on it the "bull's-eye," "centre," and "outer," marked as on the targets used for volley firing. (Paragraph 299.) Every file is to have its own target.

319.* In advancing, the men may fire in any position. In retiring, the firing is to be invariably delivered from the knee.

320. In this practice, a sentry (one of the fatigue party) is to be placed on each flank of the extended targets, about 40 or 50 yards off, to prevent any person approaching within that distance.

321. In all ball practice the instructor should caution the men that accuracy of fire is to be preferred to rapidity, and should use special pains to cultivate deliberation in firing, and the avoidance of all waste of ammunition.

322. For this purpose he should impress upon them that, in aiming at over 400 yards, they should select large bodies, artillery or columns, in place of single objects, and that at all distances they should aim chiefly at the enemy's officers, and at those bodies of troops which, though more distant, are most distinctly visible.

323. (1878.) The officers and non-com-

missioned officers should be careful in service to control the firing of the men by directing the elevation and part of the body to be aimed at (as "*At [so many] yards,*" HEAD or WAIST), as well as to indicate the direction and strength of the fire, and the objects which most deserve the attention of the troops. Troops should be cautioned to habitually fire at the feet of the enemy, and should be informed that whereas a high shot is wasted, particularly if the enemy is advancing, a low shot is effective, as, even if it strikes the ground, the ricochet is still dangerous.

PART VI.



ARTICLE I.

PERIODS OF DRILL AND CLASSIFICATION OF MERIT.

324.* The following table exhibits the minimum number of drills that should be performed by all recruits, and annually by all drilled soldiers. In addition, advantage should be taken of all available occasions to have the men review the exercises they have performed.

325. No effective man is to be exempted from performing this course. If he be reported by the surgeon to be unable to see up to 300 yards, he will be required to practice at shorter distances. Excusing men from practice only leads to malingering.

326. (1878.) The number of points to be obtained as a qualification for one class to pass into another, both for recruits and drilled soldiers is 25 points in target practice as prescribed in

PERIODS OF DRILL.

| PRELIMINARY DRILLS. | | RECruits. | | | DRILLED SOLDIERS. | | |
|---|--|-----------|-----------------------------|-----------------------------|-------------------|----------------------|-----------------------------|
| | | Drills. | Time for each drill. | REMARKS. | Drills. | Time for each drill. | REMARKS |
| Cleaning arms and theoretical drills } | | 2 | 1 hour. | | | | |
| Sighting drills * | | 2 | ½ " | | 2 | ½ hour. | |
| Position and aiming drill. | | 16 | " | | 8 | ½ " | |
| Snapping caps (5 each drill) | | 6 | | | | | |
| Blank firing (10 rounds). | | 4 | | | | | |
| Judging distance..... | | 8 | Discretionary with officer. | Up to 600 yds. | 4 | 1 " | At discretion of officer |
| P R A C T I C E S . | | | | | | | |
| Target practice, 5 rounds each. f | | 6 | | Discretionary with officer. | | | d. |
| Firing 1 round fir m rest at each distance to 300 yds. | | 5 | | 100 to 150 yds. | | | 150 to 200 yds. |
| 1st period 3d class. | | 4 | | " | 4 | | " |
| " " 2d " | | 4 | | 300 to 400 " | 4 | | 400 to 500 " |
| " " 3d " | | 4 | | 100 to 150 " | 4 | | 150 to 200 " |
| " " 2d " | | 4 | | 300 to 400 " | 4 | | 400 to 500 " |
| " " 1st " | | 4 | | 200 and 500 " | 4 | | |
| Volley firing, 10 rounds..... | | 1 | " | | 1 | | Same as recruits. |
| File firing, 10 rounds..... | | 1 | " | | 1 | | |
| Skirmishing, 10 rounds..... | | 1 | " | | 1 | | |
| Judging 1st period..... | | 2 | " | to 300 yds. | 2 | 2 " | Discretionary with officer. |
| Distance } 2d " | | 2 | " | to 600 yds. | 2 | 2 " | |
| Drill } 3d " | | 2 | " | to 900 yds. | 2 | 2 " | |

* When at sighting drill, those not actually engaged are to be exercised in position drill, with sights fixed for the actual distance, so as to employ the time profitably.

† C. to be fixed in ARMOY. If this be impossible, candle practice to be substituted.

Article II, pages 129, 130, 131, 132 and 133, and 14 points in judging distances as prescribed in Article XI, page 117.

327.* (1878.) All "Marksmen" shall receive a badge and clasp, the latter being inscribed with the word "Marksman," and the year in which they qualified, but they can only retain it by annually maintaining their efficiency.

328* (1878.) All "Marksman's badges" should be turned in with the annual reports of rifle practice. The "Marksmen" who have qualified during the year will receive them back with the addition of an extra clasp for every additional annual qualification.

"Marksmen" who have failed to qualify in any year may retain their clasps, but must return the badge. In case they again qualify they may affix these clasps to their badge. Men who have won the badge three years may retain it in case they leave the service, *but no one can wear a "Marksman's badge" who has not qualified during the preceding year.*

329. If, after having fired one or more rounds at a distance, a man becomes unable to complete the practice on account of illness, he is considered as not having fired at that distance, unless the points obtained pass him into a higher class.

330. In case of the weather preventing a squad or company from finishing a practice, it is to be completed at a subsequent occasion.

331. Men who remain in the "third class" at the final classification are to be subsequently exercised in the entire course in every respect as recruits; but it is to be distinctly understood that this additional practice is not to be looked upon as a punishment, or deprive them of any indulgences.

332.* (1878.) An annual report of the rifle practice of each regiment, battalion, troop and separate company shall be made on November 15th of each year, giving the names and scores of the "Marksmen," the number contained in the various classes at the close of the practice (those who have not shot being returned as being in the *fourth class*) and its "figure of merit."

The maximum "figure of merit" is 100. It is computed by multiplying the number remaining in the various classes as follows :

| | | | | | |
|--------------------|---|----|---|---|-----|
| Marksmen, | - | by | - | - | 100 |
| First Class Shots, | " | " | - | - | 60 |
| Second " | " | " | - | - | 30 |
| Third " | " | " | - | - | 10 |
| Fourth " | " | " | - | - | 0 |

The totals thus obtained are added together and the result divided by the aggregate number (present and absent) of the regiment at the last inspection and muster, exclusive of band and drum corps. The result, carried out to two places in decimals, will be the "figure of merit."

The figure of merit of all regiments, battalions, troops, and separate companies will be annually published by General Headquarters, and shall constitute the measure of efficiency of all organizations in rifle practice. The names of all "Marksmen," with their scores, will be published at the same time.

PART VII.



ARTICLE I.

PRACTICE AT RIFLE RANGES.

333.* In practice at a range by military organizations it is indispensable that the regulations for practice should be carefully prepared and strictly enforced. Safety, accuracy in marking, and, above all, the avoidance of delays (a point to which particular attention must be paid) can alone be secured by having all officers thoroughly familiar with the prescribed regulations.

334.* The regimental Inspector of Rifle Practice or (in default of such an officer) an officer especially detailed for the purpose, should be charged with the entire management of the targets, markers, and scorers, and should be held responsible for all delays or errors on the

ground.† He will also assist the squad commanders in instructing and correcting the practice of their men.

335.* Before the firing commences, the markers and look-out men should be posted, and a large red flag hoisted upon the flag-staff in the range. These men, when not attached to the range, should be detailed beforehand, and marched to their positions as soon as their party reaches the ground. If a guard is required, it should be posted in the same manner. Proper reliefs should also be provided from men who have completed their practice in time to allow those on duty to shoot.

336. Printed orders should be furnished to both officers, markers, and look-out men, at the time they are detailed, in the following form, and care be taken that such orders are understood.

ORDERS FOR THE SENIOR OFFICER AT EACH
FIRING-POINT.

337. Not to allow any practice to take place until the large red flag is hoisted on the main signal staff, and the sentries or look-out men

† For regulations for individual practice upon a range see Appendix, page 193.

are posted, to prevent persons from crossing the range and give notice of danger.

338. To inspect the markers and register-keepers before they take their places, and see that they are provided with all requisites and properly instructed.

339. To see that the markers and sentries are properly instructed in time, and that they are afforded an opportunity of firing.

340.* To see that the men do not load except at the firing-point, and then that they keep at a "*ready*" until they have fired.

341. In all important competitions, to see that each man's trigger is tested at least once during the practice.

342. To see that the squads firing are properly equalized.

343. Not to allow a man to fire until the shot of the previous man (should it strike the target) has been signalled.

344. To order the "*Cease firing*" to be sounded, and the "*danger*" flag to be hoisted at the firing-point, immediately the red flag is raised from the marker's butt, or any person or animal appearing in front of the firing party, and *on no account* to allow any firing to proceed so long as the danger flag is up at the marker's butt. When this flag is lowered, to order the

“*Commence firing*” to be sounded, and the “*danger*” flag at the firing-point to be dropped.

345. On the ranges, situated in pairs, to see that the parties fire by classes at the same distances, and not one class in front of another.

346.* When the “*Cease firing*” sounds to see that the firing at all the targets which are within one hundred feet of the target at which the “*danger*” flag is displayed is discontinued until such “*danger*” flag is lowered, and the “*Commence firing*.” is again sounded.

347.* To be most particular in cautioning his men that they will be almost certain to injure the marker if they should fire on a wrong target and the trap be open, and whenever a man fires on a target different from that to which he is assigned, to debar him from further practice and report him to the commanding officer.

348.* To see that all persons who desire to watch the practice stand to the rear and clear of the party, and on no account to allow any noise or talking among the men, whose attention should be fixed on the practice.

349. To be most particular that the men keep their places in the ranks while the practice is proceeding, to allow no irregularity, and to be alert to prevent accidents.

350. To see that the proper discs are used by the markers.

351. To use his best endeavors to prevent delays, and forward the progress of the firing.

ORDERS FOR THE MARKERS.

352. To see, on taking their places, that they are properly supplied with flags or discs, brushes, paint, etc., and when ready to wave their red flag and withdraw it.

353.* To see that the following flags or discs are raised to signal the position of the shots which strike the target, and the "*ricochet* and *danger*," or "*Cease fire*."

1. Black disc or white flag—outer.
2. White disc with black cross, or similar flag—inner.
3. Red disc or dark blue flag—centre.
4. White disc, or red and white flag—bull's-eye.
5. Red flag waved horizontally twice to and fro in front of the target—*ricochet*.
6. Red flag—*danger*, and cease firing.

354.* To see that the signal flags are invariably waved when the wind blows directly up or down the range; and (where flags only are used) whenever a shot strikes the target to the right of the centre, that the flag denoting its

value is inclined to the right, and *vice versa* ; also, when a shot strikes the target high, that the flag is high as possible, and upright ; and when low, that it is raised only high enough to be easily visible above the butt ; and when using the disc that it is placed immediately in front of the hit on the target.

355. To see that the "*danger*" flag is hoisted whenever it is necessary to cease firing, to recolor the target, or for any other purpose ; and to allow no one *on any account whatever*, to leave the marker's butt until the "*Cease fire*" has been sounded, or the "*danger*" flag has been raised at the firing-points *in answer* to the "*danger*" signal ; also to see that the red flag is kept up (and waved so as to attract attention) so long as the markers are out of the butt, or any person is in the line of range.

356. To see that the "*danger*" flag is lowered directly the range is clear.

357. To allow no person to enter the marker's butt, except those on duty, without an order from the senior officer on the range, nor to allow any one to enter or leave the butt except by the regular path.

358. To check all talking or noise in the marker's butt.

359. To see that the "*danger*" flag is hoisted

and shaken about immediately, any of the look-out men either hoists his flag or gives notice that persons or boats are within the line of fire, and that it is kept up until the range is clear, and the look-out man lowers his flag.

360. When the firing is at long range, to see that all persons in the marker's butt stand as close as possible to the slope most distant from the target, to avoid the chance of being struck by the bullets when falling.

361. At the first signal to "*Cease firing*" to put out the "*danger*" flag, but not leave the butt. At the second signal, to place their flags, etc., in the proper place, fall in, and return to their command.

362. To report all damage done, or repairs necessary for firing discs, flags, etc.

ORDERS FOR LOOK-OUT SENTRY.

363. To look out carefully, and the instant any person or animal appears at , going towards or along the shore (when firing seaward), coming from , to hoist the red flag and call out to the non-commissioned officers in the marker's butt, in a loud voice, "DANGER," and to keep his flag flying until the said person has passed to the (according to the direction in which

he is proceeding). The same precaution to be observed in respect to boats passing close in-shore in the line of range.

364. To give notice to all persons who may be about to pass the range that they are in danger while the firing is going on, and to signal them back.

365. In the performance of his duty (more particularly during the execution of the platoon and skirmishing practices), to keep as low as possible to avoid the risk of being hit by a ricochet shot.

366. To return to his command at the second signal of "*Cease firing*," as prescribed for the markers.

367.* The marker in the butts, if not a marker belonging to the range, should invariably be a non-commissioned officer of *a different company from that engaged in firing*, and is responsible that the correct signals are given to the several shots which strike the target.

368. The firing parties should not consist of more than twenty men each, and only one squad should be allowed to practice at a time for each target available. Such detailed arrangements should be made as will ensure the various squads being at the firing-points by the time those firing have finished their practice, and

thus prevent delay. When exercising by classes, if there be a choice of time for practice, the senior class is always to have the advantage.

369. The men's names are to be entered in a blank return before going to the practice-ground, in the order in which they stand in the ranks. One blank will answer for the squad assigned to each target to record the performances at two distances.

370.* During the practice, an officer or non-commissioned officer is to keep the register, and will, as each shot is signalled, call out its value and the name of the firer. Any objection to the marking must be made before the second shot is fired.

371. All entries during competitions or practice for final classification should be made *in ink* on the practice-ground; should any alteration become necessary, a fine line is to be drawn through the figure or letter, and the correction made adjoining it, the initials of the company officer keeping the register being immediately attached to it (*thus, 3: A. L.*), to verify the circumstances. Inattention to this regulation, or an erasure (which is prohibited), should invalidate the register. This rule should be adhered to in all cases to prevent complaints.

PRACTICE.

372.* As soon as the markers are posted, the officer will cause the company, formed in two ranks, to take position fifteen paces in rear of the firing-point, and will cause them to "*stack arms.*"

373.* (1878.) He will then divide them into as many squads as are convenient, who will fire in turn, those not firing being exercised with indicators or in estimating distances.

374.* The officer will then direct the drummer or bugler (who is to be placed on the right of the firing-point), to sound the "*Commence firing,*" and so soon as the "*danger*" flag is lowered at the target, he will order :

1. *First file on right.*
2. *Take.*
3. *Arms.*
4. *Forward.*
5. MARCH.

375.* The first file will "*take arms,*" place themselves at the firing-point one pace apart, and halt. The front rank man will then "*load*" and "*fire.*" So soon as the officer sees that the shot, if a hit, is signalled, he will command "*All clear,*" when the rear rank man will "*load*" and "*fire,*" The file will in this way fire alternately until they have expended the prescribed number of shots, when they will "*carry arms,*" and move by the right flank and

place themselves three paces in rear of their former positions in the ranks, and, as soon as their four is made up, "*stack arms.*"

Each file in succession will be ordered to the firing-point in a similar manner, being directed to "*take arms*" before those firing have completed their scores.

376.* When each stack is broken, the file remaining in ranks will hold their pieces so as to be ready to take their positions at the firing-point without delay. For the same reason, the men will be cautioned to have their cartridges in readiness when their turn comes to load.

377.* The instructor should caution the men before firing in regard to the wind and elevation, and to correct any defects in their position or practice, require them to perform the "*aiming drill*" (without the motions), several times. While requiring the men to be prompt in taking their positions at the firing-point, he should also require the practice to be as deliberate and careful as possible, impressing upon all that nothing is gained by mere expenditure of ammunition. He will be cautious not to check a man for any error at the time he is firing, as it would tend to distract his attention; but after he has fired give him such directions in regard to his elevation or position as may

be required. Each man must use his own rifle.

378.* Particular care should be used to caution the men that if they fire upon the wrong target they not only lose their shot and be debarred from further practice, but will be extremely likely to injure the marker. As this is done from carelessness and may lead to serious accidents, it should, if repeated, be punished.

379.* No loading should be allowed, except at the firing-point, and then in the position of "ready," the muzzle of the rifle being kept to the front.

380.* No man should be allowed under any circumstances to aim his rifle at another whether loaded or not.

381.* If the danger signal is displayed, or the command "*danger*" given, after a man has loaded, he will bring down his piece and throw open the breech-block, to avoid all danger of an accidental discharge. If the firing is suspended for any length of time, he will remove his cartridge. *This rule is general, and should be strictly enforced.*

382.* Where a range is to be used by a large body of troops within a limited time, they may be sent there by brigades, two or more companies from each regiment going upon each

day, under a Field Officer of the Day, each detachment being accompanied by the regimental Inspector of Rifle Practice, and the entire practice being under the direction of the brigade Inspector.

383.* When the transportation is by rail, the troops should report to the latter at the depot, who will there assign the targets available for practice among them in proportion to their strength, giving to each regimental Inspector a blank return of practice, (See Form IV.) for each target assigned to the troops of his regiment, which will be filled up on the train in the order in which each squad stands in the ranks, commencing on the right. The brigade Inspector will also attend to the arrangements for transportation, giving the necessary receipts.

384.* Upon arriving at the range, the ammunition for each detachment will be issued, a box (20 rounds) for each file; and the companies marched to their several firing-points, and at once commence practice.

385.* Each detachment should bring with it a guidon, which will be planted 15 paces in rear of the firing-points, forming a line, on which the arms are stacked, and which all spectators are required to keep in rear of.

386.* Upon the completion of the practice at

each period, the returns of each squad will be signed by the company commanders, and delivered to the regimental Inspector of Rifle Practice, who will report the number of men qualifying to shoot in the next class to the brigade Inspector, who will thereupon assign the necessary targets and cause the requisite blanks and ammunition to be issued as above prescribed.

387.* Upon the completion of the practice of each brigade, requisitions for the ammunition receipted for upon the range should be made out on behalf of each regiment, and forwarded through the regular channels.

388.* In order to secure a high rate of efficiency, and to ensure the proper value being attached to the possession of the "Marksman's badge," special care must be exercised to see that the scoring is correct and impartial; that no alteration in the register is allowed; and that the practice conforms strictly to these regulations.

389.* Any alteration in the size of the targets, placing marks to denote the allowance for wind, firing at less than the prescribed distances, allowing one man to shoot in the name of another, or adopting any other deviation from the spirit of these regulations, by which alone a fair comparative merit can be arrived at, should be

carefully guarded against, and severely punished if detected.

390. Whenever a bullet strikes the target so that the circumference of the mark cuts the outer edge of the bull's-eye or centre, such shot is to be counted, in all practices, as hitting the bull's-eye or centre, as the case may be. No shot is to be counted in any practice where the mark of the bullet, in part or the whole, is not seen on the face of the target.

391. The signal for "*danger*" or "*Cease firing*" is in all cases to be a *red flag*. This will be hoisted whenever it is necessary to cease firing, to re-color the targets, or for any other purpose. No man is on any account to leave the marker's butt until the "*Cease firing*" has been sounded or the danger-flag raised at the firing-point in answer to the "*danger*" signal.

392. The red flag is always to be kept up as long as the markers are out of the butt, or any person is in the line of range.

393. Whenever the "*Cease firing*" is sounded from the firing-point, it is to be immediately answered from the marker's butt by raising the "*danger*" flag; and in like manner the "*Commence firing*" is to be answered by lowering it. *On no account is a shot to be fired when the*

danger or trap signal is up at the marker's butt.

394.* Ricochets, or shots which strike the ground before hitting the target are to be signalled by waving the red flag *twice* to and fro in front of the target, and are to be counted as misses in individual firing, but noted in the register by the letter R. As these shots make an oblong mark on the target, the outer edge of which is an ellipse, while a direct shot makes a star, they can easily be distinguished.

395.* Whenever the target accommodation will allow, men who fail to qualify in any class should be required to shoot over.

When any man makes less than twelve points at the first distance, in any class, he should be required to shoot such distance a second time.

PART VIII.



ARTICLE I.

TARGETS.

396.* The regulation size of a single target should be six feet in length by two in breadth. If possible, it should be constructed of iron of sufficient thickness to be rifle-proof, having lines six inches apart cut on the face to facilitate the marking off of the hits on diagrams provided for the purpose, and also to serve as guides in painting the sub-divisions.

397.* (1878.) Ordinary whitewash, with a handful of salt dissolved in each pailful, is preferred at Creedmoor to color the targets *white*.

398.* (1878.) At foreign ranges a pound of size, dissolved by heat, is added to a mixture of whiting and water, the paint being made of the consistency of paper-hanger's paste. This should be put on warm. It is claimed that the size prevents its washing off on a wet day and keeps the target white. In dry weather it is more apt to peel off than whitewash.

399.* (1878.) The lines describing the divisions on the targets (which should not exceed half an inch in width) should be painted with coach black, mixed with turpentine and a very little boiled oil. The "bull's-eye" should be colored *black* with lamp-black mixed with sour beer or turpentine. Pots of these paints should always be kept near the targets.

400.* All iron targets are placed upon a wooden platform (twenty feet by nine inches), set at right angles at line of fire, and should be braced from the rear. When in use they are to be as perpendicular as possible. The edge of this platform should be faced with iron, to protect it from the "splash."

401. Care must be taken to prevent injuring the targets in lowering or raising them, and on no account should they be allowed to fall. They should be periodically painted, and when laid down should be placed on an incline, to prevent the rain lodging on them.

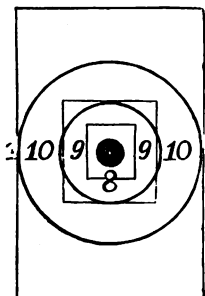
402. No attempt is to be made to measure any "string" of the shots made; therefore, to insure either correctness or comparison of records, the regulation size of target should be strictly adhered to, although different materials may be used in their construction.

SIZES AND CLASSES.

403. The targets are divided into

FIRST, SECOND, AND THIRD CLASSES,

which are made by uniting the necessary number of single targets.†



THIRD CLASS.—2 Targets.
(6x4 ft.)

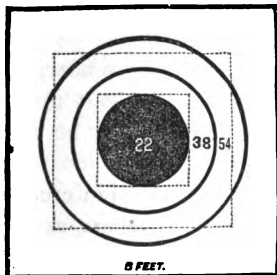
Bull's-eye, 8 in. in diameter.

Centre, - 26 " "

Inner, - 46 " "

Outer, remainder of target.

Nº2



404. (1878.) SECOND CLASS.—3 targets.
(6x6 ft.)

Bull's-eye, 22 inches in diameter.

Centre, 38 inches in diameter.

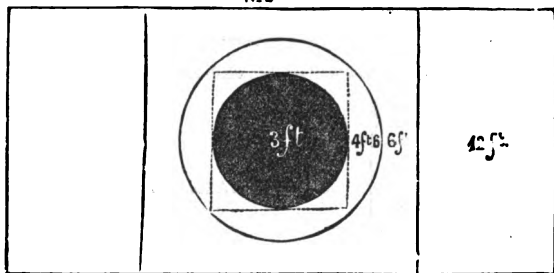
Inner, 54 inches in diameter.

Outer square, 6x6 ft.

† These targets are those adopted by the National Rifle Association in 1877, the dotted lines showing the divisions formerly in use.

405.*—THIRD CLASS.—6 targets. (6x12 ft.)

NO 3



| | | | | |
|-------------|---|---|---|----------------------|
| Bull's-eye, | - | - | - | 3 ft. in diameter. |
| Centre, | - | - | - | 4½ ft. “ |
| Inner, | - | - | - | 6 ft. square. |
| Outer, | - | - | - | remainder of target. |

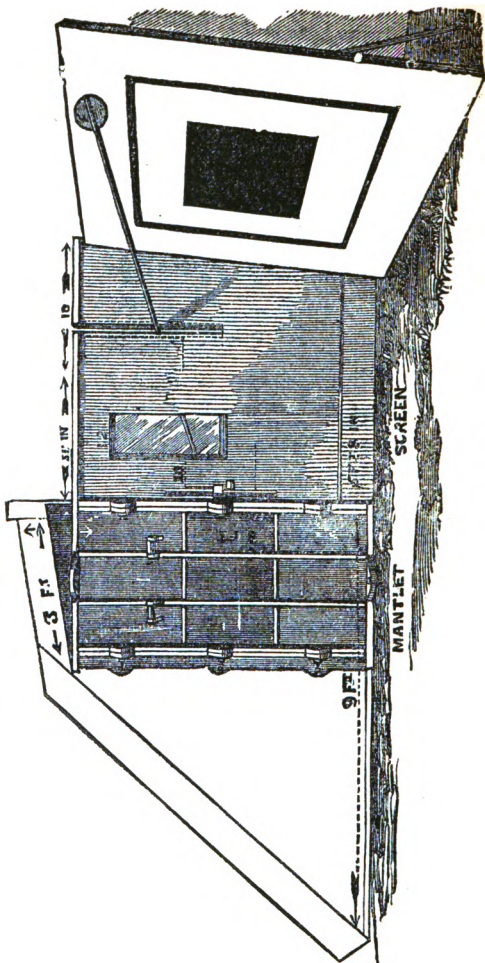
406. During the practice of a company a fatigue party of at least six men should be detailed daily, under the charge of an officer, to fix and clean the targets, act as look-out men, and perform such other duties as may be required.

407. The main point to be observed in erecting targets is, to so place the markers as to enable them to at once observe every bullet striking the target, and to signal and erase it without delay, and with safety to themselves.

408. As a bullet striking an iron target melts so

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TILDEN FOUNDATIONS.



that it is thrown in spray with great force, it is necessary that the markers should be either placed in a pit some distance to its front, or else be provided with some special shelter.

409.* The following is a description of the various systems used for this purpose:

HILL'S MARKING BUTT AND MANTLET.

410. This consists of a shot-proof hut, erected on the side of the target, away from the sun (so as to avoid casting a shadow upon the target itself), which has on the side towards the latter a window of $\frac{1}{2}$ -inch plate glass, and has also a narrow slot, 2 inches in width, extending down that side in front of the window, to a point 3 feet 6 inches from the top.

411. The marker is able to see through this window every shot that strikes the target (a distinct mark the size of the ball being produced), and is protected by the glass from flying splinters. He is furnished with a series of discs (Paragraph 421), having a paint-brush attached to their reverse side, and fastened to a long handle which passes through the slot cut in the side of the mantlet. By placing the disc over the mark of the shot it is obliterated with the brush, at the same time that the result is signalled to the firing-point by the disc itself.

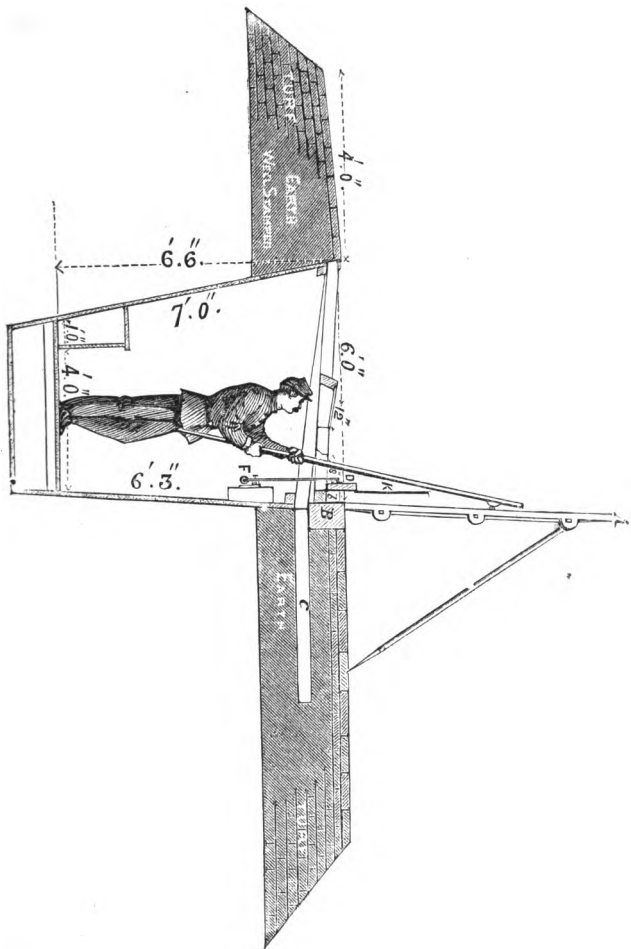
412.* This butt was found objectionable at Creedmoor, from its casting a shade upon the targets. Several markers were also slightly cut by the splash flying through the slot. It also affords no way of communicating with or relieving the markers, without stopping the firing, and is extremely hot in summer. Its use is not, therefore, recommended.

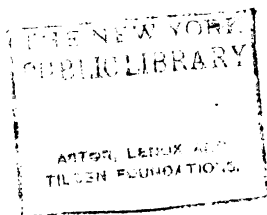
SCOBLE'S MARKING BUTT.

413.* (1878.) The following is a description of the most approved butt used at Creedmoor.†

Excavate a trench 5 feet deep, 6 feet wide at top, 5 feet wide at bottom, with a drain 1 foot deep. Wall inside with 2-inch plank securely spiked to 4-inch by 6-inch scantling, placed 4 feet apart, well sunk into the ground at bottom, and held apart at top by 4-inch by 6-inch joists, well spiked on. Make a seat 1 foot 6 inches from floor and 1 foot wide. Lay a roof of 2-inch plank over these joists; cover the 2-inch

† The author, when engaged in laying out Creedmoor, was indebted for this description to Lt.-Col. T. C. Scoble, the then Secretary of the Ontario Rifle Association, and these butts have since been known as the "Scoble butts."





plank with $1\frac{1}{4}$ inch spruce flooring; at opening (E) frame in a window of 1-inch plate-glass 12-inch by 24-inch (double this length for first-class targets), 8 inches in front of trap door, the front edge of glass level with roof, back part to be raised 3 inches. An iron trap-door (D), $\frac{3}{16}$ inch thick (8x36 inches for second class targets, 12x48 inches for first class) should be hung with (T) hinges on a 4x6 timber spiked to target bed, close to roof. Trap to be provided with 4-foot lever handle strongly bolted through plank, and provided with a counterweight (F), sufficiently heavy to balance trap when up. The target platform (B) to be of 12-inch by 12-inch timber (oak if possible), chamfered off at front upper edge, covered with angle iron, resting on stringers (C) of 4-inch by 4-inch scantling placed 4 feet apart and solidly bedded in bank. A strip 1-inch by 3-inch to be nailed to platform in rear of target. The earth taken from excavation to be thrown in front and rear of target platform, and well stamped and riveted with turf. There must be at least 4 feet of earth in rear of the marker's butt. Entrance into butt from a trap-door at one end, or steps in rear. Butts for 1st class targets must be 12 feet; 2d and 3d class targets, 8 feet long.

414.* In building these butts, the larger they

are the better, as they can be used for store-rooms, and are more convenient for all purposes. At Creedmoor they are continuous, so as to make a covered way in front of all the targets. They should have windows at each end to give ventilation, and doors every hundred feet, opening in rear of the targets. In winter they will require to be braced on the inside to prevent their being affected by frost.

415.* A wooden shield should be placed between each target to keep the splash from flying into the trap of that adjoining. This should be 6 feet high, and project about 18 inches in front of targets.

416.* To prevent any firing when the trap is up (the only way the marker in these butts can be injured) a triangular danger (red) disc should be fastened to the cover of the trap-door, so as to be elevated when that is raised. *No firing should be allowed at any target as long as this trap signal is in sight.*

417.* In wet weather the rain collects on the glass of the window so as to obscure the view of the target and prevent correct marking. A small hole on the underside will avoid this partially; but great care must be taken to arrange it so that the "splash" cannot enter it and injure the marker.

418.* At Wimbledon canvas targets have been substituted for iron slabs. A trench is dug as in the Scoble butt, but without a roof. The target is composed of canvas stretched over an iron frame having a knife edge, the outside being flat, the inside angular, so as to glance all shots into the target. This is suspended like a window sash in an iron framework, and is raised and depressed by a lever. Attached to the target, and serving as a counterpoise is a "dummy" target formed of wire network.

419.* When a shot strikes, the marker attaches the proper disc by a hook in the place upon the dummy target corresponding to the shot hole, and lowers the target, the dummy rising as the former falls, and the disc indicating the position of the hit to the firing-point. He then looks a small disc *into the bullet hole* in the real target, and raises the latter to its proper position, the latter disc correcting any error that may have been made in the position of that attached to the "dummy." When the target is struck a second time the first shot hole is covered by pasting on a paper patch, and the small disc hooked in the last shot hole.

420. (1878) These targets were first introduced at Wimbledon in 1874, and in that

climate have given satisfaction. After a careful trial at Creedmoor they have been abandoned. It is only in wet weather that they have any advantage over iron targets, and that does not occur in America with sufficient frequency to make up for their other defects. The marking upon them is slower, and there is no check upon the marker, the impact of a shot making no sound, and the telescope not showing the shot mark. The close watch which is required to be kept upon them causes a great strain upon the eyesight on a bright day, and, even with careful markers, shots sometimes slip through them without being noticed. While this may be to a certain extent overcome by covering them with light sheet-iron or zinc, yet the iron targets give much better satisfaction.

Targets of brown sandstone have been issued in New York with good results. They are cheaper than iron slabs, but their weight makes their transportation more expensive. They wear out rapidly when used as third-class targets, but for first and second class they stand well. They appear whiter in wet weather than iron slabs.

421.* The discs consist of circles of No. 24 sheet iron, 2 feet diameter for 1st class, 1 foot 6 inches diameter for 2d and 3d class targets.

These are let into handles $1\frac{1}{2}$ inch diameter, sawn down at one end to receive them. When Hill's mantlet is used, the handles are, for second class, for an outer, 12 feet 6 inches; centre or inner, 10 feet 6 inches; bull's-eye, 8 feet 6 inches; for third class, for an outer, 8 feet 6 inches; centre or inner, 7 feet 5 inches; bull's-eye, 6 feet. When the Scoble or any other pit system is used, the handles may be shorter, as 8 feet for 2d and 3d class, and from 8 to 10 feet for 1st class targets. They are painted black for "outers," black, with a white circle or cross, for "inners," red for "centres," white for "bull's-eyes." A brush (No. 20) with 3-inch handle is fixed through centre of disc, which, being full of paint, obliterates the mark of the shot while the disc indicates its position.

422.* By either of the above methods it is impossible for a mistake to be made in marking, (there being but one shot-mark on the target at a time), and no time is lost in "washing out;" while under any other system, where the markers have to leave their cover to obliterate the bullet-marks, delays are frequent and accidents unfortunately will occasionally happen.

423.* When iron targets cannot be obtained, and only the *third-class* size are required, the following style, devised by the author, may be

used, being cheap, easily transported, and found to work well in practice. It will, however, probably be too cumbersome where more than four feet in width is required :

THE REVOLVING TARGET.

424. This consists of two targets six feet long by the requisite width, placed end to end, and composed of a light framework covered by half-inch boards, on which is tacked a piece of white pasteboard, having the proper sub-divisions painted on it.

425. In using this target, the marker's pit should be about eight feet long by four wide, and be dug where the target is to be placed. If upon a side hill, five feet will be deep enough, if the dirt be thrown toward the firing-point so as to make an additional cover. If the ground is level, the dirt should be thrown the other way, and consequently the pit should be a foot and a half deeper.

426. Where the shooting is at the longer ranges the pit should be a little deeper and the markers be directed to keep as far away from the target-edge as possible.

427. A beam is placed at the rear of this pit with one end projecting six inches over its

rear edge. To this the centre of the targets is fastened by a screw passing through the division line so as to permit them to revolve, the other end of the beam being pinned down to the ground. If the targets are placed so as to overhang a bank, the beam can be put in front of them; but in that case it should be sunk below the level of the ground, as a bullet will often strike it when above, and mislead the markers.

428. By this system one target is exposed to view while the other is in the pit. When a shot is fired the markers, being directly in front of the target, know from the sound whether it has struck. If it has, one of them at once turns the target, which brings the one with the shot hole into the pit, and raises the other into its former position. He then covers the shot hole by pasting a paper seal (such as are used by notaries) over it, while his companion elevates the proper disc to signal the result of the shot, the firing proceeding without interruption.

429. By use of this target there is no occasion for the markers to lift their heads over the level of the ground, and but little opportunity for errors in marking.

430.* Where either of these targets are used *ricochet* butts are not required, as the markers,

being so near the target, can distinguish them by their making a different mark from a fair hit. In other cases a shelter should be provided 95 yards from the target, in which a marker should be placed to signal those shots which strike the ground and ricochet.

FRAME TARGETS.

431. When larger targets are desired, a frame may be made, composed of four pieces of wood 6 inches wide and 1 inch thick, the ends of the vertical side projecting about a foot below, and sharpened.

432. This frame may be covered with thin boards or muslin, and held in place by four guys fastened to the top and attached to pins in the ground in front and rear. Shot holes are to be covered by pasting seals or patches of paper, which strengthen and thicken the target so that it will last longer than would be expected.

433. In using this target the markers will be placed in a pit at its foot. After every five shots they will hoist the danger signal, and then rise and obliterate the shot holes—firing only being permitted when the flag is down.

TARGETS FOR VOLLEY FIRING.

434. (1878.) The impact of a large number

of bullets striking a target at once strains the iron slabs severely, and the " splash " from them is extremely destructive to the glass windows in the butts. It is therefore cheaper to have a wooden target covered with paper for this practice. If iron targets are used a wooden covering should be placed over the glass windows before firing.

PART IX.

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ARTICLE I.

RANGES.

435. The first point to consider in regard to a range is its safety, and too much pains cannot be taken in the selection of the ground in order to protect the public from danger, as well as to prevent unnecessary expense in the erecting of butts, etc.

436. While it is impossible to lay down precise rules for every feature of a country, the following suggestions will be found sufficient under ordinary circumstances :

437. No ground is to be selected which does not afford a range of at least 300 yards, and it is most important that the ground behind the targets should be thoroughly commanded from certain points sufficiently clear of the line of fire to ensure safety to the look-out men who

are to be placed there in order that the firing may be easily stopped when necessary: hence a range down hill is generally to be preferred, as being more easily commanded to one uphill.

438. The targets upon a range should, where the ground permits, be established by pairs, with an interval not less than ten yards between each target, and with a margin of at least 40 yards at the sides; the minimum breadth of ground for a pair of targets should be 90 yards, and all the targets should be on the same line

439. When, however, the number to be exercised in rifle practice is large, and the breadth of ground limited, a number of targets may be established, with an interval of ten yards between each, to be used as if for a pair, a margin being left at the sides of the outer targets of at least 40 yards. In these cases the number of each target should be conspicuously placed upon the butt in rear of it so as to be plainly seen from the firing-point, and the firing should be stopped at all the targets whenever the danger signal is shown at any target within 40 yards.

440. The breadth of ground in rear of the target at each side of the outer ranges should gradually increase from 40 to 80 yards, when

the ranges are parallel; but when they converge towards the targets, the breadth may or may not be required, according to the degree to which the ranges are made to converge. The distances at the targets must never be less than ten yards between ranges in pairs, and eighty yards between pairs of ranges, whether they are laid out parallel to each other or converge towards the targets.

441. If no butts are erected, and the ground is level, the space behind the targets should be about 1,500 yards. A less distance may, however, answer, if butts are erected, or if a steep hill rises in rear of the targets. Before steps are taken to procure ground for ranges, it is essential to secure the right to fire over the land behind the targets to the extent required, should it not be desirable to purchase it.

442. Generally, this distance cannot be obtained, and a butt must be erected in rear of the targets, to arrest stray shots. The height of this must differ according to the nature of the back-ground. If the range be on a plain, the regulation size of the butt is from 35 to 40 feet high, provided the distance behind the target is less than 1,500 yards. Under ordinary circumstances, however, the height of the butt need not be more than 20 feet, and when firing

towards water a butt of 12 feet in height will be sufficient.

443. On some ground there are found natural butts for the targets to rest against. To be of use in stopping stray bullets, and thereby ensure the safety of the public, the hill should be at an angle of 45 deg. at least; if at a smaller angle than this, it would, instead of acting as a stop, incur the chance of a ricochet, and therefore be unsafe. A few furrows from a plough will frequently lessen the chances of ricochets.

444. The length of the butt for a pair of targets should not be less than 45 feet, measured along the top. They are far inferior to natural obstacles, and are expensive to erect and keep in repair.

445.* The number of each target should be placed on the butt directly over it in large figures, so as to be conspicuous from the firing-points. Where there are a number of targets these numbers should be painted red and black alternately. At long ranges Roman figures, made by laying rails on the butt, are more easily discerned than numerals.

446. In crowded localities, where the range is short, and the danger of injury to the public great, a series of shields or screens may be thrown across the practice ground at different

distances, containing apertures of such a height and width as to permit the passage of all properly directed bullets, and to arrest random shots. These are sometimes high arches of cast-iron, and sometimes upright barriers of stout plank. Two or three sheds with plank roofs, made to slope *towards* the target, form a cheap and convenient screen, provided the ground between them is furrowed so as to prevent the ricocheting of the bullets which strike the sheds and glance downwards.

447. In the longer ranges, these shields are objectionable, not only because the high trajectory of the bullet makes it difficult to place them properly, but because they confine the firing to a single distance, and render the appearance of the target as visible through the apertures so different from what it presents in the "open" as to deprive those using them of many of the advantages that should be derived from target practice, and particularly from acquiring a practical knowledge of distance.

448. If care be taken that none be allowed to practice with ball who have not been through a course of "*position and aiming drill*," the danger of random firing will be reduced to a minimum, and the prescribed butt be found amply sufficient for all practical purposes.

449.* Every range is to be carefully and accurately measured, and the distances defined by a line of small pegs, at intervals of 50 yards, commencing at 100 yards from the target, and continuing to 900 yards, or to the extent of the ground, if under that distance.

These pegs also serve as guides to prevent firing on a wrong target—a fruitful source of accidents.

450. To avoid the sun, the targets must be placed at the northern end of the range; or if that is not practicable, at the eastern.

451. In using the ranges the firing parties commence their practice close to the targets and gradually retire. Consequently, as there is not likely to be as much practice at the extremely long ranges as at the shorter ones, a piece of ground of a triangular shape may be selected for an extensive range, the targets being placed at the broadest part, and the firing-points being reduced as the distance is increased.

452. Several flag-staffs should be placed in such positions upon the range as to make the danger signal so conspicuous when hoisted upon them as to give notice to all passers-by that firing is going on. Smaller flag-staffs should also be provided at each look-out sta-

tion. A danger flag should also be provided for each firing-point, to be elevated in answer to the danger signal, as hereafter explained.

453. Several flags should be erected above the top of the bank in rear of the targets during the practice, together with one midway upon the range, to show the direction of the wind.

454* A wooden socket should be set in the ground in front of each target, in which the marker should place the staff of his danger flag when obliged to leave his mantlet for any cause. This should be set at an angle so as to display the flag clearly.

455. (1878.) A danger signal composed of a square frame covered with canvas is preferable to a flag.

456. (1878.) In selecting a range accessibility is of the highest importance. This should never be sacrificed to secure a long range.

ARTICLE II.

ARTICLES REQUIRED FOR RANGE.

457. The following is a list of the articles required for practice upon the range by a single regiment :

| | |
|--|---------|
| Iron targets, 6 feet by 2 feet, complete* | 8 |
| Flags (when used), Red, 6 feet square (for flag-staff) | 1 |
| “ “ Red, 3 feet by 4 feet (danger) | 4 |
| “ “ Red and white, $2\frac{1}{2}$ feet square | 4 |
| “ “ Dark blue, $2\frac{1}{2}$ feet square | 4 |
| “ “ White, $2\frac{1}{2}$ feet square | 4 |
| Poles—lance, 10 feet long | 22 |
| Discs (when used), Red flag, danger and for flag-staff (as above) | 2 |
| “ “ Black and white disc, 18-inch diameter, 3d class, 9-inch | 4 |
| “ “ Red disc, 2d class, 18-inch in diameter; 3d class, 9-inch | 4 |
| “ “ White disc, 2d class, 18-inch in diameter; 3d class, 9-inch | 4 |
| “ “ Black disc, 2d class, 18-inch in diameter; 3d class, 9-inch | 4 |
| Poles, 1 $\frac{1}{4}$ -inch, for 2d class; for outer, 12 feet 6-inch; centre, 10 feet 6-inch; bull's-eye, 8 feet 6-inch | 22 |
| Poles, 1-inch, for 3d class; for outer, 8 feet 6-inch; centre, 7 feet 6-inch; bull's-eye, 6 feet | 22 |
| 90 yards Gunter's chain or cord, labelled every 5 yards, and numbered from 1 to 900, divided into 18 equal parts | 1 |
| Pins of stout wire, 12 inches long | 18 |
| Stadometer complete, with 20 yards of chain, cross-staff and tripod for stand | 1 |
| Tripod rests | 2 |
| Sand-bags, bushel | 2 |
| Large brushes for coloring targets, 1 lb | 4 |
| Small brushes for coloring target (sash tools) | 4 |
| Whiting, fine, without lumps (annually) | 1 cwt. |
| Lampblack | 15 lbs. |
| Glue, to make size | 42 lbs. |

* These targets are joined together to make the size prescribed for the different classes.

PART X.



PRACTICE WITH INDICATORS.

458. (1878.) Whenever *Wingate's Indicators for Aiming Drill* are issued to any organization, they should be used in place of candle practice. These consist of a square steel rod, (see cut) which is propelled from the barrel of a rifle by the blow of the firing-pin. The rod passes through a square hole in the centre of a tompon, and its butt is inserted in a short wooden cylinder, the diameter of the bore, which causes it to move in a true line with the centre of the barrel. A pin at the end projects upward and forward in front of the foresight. When the rod is thrown out of the barrel this pin is carried forward in a line with the foresight and strikes the object upon which the latter is aligned, as a bullet would do if the rifle was fired.

They can be used in all rifles having a main spring of a force corresponding to those of the Springfield or Remington.

459. (1878.) The targets should be printed on thin card board. They should be scaled to represent the regulation targets at 150, 300 and 400 yards. (See cut.) A smaller size should be used for private practice by good shots.

In practice the targets should be inserted in sockets placed 3 feet apart, upon a strip of

INDICATOR FOR AIMING DRILL,

Invented by COL. GEO. W. WINGATE, General Inspector of Rifle Practice, State of New York.

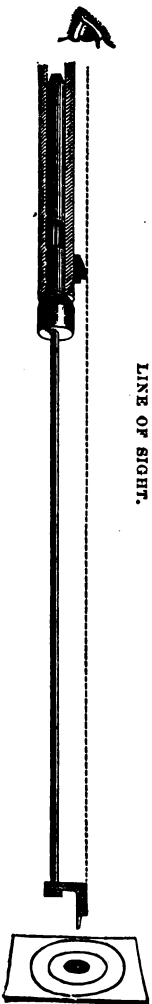


POSITION IN RIFLE, BEFORE FIRING.



POSITION AFTER FIRING.

LINE OF SIGHT.



a, brass plug; *b*, wooden butt; *c*, square steel rod; *d*, brass tompon; *e*, cap to tompon, (pierced with square aperture to fit rod); *f*, pointer.

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hard wood, suspended by hooks from the wall of that part of the drill-room where the best light for aiming exists. This strip should be raised or lowered as required for practice in the different positions. In the standing position the targets are required to be from 5 feet to 5 feet 6 inches from the floor. In kneeling, 2 feet 6 inches, and in lying, 12 inches.

A movable frame may be used to hold the targets, instead of hanging them upon the wall. It must, however, be constructed so solidly that the blow of the indicators will not cause it to vibrate.

460. (1878.) When the wood behind the target sockets becomes so much indented by the blows of the indicator as to cause its point to make a ragged hole through the card targets, the position of the latter should be shifted. This, however, will seldom be required.

461. (1878.) The indicators should be suspended by the side of each target socket. They should be oiled before being used, and great care taken to prevent their being bent or bruised. They should only be used in a rifle having a clean barrel, free from any gummed oil or other matter likely to cause friction.

462. (1878.) The blow from the hammer of an ordinary military rifle should throw the in-

indicator nearly its entire length out of the barrel. If one is observed not to work freely, the barrel of the rifle should be looked at. If that is clean, the indicator should be examined, and the defect corrected. Occasionally the wooden butt will swell or warp so as to cause friction, or a barrel be smaller than usual, a slight variation making a material difference in the friction. This may be obviated by reducing the diameter of the butt with sandpaper. If the brass plug at the butt becomes so much indented by use as to prevent the firing pin from striking its full blow, the former should be filed flat, or, if necessary, replaced.

The tompion should enter the barrel sufficiently to allow the rod to project a quarter of an inch beyond it when the butt is against the firing-pin. If it does not do so, its diameter should be reduced.

463. (1878.) Before the practice commences, a non-commissioned officer should enter each man's name upon a separate target, and insert them in the sockets in the order in which the men stand in ranks. The squad should be formed in single rank, 4 feet from the targets (which distance should be designated by a line on the floor), and dressed so that each man will be opposite his own target.

464. (1878.) The instructor will then command :

1. *Squad*, 2. *Take*, 3. *INDICATORS*.

Without further command each man will advance, take the indicator suspended by his target, drop it into the barrel of his rifle, and return to his former position. He will then adjust the indicator in his rifle by turning the tompion until the pointer is in line with the foresight. This he will be directed to verify by aiming his piece at the light or other bright object, when the pointer will be seen on one side of the foresight if it be not properly adjusted. When assured that the pointer is in line, he should press the tompion home so as to insure its retaining its position in the barrel, and the butt of the indicator touching the firing-pin. He will be instructed that when the latter is the case the rod will project about a quarter of an inch beyond the tompion.

465. (1878.) The instructor will then command :

1. *Squad as Skirmishers*, 2. *READY*;

when the squad will assume the position of *ready*, as described in paragraph 143. The instructor will caution the men that to insure contact with the firing-pin they should, *after cock-*

ing the rifle, raise the muzzle to a perpendicular position, with a slight upward jerk of the piece, at the same time observing that the breech block is not forced open by the falling of the indicator against it.

He will then direct them to fire the prescribed number of shots. This should be done independently, each man satisfying himself where his shot has hit before firing a second time, and coming to an *order* when his score is completed. The instructor should impress upon the men that if the indicator does not touch the firing-pin, the blow of the hammer will not affect it, and that they therefore should be careful, in coming to an *aim*, to avoid any jerk or abrupt motion of the piece which would have a tendency to throw it away from the firing-pin.

466. (1878.) At the conclusion of the practice, standing, the instructor will direct the targets to be lowered, and having caused the squad to assume the position of "*Ready—kneeling*," as prescribed in paragraph 146, will direct the practice to be continued from that position. The targets will then again be lowered, and the men required to lie down, as prescribed in paragraph 154, and the practice continued from that position.

467. (1878.) On the conclusion of the entire practice, the instructor will command :

1. *Squad*, 2. *Return*, 3. *INDICATORS*.

Each man will then remove the indicator from the barrel of his rifle, hang it up, and resume his position in ranks. If the tompon is too tight to be easily withdrawn with the fingers, the rod should be drawn out nearly to its full extent, and given several slight upward jerks, so as to bring the butt of the indicator smartly in contact with the base of the tompon until the latter is disengaged from the barrel.

468. (1878.) The instructor will then direct one or more non-commissioned officers to collect the various targets, and enter upon them from the shot holes the scores made by the different men (the shots being entered in the order of their value, the highest first), aggregate them, and assort the cards according to the relative value of the scores. They will then be handed to the instructor, who will announce the total scores in front of the squad.

469. (1878.) During the practice the muzzles of the rifles, in aiming, should be kept at from twelve to fifteen inches from the targets.

470. (1878.) The instructor will observe carefully the position of the different men, and

the result of their shots, correcting any errors that may exist, and pointing out, as far as practicable, the cause of any wild shots that may be made. He will be careful that the men understand how to adjust the indicators in their rifles, and will assure himself that they are in proper position. When the squad is large the non-commissioned officers and marksmen should be used as assistants during the practice.

471. (1878.) This practice should be performed during or at the end of each company drill, whenever practicable. Even although the limitation of time or the size of the company may oblige the individual instruction to be brief, the emulation excited by the announcement of the individual scores will make the practice valuable. At least once a month during the drill season each company should be divided into squads and thoroughly instructed in this practice, particular attention being given to the poorer shots.

472. (1878.) Commanding Officers and Inspectors of Rifle Practice should impress upon Company Officers that the want of familiarity with the kneeling and lying positions is the cause of the failure of many to qualify in the second class, and that the men should therefore

be frequently practiced with the indicators in these positions.

473. (1878.) Volley firing with indicators should be frequently performed, the men being in single rank and each opposite a target as above prescribed. In this practice the officers should study to acquire that method of giving their commands prescribed in paragraphs 304 to 307, which will secure the most uniform volley.

474. (1878.) Whenever practicable the indicators should be used upon the range in instructing the men who are waiting their turn to fire.

475. (1878.) Practice with the indicator should not be performed immediately after any extended "*position*," or "*aiming drill*," or marching in "*double time*," as the men will be apt to be unsteady.

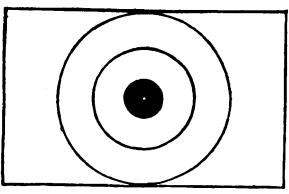
476. (1878.) The firing-pins of the rifles should be frequently inspected to see that any of them that may be constructed of inferior metal have not become shortened by this practice so as to interfere with their exploding a cartridge.

477. (1878.) Instruction in sighting with the Vose tripod will be found to be simplified by using an indicator in the rifle. Where this plan is adopted, the recruit should be required

to aim at the bull's-eye upon a card target placed twelve inches from the muzzle of the piece. The instructor having pointed out any defects in the sighting, as described in paragraphs 112 and 113, should then pull the trigger, (being careful not to move the rifle) when the indicator will show upon the target the deviation made in the aiming. Where the spring of the tripod used will permit the piece to be aimed without depressing the stirrup, it is better not to do so, to avoid the movement of the rifle which sometimes occurs when the spring is suddenly released. If the spring is used it should be released gradually, the man aiming being cautioned to hold the rifle firmly to his shoulder with both hands, as if actually firing.

No. _____ 187

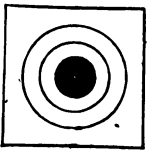
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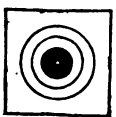
STANDING.

| POSITION. | SCORES. | | | | | Total. |
|-----------|---------|---|---|---|---|--------|
| | 1 | 2 | 3 | 4 | 5 | |
| Standing. | | | | | | |
| Kneeling. | | | | | | |
| Lying. | | | | | | |

Aggregate. _____



KNEELING.



LYING.

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APPENDIX.



NATIONAL GUARD PRACTICE.

Rifle practice constitutes a branch of military instruction peculiarly fitted for the National Guard, and in which they will always excel. The "*position*" and "*aiming drill*" which constitute the foundation of the system,* can be acquired in their armories, and even at their homes, while the high state of intelligence existing among them enables them to soon apply upon the range the instruction they have received.

Rifle practice is to a great extent a matter of judgment, particularly at the longer ranges, and

* Hans Busk says one hour a day of private practice in aiming drill will in a few weeks make a man a first-class shot. (Busk's Hand book for Hythe, p. 162.)

the more intelligent men are, the better they will shoot. Thus both in England and Canada the volunteers have been found to shoot better than the regulars.

But the results that have been attained in the United States are still more conclusive. When this work was first written (March, 1872), the National Guard of the State of New York were utterly ignorant of rifle practice. Neither were there any works of instruction on the subject or grounds available for practice. Outside their ranks, although there were many expert "off-hand" Marksmen, long-range practice was a thing unknown.

Yet, during the two years that have elapsed since the opening of Creedmoor, they have acquired such proficiency as to make the present standard of marksmanship among them as high as that existing in either Great Britain or Canada, although the latter have had the advantage of years of experience and instructors, specially trained in the Hythe School of Musketry.

The following table gives a comparison of the improvement in the shooting of the different years :

(Teams of twelve, distance 200 and 500 yards 5 shots highest possible individual score 40; highest possible team score 480. No competitor making less than 8 points, at 200 yards, being allowed to fire at 500 yards.)

| Regiment. | SPRING COMPETITION.—THIRD MATCH. June 21, 1873. | | | | | | ANNUAL MEETING. State Match—Oct. 1873. | | | | | | STATE MATCH. 1874. | | | | | |
|------------|--|-----------------|---------------------|-----------------|--------------|------------------|---|---------------------|-----------------|--------------|------------------|-----------------|-----------------------|-----------------|--------------|------------------|--|--|
| | No of Men. | Score, 200 yds. | Men not qualifying. | Score, 500 yds. | Total score. | Average per man. | Score, 200 yds. | Men not qualifying. | Score, 500 yds. | Total score. | Average per man. | Score, 200 yds. | Men not qualifying. | Score, 500 yds. | Total score. | Average per man. | | |
| 79th N. G. | 12 | 70 | 9 | 15 | 85 | 7.8 | 154 | 1 | 98 | 252 | 21. | 149 | 0 | 118 | 267 | 22.2 | | |
| 19th N. G. | 10 | 76 | 5 | 20 | 96 | 9.6 | 132 | 1 | 62 | 194 | 16.1 | 100 | 2 | 27 | 133 | 11.0 | | |
| 9th N. G. | 12 | 41 | 11 | 4 | 45 | 3.7 | 137 | 0 | 88 | 215 | 17.9 | 127 | 2 | 16 | 143 | 11.9 | | |
| 32d N. G. | 12 | 86 | 7 | 25 | 111 | 9.2 | 96 | 7 | 42 | 138 | 11.5 | 138 | 0 | 47 | 185 | 15.4 | | |
| 23d N. G. | 12 | 104 | 4 | 55 | 159 | 13.2 | 128 | 2 | 58 | 186 | 15.5 | 146 | 0 | 108 | 254 | 21.1 | | |
| 14th N. G. | 12 | 66 | 7 | 18 | 84 | 7. | 67 | 8 | 27 | 94 | 7.8 | 112 | 3 | 39 | 151 | 12.5 | | |
| 22d N. G. | 12 | 136 | 1 | 127 | 263 | 21.9 | 155 | 1 | 125 | 280 | 23.3 | 148 | 0 | 147 | 295 | 24.5 | | |
| | 44 | | | | 10.3 | | | 20 | | 16.1 | | | 7 | | 16.9 | | | |

Nor is this experience confined to Creedmoor. The team of twelve men of Company C, First California N. G., in the Inter-State match with Company D, Twelfth New York N. G., June 26, 1875, in seven shots at 200 yards, made 255 points, and at 500 yards 256 points, which is better than any score made at Creedmoor. "The National Guard of Virginia City, Nevada," has also made extraordinary shooting.

In addition to the vast increase in military efficiency resulting from becoming good shots, it has been found that rifle practice has proved to be one of the most agreeable portions of military instruction. The honorable reputation of being a "crack shot," and the knowledge that the desired skill is solely dependent upon individual exertions, has done much to interest the National Guard in the subject, and has induced many to join its ranks.

While every inducement should be made to attract and develop good individual shots, so as to constitute a good regimental "team," and for this purpose individual emulation should be encouraged in every way, yet regimental commanders must bear in mind that the true object to be attained is to secure the *general efficiency* of the rank and file as riflemen. More credit should attach to an organization making high

average shooting than to one having a champion team, and all influences possible should be exercised in that direction. Nor will this course interfere with the selection of a good team. Nothing has been more clearly demonstrated at Creedmoor than that shooting is a matter of education, and it will be found that a thorough course of instruction will not only make the regiment efficient as a whole, but invariably develop a number of "crack" shots from among those who supposed themselves to be without the qualifications requisite for a "Marksman," and the more "Marksmen" the better the chances for a strong "team."

The course of instruction prescribed in the preceding Manual has been carefully reduced within such limits as to make it practicable to be performed by all regiments of the National Guard, and all officers should be particular in seeing that every member of their command is obliged to conform to it. No part of their drill is of as much importance as this, and none should be less neglected.

In place of an excursion by a regiment "*en masse*" to a range for rifle practice, much more careful supervision and better results can be obtained, at least until all the officers have become thoroughly acquainted with the subject,

by practice in the detachments of two companies.

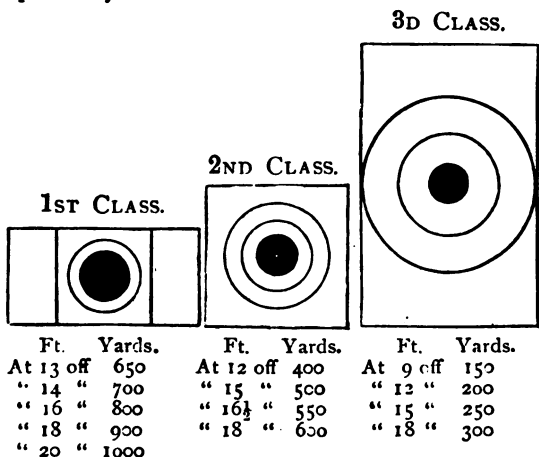
The character and efficiency of the officer who acts as the regimental inspector of rifle practice will have the greatest effect upon the progress it will make in this particular, and he should therefore be selected with great care. He should make a practice of being upon the range at certain specified times, at which the members of his regiment should be required to report to him and go through the prescribed course under his supervision.

The advantages of constant practice in "*aiming drill*" should be constantly impressed upon all desiring to become good shots, and the members of all regiments should be allowed to take their rifles home with them for this purpose, under proper regulations to secure their return.

TARGETS FOR PRIVATE PRACTICE.

For private practice in "*aiming drill*" the following diagrams will be found valuable as approximately representing the different sizes of targets at different ranges. They should be in the possession of all who desire to excel, and may be drawn separately and pinned to the wall opposite a window. For standing position

the 3d class should be 4 feet 6 inches from the ground, and the 2d and 1st class, for kneeling and lying down, 2 feet 6 inches, and 1 foot, respectively.



When it is considered how slight a variation in the direction of the muzzle of a rifle will send a bullet a long distance from the target, and that the extent of this deviation increases with the distance, many may be inclined to despair of ever being able to attain sufficient steadiness to enable them to make such a score as to entitle them to be called "Marksmen."

The difficulty, although certainly existing, is, however, more imaginary than real. In fact,

when it is considered how exactly the sights must be aligned upon the target to prevent missing it altogether, the accuracy which is attained is surprising. So far, however, from it being more difficult to make a good score at long than at short ranges, the contrary is very frequently the case.

In ranges under 300 yards, the shooting must be "off-hand," which requires a close union of hand and eye, together with a quickness and steadiness of nerves which many do not possess. In shooting over that distance, on the other hand, the rifleman is allowed to lie down, and by this not only obtains a more deliberate aim, but secures a position so much more immovable than when standing, as to more than make up for the difference in distance.

Thus at Creedmoor a score of 17 out of a possible 20 points (old style of targets) has been seldom exceeded at 200 yards, while 18, 19, and even 20, has frequently been made at 500 yards, with military rifles, and at 800, 900, and even 1,000 yards, with long-range rifles.

In the first edition of this work it was stated that, "to further encourage beginners, they should understand that the English authorities state officially that the system described in this work, if followed with moderate industry and

diligence, will enable the learner to hit a three-foot bull's-eye at 500 yards with but little more difficulty than he experienced in the first instance in striking a third-class one at 150 yards. And as a further example of the rapid improvement arising from this method of instruction, it is officially reported that thirty volunteers who had appeared at Hythe without previous instruction, were allowed to fire three rounds at a target 8 by 6 feet at 600 yards, and only succeeded in making 18 hits. They were then put through a single course of the preliminary drill, and, under the same circumstances, made 30 hits, showing that their efficiency had nearly doubled."

A further encouragement to Americans may be had in the fact that the scores originally given as examples "of what might be done" have all been badly beaten at Creedmoor by men who had never shot at long range until after the work was written (for which reason all such scores have been omitted from the present edition, as of no value), and that the champions of Wimbledon have been defeated, both at Creedmoor and in Ireland, by scores unparalleled in the history of rifle shooting, made by an American team, none of whom had until the last two years ever shot at long range.

INDICATOR AND CANDLE PRACTICE.

This portion of the drill is specially to be recommended for the National Guard. It gives almost the same results as armory target practice, and, as it may be performed simultaneously by an entire company, the saving of time is a great desideratum. Calculating on a basis of one shot a minute, 5 shots by 30 men at a single target require two hours and a half, while in this practice they could all be fired in ten minutes. The manner of using the indicators is described in par. 458 (they having been invented since this book was stereotyped). Since their introduction candle practice has been abandoned by the National Guard of New York.

Gas pipe with small jets is preferable to candles. Some place a miniature tin target in front of the lights aimed at, having the bull's-eye cut out, the flame appearing just behind its centre, so that a "bull's-eye" extinguishes it. When candles are used, it is an advantage to insert them in a tube with a spiral spring, so as to always keep the flame in one position, as in a carriage lamp.

In candle practice the primer used on the regular cartridge does not contain sufficient fulminate to extinguish the flame at a distance of three feet with certainty. Special primers,

however, can and should be obtained containing an extra quantity of fulminate. Better effects are also found to result from enlarging the aperture into the cartridge.

The shells made by the Union Metallic Cartridge Company are unsuited to this practice. The cone-shaped anvil used in them blows out, when used without powder, at the second or third discharge, spoiling the shell, and thus making the practice expensive. Neither the Remington shell nor that made by the United States Cartridge Company of Lowell is liable to this objection, and in both the opening for the fulminate can be enlarged.

As a piece of the cap is frequently forced through the barrel by the explosion of the primer, care must be taken in this practice never to aim in any direction where injury could be caused by it.

The main drill of the National Guard (in the cities at least) must take place in their armories, and practice at the range be but occasional, "not to learn, but to test what has been learned."

Officers should, therefore, devote all available time to the sighting, position, and aiming drill, which form the foundation for the whole system. As these are apt to prove monotonous,

candle practice should be frequently indulged in, this portion of the drill being always interesting to the men. It is, therefore, recommended that the men should be practiced in firing at candles at the conclusion of each aiming drill.

With men of the intelligence of those composing the National Guard, the improvement that will be found to result from a little careful practice of this description will be found surprising; and a company that at the beginning could not extinguish more than two or three candles at a volley, in two or three months will put out nine out of ten; and it is frequently observed that those who have had the least previous practice as sportsmen will prove the best shots.

This (candle) practice will also prove valuable as a substitute for ball practice in judging the efficiency of the men in those cases where the latter cannot be had; and none should be practiced in target-firing who have not averaged extinguishing five out of ten candles at a previous drill.

DISTANCE DRILL.

There is no portion of rifle practice more important than understanding how to estimate

distance; but the question of how such a knowledge shall be acquired and imparted, forms a very difficult problem for an officer of the National Guard. In the country, facilities for the purpose can be easily obtained; but in the cities, officers, in addition to requiring their men, when upon the range and not firing to practice in this exercise must urge them to accustom themselves to judge distances the best way they can, impressing upon them that, no matter how accurate Marksmen they may be at a fixed target, they are worthless if they cannot calculate the distance of an enemy.

In estimating distances, the following suggestions may be valuable : At 50 yards the observer can name any one of his comrades readily, as the age, complexion, height, and figure can be determined at that distance.

At 100 yards he should notice those parts which are clearly visible, and his attention drawn to the indistinctness of other portions. The lineaments of the face are no longer visible, the buttons down the front of the coat appear one continuous line. The movements of the men individually, and the form and color of the uniform, are, however, perfectly visible. At 225 yards, the colors of the uniform, cartridge-boxes, etc., are still visible; but the face

now resembles a light-colored ball under the cap. At about 250 yards he can distinguish only the different parts of the body and the rifle. At about 450 yards, the direction of the line of march and the movement of the rifles can be detected, and in cavalry the helmet, cuirass, bright colors of the uniform, etc. At 600 yards the head looks like a small round ball, and the shoulders sloped off. At 700 or 800 yards the body has a dwindled appearance, but the legs of men in motion or extended arms are still distinguishable. At 900 and 1000 yards the separate files and direction of march are still apparent. At 1200 yards infantry can be distinguished from cavalry. At 2000 yards a man, or even a horse, looks like a mere speck or dot.

INDIVIDUAL PRACTICE AT RANGES.

Individual practice should be encouraged by all officers (Paragraph 277); and particularly in the case of the National Guard, to whom every inducement should be made to visit any available range for private practice.

To prevent accidents and ensure the enforcement of the prescribed rules, every man should be required to enter his name on arriving at the range; those first arriving to have a right

to choose the distance at which they wish to fire. As the men arrive, they will form themselves into squads, each squad electing a captain, who will keep the score and enforce the rules of the range. All arriving subsequently are to obey his orders. If no markers or look-out men are employed, each captain must make a detail from his squad for such purposes, and see that those detailed are properly relieved.

The firing is to be conducted according to the principles above laid down, and every shot fired in rear of the firing point, whether accidentally or otherwise, unless fired into the pit provided for the purpose, shall be entered as a miss. The men last at the ground must see that the danger flag is hauled down, and the appurtenances belonging to the range replaced where they belong, or returned to the keeper.

Practice upon the range is only intended to find out and apply what has been learned at drill, and acquire a practical knowledge of elevations and the allowances required for wind and weather. In all cases, therefore, extreme deliberation should be used. No advantage is gained by firing more than ten shots at a distance; and the habit beginners have of expending all the ammunition they can procure as fast as possible, is a positive detriment. Each shot

should be fired with a definite purpose, and its results noted and remembered. The captain of each squad, or of a team, should give special attention to this subject, as not only will the expense of the practice be greatly reduced, but the quality of the shooting greatly improved. There is nothing which prevents wild and haphazard shooting and develops those qualities of coolness, forethought, and judgment, which make a reliable shot, than to be kept on a short allowance of ammunition.

RULES OF THE NATIONAL RIFLE ASSOCIATION, TO GOVERN ALL COMPETITIONS IN MARKSMANSHIP. (As revised 1878.)*

I.—MANAGEMENT.

A.—Spring and Fall Meetings.

1. The annual meetings for competitions will be conducted by an Executive Officer, wearing a *tri-colored* badge, aided by a Statistical Officer, wearing a *blue* badge, a Financial Officer, wearing a *white* badge, and assistants, wearing *red* badges.

2. The Executive Officer shall have control of the range for the conduct of matches.

3. The Statistical Officer shall have charge of all statistics.

* These regulations were again revised, August, 1879, but as they are undergoing a further revision (Oct. 1879), we do not insert the amended rules.

4. The Financial Officer shall have charge of all finances connected with these meetings.

B.—Other Competitions.

1. All other Association competitions will be conducted by an Officer or Director of the Association, or other competent person, designated by the Senior Officer or Director present on the range at the hour of shooting, unless previously designated. In the absence of Officers and Directors, the Assistant Secretary or Superintendent of Range shall act as or designate an Executive Officer.

II.—GENERAL REGULATIONS.

1. During the progress of a match, no one, except the officers and employes of the Association, the competitors and the score keepers, will be permitted within the ropes without special permission of the Executive Officer.

2. The squads of competitors will be stationed not less than four yards in rear of the firing-points, where each competitor must remain until called by the score keeper to take his position at the firing-point, and until he has completed his score. The score keepers will be seated close to and in rear of the firing-point stakes.

3. Score keepers shall, as each shot is signaled, call in a loud voice the name of the competitor and the value of the shot, and at the conclusion of the score of each competitor, announce in like manner his name and total score.

Competitors must pay attention to the scores as announced and recorded, so that any error may be promptly investigated.

4. All competitors will be allowed to examine the records of the score keeper during the progress of any match.

5. All protests and objections must be made to the Executive Officer in charge of the match, or in his absence to one of his assistants. In case a competitor is dissatisfied with the decision of the latter, he may appeal to the Executive Officer.

6. Any competitor feeling himself aggrieved by the ruling of an Executive Officer, may make to the Secretary a statement of his grievance, in writing, giving the names of two or more witnesses in the case, which shall be handed to the Executive Committee at its first meeting thereafter for its consideration. The decision of the Executive Committee shall be final, subject, however, to the discretion of said Committee, or any two members of it, to refer the matter to the Board of Directors for its decision.

7. These regulations, and such directions as the Executive Officer may give, must be rigidly complied with by competitors and all other persons upon the range grounds.

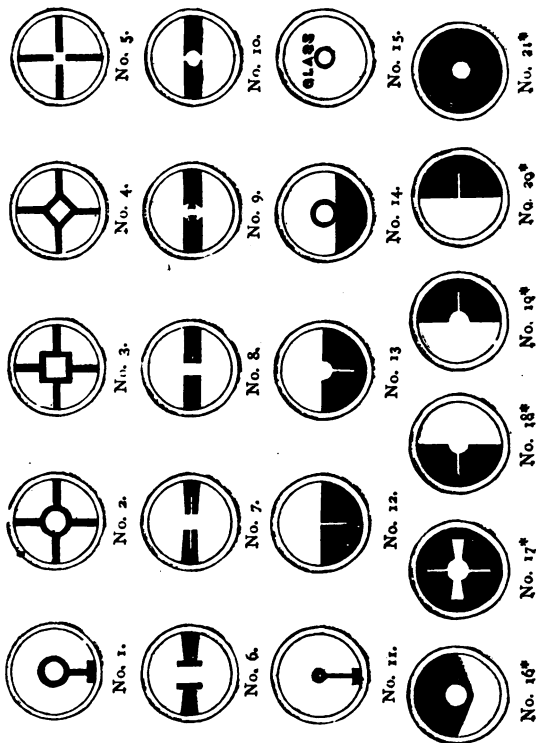
III.—RIFLES.

The rifles allowed to be used in the competitions are—1st. Military rifles; 2. Any rifle; and must comply with the following conditions, viz. :

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DIAGRAM OF FORESIGHTS.



Numbers 1 to 15 allowed by rules of The National Rifle Association provided that in Nos. 1 to 5 the metal do not exceed 3-100ths of an inch, and in No. 6 to 15 that the width of bar be under 8-100ths of an inch. No. 16 to 21 are disallowed.

Other sights than those shown above will not be allowed until approved by the Executive Committee.

1. MILITARY RIFLES, weight (without bayonet) not to exceed 9 lbs. 4 oz. Stock sufficiently strong for military purposes, and such as to admit the use of a sling; minimum pull of trigger, six pounds. Sights to be of *bona fide* military pattern, to be attached to the barrel, and to be without any movable adjustment other than a hinged flap and sliding bar, to be moved by hand only. In military team matches (unless otherwise specified), competitors must use the rifle with which the organization to which they belong is armed at public expense. Filing or altering the sights of such rifles, or of the rifles, used by the National Guard, or Regular forces (except as authorized by the military authorities thereof), or using them in any other way than as originally intended, is prohibited, except that the sliding-bar of the rear sight may be inverted, and lines drawn to mark the centre. Sights may be blackened, but not whitened or colored. Any pad or shoe for the heel of the butt is disallowed.

2. ANY RIFLE, maximum weight ten pounds, minimum pull of trigger three pounds, sights of any description, except telescope, magnifying and such front aperture sights as solid discs or bushes pierced in the centre, which cover the target so as to conceal the danger signal when displayed. No stirrup constructed of metal or other substance, connected to the rifle by straps of any kind, for the purpose of taking up or lessening its recoil, will be allowed in any of the matches of this Association.

3. Competitors shall submit their rifles and ammunition for inspection whenever required.
4. No hair or set triggers will be allowed.
5. No fixed or artificial rests will be allowed.
6. In all competitions confined to the use of breech-loaders, the gun shall be loaded at the breech with fixed ammunition.

IV.—AMMUNITION.

1. In all competitions, unless otherwise specified, any ammunition may be used, and must be provided by the competitors.

V.—TARGETS.

The targets are divided into three classes, and shall be of the following sizes :

1. *Third Class*, to be used at all distances up to, and including 300 yards—Target, 4x6 feet.

Bull's eye, circular, 8 inches in diameter.

Centre " 26 " "

Inner, " 46 " "

Outer, remainder of target.

2. *Second Class*, to be used at all distances over 300, to and including 600 yards—Target, 6x6 feet.

Bull's eye, circular, 22 inches in diameter.

Centre " 38 " "

Inner " 54 " "

Outer, remainder of target

3. *First Class*, to be used at all distances over 600 yards—Target, 6x12 feet.

Bull's eye, circular, 36 inches in diameter.

Centre, " 54 "

Inner, square, 6x6 feet.

Outer, remainder of target.

VI.—MARKING, SCORING AND SIGNALING.

1. Bull's eye, counts 5; signal, white circular disc.

Centre, " 4; " red "

Inner, " 3; " white and black "

Outer, " 2; " black "

Ricochet, scored R; " red flag waved twice right and left in front of the target.

Ricochet hits will be marked out after the flag signal.

2. When a shot strikes the angle iron upon which the target stands, the marker will open the trap and raise and lower his flag three times in front of the target.

3. Any objection to the scoring of a shot as signaled, or to one not signaled, must be made before another shot is fired.

4. Any alteration of a scoring ticket must be witnessed by an officer in charge of the firing-point, and indorsed with his initials.

VII.—RUNNING DEER.

1. Will be run only by signal from firing-point. Any rifle may be used provided the sights are over the centre of the barrel. Position, standing; distance, 100 yards, unless otherwise prescribed. A fine of ten cents will be imposed for firing, when out of bounds, not firing, or for hitting the haunch.

Scoring and Signaling.

| | |
|--------------------------------|----|
| Bull's eye, white disc, counts | 4. |
| Centre, red " " | 3. |
| Outer, black " " | 2. |

Haunch, white disc, with black cross, scored H.

VIII.—MATCHES.

1. The commencement of matches at the Spring and Fall meetings will be signaled by the firing of two guns, 15 minutes apart. The first will be the signal for competitors and score keepers to assemble at the firing-points, and the second to commence firing.

2. The matches will take place, if possible, in the order named in the programmes. Any deviation from the programmes will be posted upon the Bulletin board at Headquarters as long beforehand as practicable. *The posting upon such bulletin will be considered sufficient notice to all competitors of everything so posted.*

3. Temporary discontinuance of matches on account of bad weather, (which will be in the discretion of the Executive Officer, on all occasions), and discontinuance for noon-day intermission, will be signaled by the firing of a gun. In each case the competitions will be resumed upon the firing of two guns.

4. No practice will be allowed upon the range on any of the days of the annual meetings for competitions, unless specially authorized by the Executive Officer. This does not apply to days upon which special matches of the Association, or of affiliating Associations or Clubs, take place.

IX.—ENTRIES.

A.—Annual Meetings.

1. For the State prize, and all other competitions open to military organizations, the teams shall (unless otherwise specified) consist of twelve from each Regiment, Battalion, Company or Troop.

2. All regimental officers shall be eligible as members of such teams.

3. In all cases competitors for prizes offered to military organizations must be regularly enlisted members in good standing of the regiment, battalion, company or troop which they represent, and shall have been such for at least three months prior to the match for which they are entered; all entries must be made for full teams.

4. Entries must be made at the office of the Association, in New York City, at least *one week* preceding the commencement of the meetings. A charge of 50 per cent. additional will be imposed for all entries made after that time.

5. Competitors who are prevented from being present at any meeting shall have the entrance fees they have paid returned after the meeting, provided that they send their tickets and give written notice to the Secretary before the day on which the prize for which they have entered has been announced for competition.

6. Competitors prevented from competing by illness will receive back their entrance fees in full, on production of a medical certificate and their entry tickets.

7. Post entries are those made after the entry

books are closed at the office of the Association.

8. The holders of the post entry tickets may be ordered to fire when target accommodation can be provided; but should they be precluded from competing by deficiency of target accommodation, their entrance fees will be returned to them, the Executive Officer not being able to guarantee accommodation for all such entries.

B.—General Regulations.

1. A member of the Association entering for or shooting in a match on the range must exhibit his badge.

2. A register ticket may be transferred at any time before the firing for the match has commenced, by exchanging it at the office of Statistical Officer for one having the name of the new holder. Any erasure, or the substitution of one name for another, will render the ticket invalid.

3. No post entries shall be made for any competition after the firing in such competition has commenced, unless otherwise specified.

X.—SHOOTING.

A.—Annual Meetings.

1. Two sighting shots shall be allowed to every competitor at each distance, on payment of ten cents a shot, unless otherwise specified.

2. Tickets for sighting shots will be sold upon the ground, and will be good for any match during the meeting. Competitors must decide,

before firing, upon the number of sighting shots they will take, and hand the tickets for the same to the scorer. Sighting shots cannot be counted upon a score, in any competition.

3. Competitors who, at the close of the firing on any day, have not completed the number of rounds prescribed by the conditions of a competition, shall be allowed one sighting shot when such competition is resumed, without charge.

4. In all competitions confined to military organizations, competitors shall shoot in the authorized uniforms of their corps, including waist belts.

5. In all military matches each team will be limited to an average of one minute per shot, for each squad, to complete its score.

B.—General Regulations.

1. In all competitions restricted to military rifles, the competitors shall place themselves at the firing-point by twos, who shall fire alternately until they have fired all their shots.

2. In other competitions, the competitors shall fire their shots alternately throughout the squad.

3. Competitors may wipe or clean out their rifles during any competition, except those restricted to the use of military rifles. In competitions of more than one distance, restricted to military rifles, cleaning out will be permitted between distances.

4. Whenever the danger flag is displayed,

competitors about to fire will be required to open the breech block of their rifles (if breech-loaders. If they leave the firing-point they must draw the cartridge.

5. No two competitors shall be allowed to shoot with the same rifle in the same match.

6. Any competitor delaying his squad will be passed by. In no case will the firing be delayed to enable a competitor to procure a rifle.

7. Any competitor engaged in an uncompleted match at the time fixed for the commencement of another, for which he is entered, on reporting the fact to the Executive Officer, will, if it be practicable, be assigned a target to enable him to shoot in such match upon the completion of that in which he is shooting.

XI.—POSITION.

1. In all matches (except those for cavalry carbines) the position up to and including 300 yards, shall be standing. The left elbow may be rested against the body, provided the little finger of the left hand is in front of the trigger guard.

2. In all military infantry matches, at 400 yards, the position shall be kneeling; at distances above 400 yards any position may be taken in which the head is toward the target.

3. In cavalry carbine matches the position, at 200 yards, shall be standing; at 300 yards, kneeling; over that distance, in any position (as prescribed for infantry.)

4. In all other matches, at distances above 300 yards, any position may be taken without artificial rests to the rifle or body.

5. One-armed competitors shall be allowed to use false arms without extra support, in the standing and kneeling positions, and to assume any position in the use of military rifles, at distances above 400 yards, the same as is allowed for *any rifles*.

6. Sighting shots may be fired in any position, without artificial rests.

7. In all cases the gun shall be held clear of the ground.

XII.—TIES.

I.—Ties shall be decided as follows :

A.—Individual Shooting.

1. When the firing takes place at more than one distance, by the score made at the longest distance ; and if still a tie, and there be three distances in the competition, by the score at the second distance.

2. By the fewest MISSES.

3. By the fewest OUTERS.

4. By the fewest INNERS.

5. If still a tie, by inverse order of shots, counting singly from the last to the first.

6. By firing single shots at the longest range.

B.—Team Shooting.

1. By the aggregate scores made at the longest distance.

2. By the fewest MISSES.

3. By the fewest OUTERS.

4. By the fewest INNERS.

5. By the competitor on each side who has made the highest score, firing five rounds at the longest distance.

II.—The names of competitors who have to shoot off ties will be posted on the Bulletin Board as soon after each match as practicable.

III.—When the ties are shot off, one sighting shot shall be allowed without charge.

IV.—Competitors not present at the firing-points at the hour named for shooting off ties, lose their right to shoot.

V.—If, having forfeited their right to compete, they shall still be within the number of prize winners, they shall take any prize that may be allotted to them by the Executive Committee.

XIII.—PRIZES.

1. Prize winners will, upon application to the Statistical Officer on the range, receive certificates, which must be given up on receiving the prizes.

2. Prizes will be delivered on the range at the close of the meeting, under the direction of the Executive Officer, unless otherwise specified.

3. The principal prizes at the annual Fall meeting will be formally presented to the winners at the State Arsenal, Seventh avenue, corner Thirty-fifth street, New York, on the Saturday following the last day of such meeting, at 8 P.M., unless otherwise announced. Winners who will be unable to attend are requested to give notice at the Headquarters Office upon the Range.

4. All prizes not claimed within one month after the match at which they have been won, shall be forfeited to the Association.

XIV.—PENALTIES.

Competitors must make themselves acquainted with the regulations, as the plea of ignorance of them will not be entertained.

Disqualification.

Any competitor—

(a)—Who shall fire in a name other than his own, or who shall fire twice for the same prize, unless permitted by the conditions of the competition to do so, or

(b)—Who shall be guilty of any conduct, considered by the Board of Directors or the Executive Committee as discreditable ; or

(c)—Who shall, in National Guard matches, use any other ammunition than that issued to him on the ground, or in any way tamper with that so issued ; or

(d)—Who shall be guilty of falsifying his score, or being accessory thereto ; or

(e)—Who shall offer a bribe of any kind to an employe—

Shall, upon the occurrence being proved to the satisfaction of the Board of Directors or the Executive Committee, forfeit all his entrance fees, be forever disqualified from competing at any time upon the Range of the Association, and shall not be entitled to have any prize won by him at the time or meeting, awarded to him.

Exclusion from Further Competition.

1. Any competitor who shall be detected in an evasion of the conditions prescribed for the conduct of any match, shall be ruled out of such competition.

2. Any member of a squad or firing party who shall fire a shot from any other firing-point after the hour prescribed for his squad to fire, and before he has completed his score (except in pursuance of orders), shall be disqualified in that competition.

3. Any competitor, in any meeting or match, refusing to obey any instructions of the Executive Officer or his assistants, or violating any of these regulations, or being guilty of unruly or disorderly conduct, or being intoxicated, will be immediately ruled out of all further competition, during such meeting or match, and forfeit his entrance fees; and may also be reported to the Board of Directors of the Executive Committee, and be by them disqualified from use of the Range.

4. Any competitor firing when the danger flag or trap disc is shown at the target or firing-point, or knowingly discharging his rifle, except at a target to which he has been assigned, or into the blowing-off pits, or as may be directed by an officer, shall be debarred from all further competitions during the meeting, and shall forfeit his entrance fees. This shall not apply to a competitor accidentally firing at the wrong target when no danger disc is up.

5. Any person discharging a rifle or snapping

a cap within the inclosure, except in accordance with the regulations for shooting, may, at the discretion of the Executive Officer, be required to leave the ground.

6. Any competitor or other person found with a loaded rifle, except at the firing-points and when about to shoot, shall be debarred from further competition during that meeting or competition.

7. Any person, whether a competitor or not, interfering with any of the firing squads, or annoying them in any way, will be at once expelled from the ground.

8. Any competitor discharging his rifle accidentally, either by his own want of care, or by reason of any defect in the rifle, shall be disqualified from further competition in the match.

9. Should a competitor lose his register ticket, omit to take it to the firing-point, fail to attend at the prescribed hour, or give a wrong ticket, and so by his own neglect miss the opportunity given to him of competing for the prize for which his ticket was issued, his claim in regard to such competition shall be cancelled.

10. Any person firing on a wrong target will be fined \$1, or be debarred from further competition; or both, in the discretion of the Executive Officer.

11.—Any competitor, being a member, who shall neglect to wear conspicuously his badge of membership in any competition, shall have his score disallowed.

12.—Any person ruled out of any meeting or competition shall forfeit all entrance fees.

XVI.

1.—All regulations heretofore adopted and inconsistent herewith, are hereby repealed.

2.—These regulations shall take effect immediately.

SUGGESTIONS TO MARKSMEN.



CLOTHES.

The selection of clothes to be worn in rifle-shooting is of no small importance.

In military practice the uniform is always required to be worn and kept buttoned; but care should be taken to have it as easy as possible, particularly about the throat and arms. The shirt-collar should be perfectly loose, to allow full liberty to the head and throat. Whether wearing a uniform or plain clothes, it is necessary that they should be comfortable, and not too fine. Full-dress uniform, or any clothes that the sun, wind, or a little mud will injure, are out of place upon a rifle range. In the summer, an East Indian pith helmet will be found a great protection from the sun. The Inspectors of Rifle Practice at Creedmoor wear these helmets, and a loose sack coat of blue flannel, without padding or embroidery. When these helmets are used, the wearer should be provided with a water-proof cover, as they absorb a great deal of water in a rain.

For firing when lying upon the back, a close-fitting cap is preferable, except when the sun is excessively hot. The American team of 1875 wore these caps, and a blue flannel blouse, belted at the waist, to prevent their clothing from being soiled in wiping their rifles.

As the recoil of the rifle when fired in a lying position injures the shoulder-strap, officers will find it preferable, when shooting in fatigue uniform, to wear the bars, or other similar designation of rank, in their stead. In the Spring and Fall good heavy clothes and boots should be worn on the range, and an overcoat or rubber cape or coat be kept on the ground. There is nothing that spoils good shooting like being shivering with cold.

The rifleman should always be provided with a rubber blanket to lie upon in long-range shooting. A heavy woolen rug will also add greatly to his comfort, at almost all times, by keeping off the chill of the ground.

The Amateur Rifle Club, during their practice and in their matches, provide for each firing-point a strip of cocoa matting 4x6 feet, with a cocoa door-mat for a rest for the elbows. A heavy cocoa mat, such as is used for hotel doors, is preferable to matting, as being thicker.

FOOD AND TRAINING.

While excess of every kind should be avoided, particularly in tobacco, no training is required on the part of those desiring to become expert riflemen. They should live plainly, and according to their usual habits. Any sudden change in diet, abstaining from stimulants, etc., will frequently make men so uncomfortable as to injure their shooting in a match.

While sufficient exercise should be taken to preserve health, and sufficient practice in aiming drill to make the position selected easy and natural, there is no necessity for anything further. Dumb-bells, etc., are unnecessary. An easy, imperturbable temper is a great advantage, and the habit of worrying or borrowing trouble should be carefully avoided.

POSITIONS.

FIRING STANDING.

In firing standing, the regulation position is generally preferred. (See pages 75, 76, and 81.)

Some good shots rest the left elbow against the body—which is allowed by the rules of the National Rifle Association, provided the little

finger of the left hand is in front of the trigger-guard. To many of a certain build this involves a loss instead of a gain in steadiness. The better opinion also is that it does not give as good a control over the rifle as when the arm is held clear of the body, particularly in case of a side wind (which acts with great force on the barrel).

Many find an easier and firmer position by bringing the left shoulder well to the front, and resting the rifle over the lower part of the left thumb. The advantage of this position is that it brings the left elbow directly under the barrel without any strain on the muscles. Its disadvantage is that, in a side wind, the body is too apt to sway sideways, which must be avoided by placing the feet further apart.

With most men the position is steadier if the toe of the butt is held well up on the shoulder, so that the cheek can rest against the side of the stock.

The Hythe School directs that the rifle be pressed against the shoulder with the *left* hand, the right holding the stock lightly; but most Breedmoor Marksmen prefer, while grasping the barrel firmly with the left hand, so as to keep it steady, to hold it well against the shoulder with the right. In all cases, it will be found

that the pull-off of the trigger will be lightened by a firm grip with the right thumb. While it is indispensable that the butt be pressed snugly to the hollow of the shoulder to lessen the recoil, care must be taken, on the other hand, that it is not pressed so hard as to throw the shoulder back and affect the equilibrium. Placing it against the muscle of the arm must also be avoided.

In military rifles, a great advantage will be found to be obtained, particularly by persons of sedentary occupations, by using two fingers on the trigger instead of but one. In doing this, the second finger should be passed well through the trigger-guard, so that its tip will touch and be supported by the left side of the rifle. In this way the pressure can be evenly applied, by a gradual contraction of the hand, all jerk avoided, and the heavy pull of a military trigger overcome without difficulty. In fact, with practice, it can be drawn back so gradually as almost to make it a hair-trigger, the last pressure being given just when the aim is assured. If one finger is used, the thumb should grasp the stock, so as to touch the end of the middle finger, as directed in the Manual (Par. 123). It should be the aim of every one seeking to become an expert rifleman to so ac-

custom himself to the trigger-pull of his rifle that it will be as natural to his hand as a favorite tool is to a mechanic; and, for this purpose, it must be stated, even at the risk of reiteration, that constant practice in aiming drill is indispensable. This should be practiced lying as well as standing, for it by no means follows that because one is steady standing that he will not swerve in firing lying. Nothing is more a matter of habit than the ability to shoot well with a heavy trigger-pull. Most American and German riflemen who have been accustomed to a hair-trigger, or at most to a pull of less than three pounds, regard it as impossible to do good shooting with anything heavier. This was at first the idea at Creedmoor; but experience has worked a change. While a trigger-pull of six pounds gives an advantage over one of ten, it is so slight as not to be thought much of, and many of the best military shots at Creedmoor care so little how much pull their rifles require as not to trouble themselves to have them eased up, provided their pull is not over ten pounds. Certainly the difference between the off-hand shooting with military and sporting rifles, in the matches, will be seen to be very slight, and owing far more to the finer sights of the sporting rifle than to its lighter trigger-pull. A

hair-trigger undoubtedly gives an advantage in firing from the shoulder ; but these are excluded by the Rules of the National Rifle Association, as unsafe.

ANY POSITION.

At distances over 300 yards, "any position" is allowed. This means any position that can be taken on level ground. The standing position depends so much on the "personal equation" of the Marksman as to prevent that extreme nicety of aim required in long-range firing. It also renders the rifleman liable to be swerved by the wind. It is, therefore, never used in long-range matches.

KNEELING POSITION.

Kneeling is also open to the same objection, although to a less extent.

If the left elbow is placed directly upon the knee, two round surfaces are brought together, and the position is unsteady. But by sitting firmly upon the heel and placing the left elbow well in front of the knee, a pretty good rest is obtained. Still, the position depends upon so many parts of the body that it is seldom used in matches. It is valuable, however, for military practice, from the rapidity with which the soldier can change his position, and also be-

cause it permits of a fire when in double ranks—for which reason it is prescribed in the Manual in practice between 300 and 400 yards. In the English army, when the fire is in two ranks, the front rank always kneel, not only to obtain a steadier position, but to get them out of the way of the rear rank, and thus secure a more rapid and accurate fire.

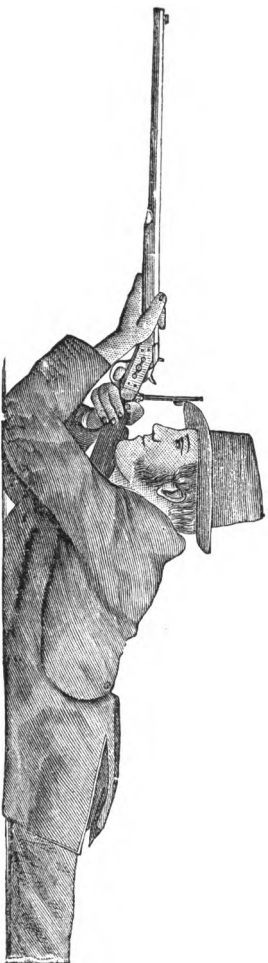
SITTING POSITION.

The proper mode of shooting sitting, in which position many succeed tolerably well, is with the left leg in line with the target and the right almost at right angles to it. The elbows are placed just inside the knees, and the body leaned slightly forward. With a small elevation to sit on, the position is greatly improved. The recoil of the rifle is felt less in this position than when lying.

FIRING LYING.

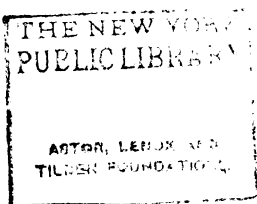
The favorite position for long-range firing particularly with a military rifle, is that of a "*skirmisher lying*." (See pages 85 and 86, ante.)

In taking this position, the legs should be well separated, the toes being turned outward, so as to cause the body to hug the ground as



COL. JOHN BODINE IN POSITION.

(Skirmisher Lyings.)



closely as possible. The left elbow should be kept almost straight under the rifle (if placed too far to the left, it strains the wrist), and the barrel grasped *firmly* with the left hand. The right elbow should be placed a little to the right. To prevent the elbows separating, as they are naturally inclined to do on hard ground, a depression may be made in the ground with the heel of the boot, or something soft placed under them. The hips should be twisted to the left, and the right shoulder well raised, to keep the collar-bone out of the way and afford a firm seat for the rifle-butt, which must be held closely against it.

In *all cases* rifles must have a shot-gun butt, the broader and flatter the better. The crescent-shaped abomination used in our sporting rifles is good for small charges, and even for moderate heavy ones, when used in a standing position. But even in this position they oblige the shooter to rest the rifle-butt on the muscle of the arm, with the result of rendering it black and blue in a short time; when, if the butt had been flat and placed in the hollow of the shoulder, the recoil never would have been felt. In lying, the horns of the crescent butt strike a violent blow upon the upper part of the shoulder, when the rifle is fired, the effect of which

is increased by the immobility of the body, so that after a few shots the rifleman is "shoulder-sore." When this is the case, no amount of nerve will enable a man to be *certain* of doing good shooting, and too much care cannot be used to avoid such an accident, particularly on the eve of a match. For this purpose, it is advisable for those who are thin about the shoulders to use a pad to lessen the effect of the recoil, which sometimes runs up to 200 pounds with a heavy charge. In this, however, as in the case of the trigger-pull, habit will do much to accustom a rifleman to endure with indifference what he never could have undergone at first.

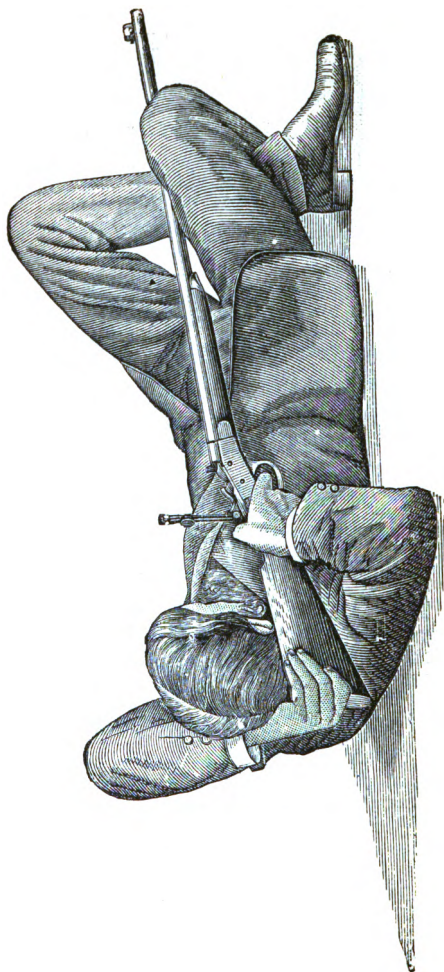
Within the last year some of the best shots at Creedmoor have begun to shoot on their backs, and the practice is extending. The American team of 1875 all shot in this position but Col. Bodine.

Messrs. Yale and Hepburn both lie slightly on their right side, resting the rifle-barrel over their left leg, the left hand grasping the piece at the small of the stock, and pressing it against the shoulder. In this position, the distance of the rear sight from the eye requires a larger aperture than usual.

Major Fulton, who, in the International

GEO. W. YALE IN POSITION.





MAJOR HENRY FULTON IN POSITION.

Match of 1874 made 171 out of a possible 180 points, *the highest score ever made in a match*, has adopted a position *sui generis*.

He lies on his back, his legs crossed, the left leg under the right knee, and firmly held by the right calf, the muzzle of the rifle resting in the crotch between the knees. The left arm is placed behind the head, the hand firmly grasping the butt of the rifle, the back of the head resting on the left forearm, the right cheek touching the side of the butt. The right hand holds the pistol stock with a firm grasp, the elbow resting on the ground.

In this position, not only the piece, but the entire person of the shooter is perfectly supported, and absolute steadiness is secured. Beginners practicing this position must recollect that the head must be turned well to the left, to prevent the recoil striking the jaw. Gildersleeve, Coleman and others of the American team have adopted this position, and Sir Henry Halford and other leading riflemen at Wimbledon, who have copied it from them, concede its advantages.

Two members of the Irish team, Messrs. Milner and Johnson, shot on their back, placing the butt of their rifle under the right shoulder, but supported the muzzle on their toes, the former

having the rear sight placed on the heel of the butt to bring it close to the eye.

General Dakin in the International Match of 1874 shot on his face; but in that of 1875, where he made the highest score, he shot lying upon his back, the left ankle under and firmly grasped by the right calf, the rifle resting upon the right leg, the butt held by the left hand, the back of which is placed against the right shoulder. He also has his sights placed upon the heel of the butt. As this brings the sights further apart it is possibly an advantage; but it requires a little more elevation on the sights than when they are closer. It is better to place the piece between the knees than on the toes. It is also an advantage to place the left hand behind the head so as to support it, the tips of fingers extended and resting upon the ground.

In shooting with military rifles, it is doubtful whether any advantage is gained by lying on the back. Colonel Henry A. Gildersleeve (who may justly be considered the best shot with a military rifle at Creedmoor), and who is of opinion that he shoots better with a target rifle in Fulton's position, prefers the "face downwards" position in military matches.

It is also preferable for military reasons, enabling the soldier to rapidly advance or retreat,

to shelter himself behind cover or to entrench himself, and the National Rifle Association have recently (1875) required that, in National Guard infantry matches, the head shall be kept to the target. (See Rules, page 220.)

Whether the rifleman shoots standing, kneeling, sitting, or lying, after having once tested and become satisfied as to the position best suited to himself, he should practice it until it becomes perfectly natural and easy, and should not attempt anything unusual, especially in a match, which is no place to try experiments. In shooting lying with a military rifle, two fingers should be used on the trigger, as previously described. With a rifle having an easier "pull-off," the right thumb should be kept extended along the right side of the stock and parallel to the barrel, as it enables the necessary pressure to be applied with less danger of deflecting the muzzle.

In lying on the face, most riflemen grasp the rifle-barrel with the left hand completely around the barrel; some do the same when firing off-hand. It can only be done, however, when the sights are elevated enough to clear the fingers. It will be found that the harder a rifle is held and the closer it is pressed to the shoulder the higher it will shoot. Care should, therefore,

be taken to hold it as nearly uniformly as possible.

CAUTION IN USING A RIFLE.

Whatever position is used, care should be taken never to load a breech-loader or cap a muzzle-loader except at the firing-point, and when it is time to fire, and then to keep the muzzle down and to the front. Whenever the danger signal is displayed the breech-block of all breech-loaders should be thrown open, so as to render an accidental discharge impossible. If the firing is suspended, the cartridge should be withdrawn. All loaded rifles should be kept at half-cock, and even then it is a golden rule to "always look at your rifle, and never allow your rifle to look at you or any one else"—a rule which should always be observed, even with a rifle supposed to be empty, as it is from such rifles that most accidents take place. Notwithstanding the greatest care, accidents will sometimes occur, but with the above precautions they will be reduced to a minimum. No one has ever been injured at Creedmoor by an accidental discharge.

AIMING.

It will generally be found that a certain blur exists in aiming, particularly at long ranges.

Various descriptions of sights have been devised to remedy this evil, but without any very great success, as it arises mainly from the impossibility of keeping the eye in focus for the sights and a distant object at the same time! Particular attention must, therefore, be paid (as previously explained) that the eye be directed at the mark instead of being fixed at the sights and glanced from them to the target.

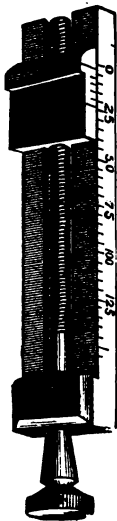
Many good shots hold that *first* sight is the best. Probably, for "off-hand" shooting, it is, if it is a good sight. No one, however, should at any time pull his trigger unless he is satisfied he has taken a correct sight, unless it is at game "on the jump." If he has not a satisfactory sight, he had better try again, if his target will wait. In shooting in any other position than "off-hand," nothing can be better than to follow Mr. Russell's advice. He says: "My practice is first to get into a comfortable position for the body, then to bring the rifle to bear at the spot I have chosen to aim at; think of any slight variation in wind or light before I press the trigger, *then make sure of the sights being perpendicular*, take a full breath and commence a steady pressure, and when satisfied that I can hold quite steady for a second or two longer, apply the little extra pressure, the

rifle going off, as it were, quite unexpectedly. After firing I continue the aim for a moment, as I regard it as a bad practice some have of immediately jumping up to see the effect of their shot, as I have often seen bull's-eyes scored from following this practice, when otherwise, from the rifle's hanging fire, almost any one else would have failed to hit at all." In all cases the rifleman, before pulling trigger, must assure himself that he is aiming at the right target, as it is very easy (particularly at long range) to get shifted to another without noticing it.

Of course, at a moving mark, or on a very windy or dark day, the aim must be quick.

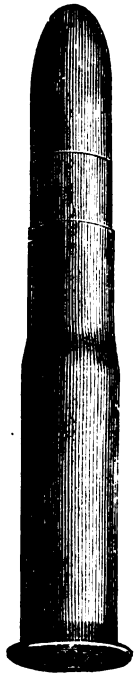
In using military sights, the safest way is to draw a full sight. The difficulty of being certain that the same amount of the foresight is drawn every time—which is indispensable to obtain correct shooting—is much greater when a fine or "half sight" is drawn; there is also more blur with the latter. For this reason, the best shots bring up the front sight until they can just see the edge of the block at the bottom of the V of the rear sight, thus exposing the entire front sight. Some aim directly at the bull's-eye. It is a better plan to aim either at a lower corner or on one side, so as to give a

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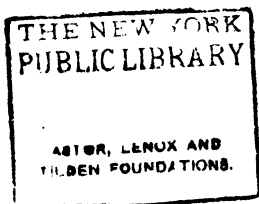


REMINGTON'S VERNIER SCALE FOR MILITARY RIFLES.

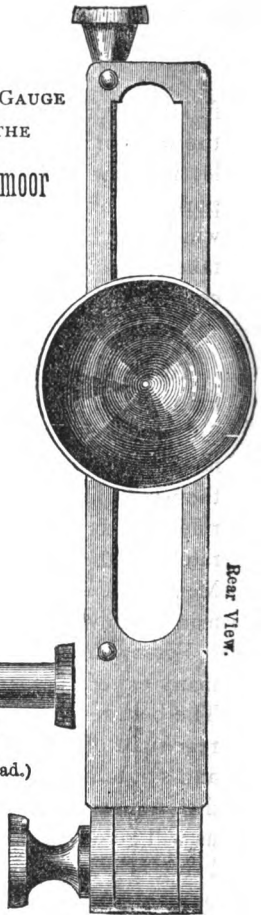
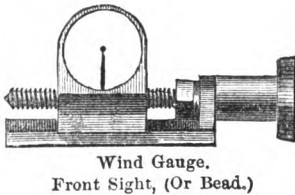
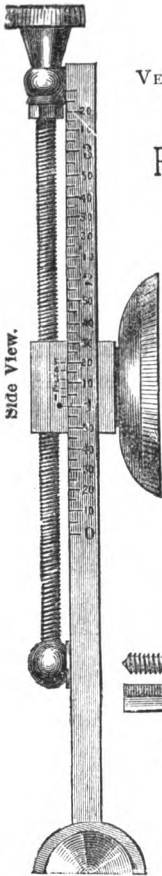
DIRECTIONS.—Turn the screw until the lower line of the Vernier is at the desired elevation. Raise the bar of the rear sight, place the Vernier behind it, the lower part resting on the rear sight. Hold the Vernier and rear sight closely together, and slide the bar down until it touches the clamp on the Vernier. It will be found an improvement to file off the screw below the zero mark.



SPECIAL CARTRIDGE, 44 CAL. FOR LONG-RANGE PRACTICE.



VERNIER AND WIND-GAUGE
SIGHTS USED ON THE
Remington Creedmoor
RIFLE.



LONG RANGE "VERNIER" ORTHOPTIC (OR PREP) SIGHT.

full view of the bull's-eye, and also to allow the wind or the drift of the rifle to carry the bullet into the bull's-eye. It also affords an opportunity of allowing for any sudden changes in wind or light by altering the aim. If the aim is taken directly on the bull's eye, the front sight covers it so as to render the aim uncertain.

WIND.

To become an expert shot, particularly at long range, the effect of wind must be carefully studied. With target rifles the allowances necessary to counteract its effect are made upon the wind-gauge and Vernier scale. On military rifles the elevation can be controlled very accurately by the adjustable Vernier scale, made by Messrs. E. Remington & Son, which no one using a military rifle should be without.

For a side wind, which has the greatest effect, many expedients are used with military rifles. The best results are obtained by inverting the rear sight of the rifle, blackening it with smoke, and scratching a perpendicular line at such a distance from the centre and *toward the wind*, as will give the necessary allowance, this scratch being aligned with the foresight. Others twist or cant their rifle, the effect of which is to throw the ball to the side toward which the

rifle is canted and to reduce the elevation. The trouble with both these methods is that they require very nice calculation, a slight error making them a source of danger rather than an advantage; although the use of the bar sight is becoming more common. The majority of riflemen, when using military rifles or rifles without a "wind guage," "*hold off*" for wind. In doing this, a mental calculation must be made of the distance the ball will be carried, and a spot selected corresponding to that distance, measured from the inward edge of the bull's-eye, so that the bullet will, if possible, be blown into it, the width of the bull's-eye being kept as a margin for an error in calculation. The danger always is, particularly in a stiff breeze, that the rifleman will not hold off enough, as the inclination is to underestimate the force of the wind, and to aim close to the target.

When shooting in a gusty wind, always try and fire when the wind is blowing with the same force. The rifleman must keep his attention constantly directed upon everything from which an idea of the force and direction of the wind can be obtained. The movement of the flags on the range, the smoke of the rifles, where the shots of his companions strike, etc., should all be care-

fully watched. Particular attention should also be paid to the different currents of air caused by the formation of the ground, or shifts of wind, and they should be instantly allowed for.

In long-range shooting, the ability to discern and calculate the force of the wind is nine-tenths of the battle.

Every one who desires to become expert should keep a careful register of his practice (see Forms II. and III., pages 301 and 302), both with military and target rifles, and tabulate and preserve the result of his experience. In keeping this, the direction of the wind should be indicated by the figures on the dial of a watch, corresponding to the point from which it blows (the watch being held so that the target is at XII.), and its force should be carefully noted.

These registers can be obtained from E. Remington & Son

It will be found by experience that a side wind frequently depresses the bullet, in addition to moving it sideways; that, while a front wind retards it and requires a higher elevation, a rear wind reduces the elevation, although not to the same extent; also that the allowance required to be made for the wind increases with the distance.

While it is somewhat difficult to give correct

tables of allowances for wind, the following will prove of assistance :

CLASSIFICATION OF WINDS.

| | | | | | |
|------------|-----------------|---|---|---|---|
| Gentle, | 4 miles an hour | - | - | - | 1 |
| Moderate, | 10 " | " | " | - | 2 |
| Fresh, | 20 " | " | " | - | 3 |
| Strong, | 35 " | " | " | - | 4 |
| Very high, | 50 " | " | " | - | 5 |
| Gale, | 80 " | " | " | - | 6 |

ALLOWANCES FOR CROSS-WIND (IRRESPECTIVE OF DRIFT).

Right Wind.

| Force. | 1 | 2 | 3 | 4 | 5 | 6 |
|-------------------|---------|---------|---------|---------|---------|---------|
| Distance (yards). | Ft. in. | Ft. in. | Ft. in. | Ft. in. | Ft. in. | Ft. in. |
| 200..... | 0. 3 | 0.5 | 0.7 | 0.9 | 1.1 | 1.4 |
| 300..... | 0. 5 | 0.8 | 1.0 | 1.2 | 1.9 | 2.0 |
| 400..... | 0. 7 | 1.0 | 1.6 | 2.0 | 3.0 | 4.0 |
| 500..... | 0.10 | 1.6 | 2.6 | 3.6 | 5.0 | 7.0 |
| 600..... | 1. 4 | 2.0 | 3.6 | 5.0 | 7.0 | 10.0 |
| 700..... | 1. 8 | 3.0 | 4.9 | 7.0 | 9.0 | 13.0 |
| 800..... | 2. 0 | 4.0 | 6.6 | 9.0 | 12.0 | 17.0 |
| 900..... | 2. 8 | 5.6 | 8.6 | 12.0 | 16.0 | 23.0 |
| 1000..... | 3. 6 | 7.0 | 11.0 | 16.0 | 21.0 | 30.0 |

Left Wind.

| Force. | 1 | 2 | 3 | 4 | 5 | 6 |
|-------------------|---------|---------|---------|---------|---------|---------|
| Distance (yards). | Ft. in. | Ft. in. | Ft. in. | Ft. in. | Ft. in. | Ft. in. |
| 200..... | 0. 4 | 0.6 | 0.8 | 0.11 | 1.3 | 1.6 |
| 300..... | 0. 6 | 0.9 | 1.0 | 1. 4 | 2.0 | 3.0 |
| 400..... | 0. 8 | 1.2 | 2.0 | 2. 6 | 3.3 | 4.6 |
| 500..... | 1. 0 | 1.8 | 2.8 | 4. 0 | 5.6 | 8.0 |
| 600..... | 1. 6 | 2.3 | 4.0 | 5. 6 | 8.0 | 11.0 |
| 700..... | 1.10 | 3.6 | 5.6 | 8. 0 | 10.0 | 14.6 |
| 800..... | 2. 6 | 4.6 | 7.0 | 10. 0 | 13.0 | 18.6 |
| 900..... | 3. 0 | 6.0 | 9.6 | 13. 0 | 17.0 | 25.0 |
| 1000..... | 4. 0 | 7.6 | 12.0 | 17. 6 | 22.0 | 34.0 |

The above are calculated for a charge of

ninety grains of powder in a target rifle. For a military rifle, with a charge of seventy grains, and particularly with a 50 calibre, this allowance will have to be increased as follows :

ALLOWANCES FOR A MILITARY RIFLE.

Left Wind.

(Counting from left edge of Bull's-eye.)

| Distances (yards). | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--------------------|----------------|------------------|--------|--------------|--------------|------------|-------|
| | Gentle breeze. | Moderate breeze. | Fresh. | Strong wind. | Very strong. | Half gale. | Gale. |
| 200..... | 0.6 | 0.9 | 1.0 | 1.3 | 1.10 | 2.2 | 2.6 |
| 300..... | 0.9 | 1.1 | 1.6 | 2.0 | 3.0 | 3.10 | 4.9 |
| 400..... | 1.0 | 1.9 | 2.9 | 3.9 | 4.9 | 5.9 | 6.9 |
| 500..... | 1.6 | 2.6 | 4.0 | 6.0 | 8.0 | 10.0 | 12.0 |
| 600..... | 3.6 | 4.6 | 8.0 | 11.0 | 16.0 | 19.0 | 20.0 |
| 700..... | 3.8 | 7.0 | 11.0 | 16.0 | 20.0 | 24.6 | 29.0 |
| 800..... | 5.0 | 9.0 | 14.0 | 20.0 | 26.0 | 31.0 | 37.0 |
| 900..... | 6.0 | 12.0 | 19.0 | 26.0 | 34.0 | 41.0 | 50.0 |
| 1000..... | 8.0 | 15.0 | 24.0 | 35.0 | 42.0 | 54.0 | 68.0 |

Right Wind.

(Counting from right edge of Bull's-eye.)

| Distances (yards). | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--------------------|---------------------------|------------------|--------|--------------|--------------|------------|-------|
| | Gentle breeze. | Moderate breeze. | Fresh. | Strong wind. | Very strong. | Half gale. | Gale. |
| 200..... | | 0.2 | 0.4 | 0.6 | 1.0 | 1.6 | 2.0 |
| 300..... | | 0.3 | 0.6 | 0.9 | 1.6 | 2.6 | 4.0 |
| 400..... | | 0.4 | 0.8 | 1.0 | 2.0 | 4.0 | 6.0 |
| 500..... | Aim centre of Bull's eye. | 0.6 | 1.0 | 2.0 | 4.0 | 6.0 | 8.0 |
| 600..... | | 1.0 | 2.0 | 4.0 | 8.0 | 10.0 | 12.0 |
| 700..... | | 2.0 | 4.0 | 8.0 | 11.0 | 14.0 | 17.0 |
| 800..... | | 4.0 | 8.0 | 12.0 | 16.0 | 20.0 | 24.0 |
| 900..... | | 6.0 | 12.0 | 18.0 | 23.0 | 28.0 | 33.0 |
| 1000..... | | 9.0 | 15.0 | 24.0 | 30.0 | 36.0 | 42.0 |

A gentle front wind requires an elevation of about one point; on a target rifle at 800 yards, if moderate, from two to three. A rear wind or the same character requires a little less.

With a military rifle (50 calibre, 70 grains powder), in practice at 500 yards, about the same allowance on the Vernier scale is required.

The drift of the Springfield rifle, new model, 45 calibre, 70 grains powder and hardened bullet, weighing 405 grains, is 25 inches at 500 yards, or about 11 inches less than the foregoing.

ELEVATIONS.

In practice with the Remington 50 calibre, used by the National Guard of New York, having the sights first issued, a slightly increased elevation will be required over the scale, as follows, viz. :

| | | | |
|--------------------|---|---|-----------------------|
| 200 and 300 yards, | - | - | about 25 to 40 yards. |
| 400 | " | - | " 40 to 50 " |
| 500 | " | - | " 60 to 75 " |
| 600 | " | - | " 70 to 85 " |

This is calculated for a half sight, and upon a still day. It will be diminished or increased as a full or fine sight is used. The difference between a fine and full sight at 500 yards is four points on the Vernier.

The sights made on the new pattern are scaled 100 yards lower than the old, while the V is less deep. Consequently, at 200 yards, a full sight at the 100 yards elevation is recommended. At 500 yards an elevation of 450 yards, or 21 on the Vernier, with them is generally correct, corresponding to 575 on the old pattern. At distances under 500 yards the increase in the elevation is generally made upon these rifles by placing a piece of the pasteboard torn from the boxes in which the cartridges are issued under the flap of the sight. At 200 yards a single thickness is sufficient; but at 300 and 400 yards, except *on damp days*, two will be required. All guns differ more or less, and men differ in aiming the same gun. In armory practice at 40 yards, a fine sight must be drawn at least four inches below the mark.

For the cavalry carbines (same model), at 100 yards, draw a fine sight; at 150, show one-third; at 200 yards, three-fourths of the foresight without elevating the rear sight. At 250 and 300 yards aim through the opening in the rear sight.

In practice, after the first four shots, a rifle-barrel fouls, if it be not wiped, so as to cause the shots to drop slightly, particularly on a hot, bright day. This must be kept in mind, and

the elevation raised, if required. A one-hundredth on the Vernier will be enough at a time.

Too much care cannot be taken, with the first shot especially, in a match. With open sights, it is of the utmost importance that the marksman should know, when about to deliver his second shot, the exact portion of the foresight seen through the V when the first shot was fired, together with the exact spot upon the target where the top of the foresight was held.

The particulars of previous shots should always be remembered, but this is of more importance at first, for the reason that the elevation and aim might be altered unnecessarily, and the advantage of the previous shot lost, should the result be unsatisfactory.

After having made several good shots, the aim or elevation should not be changed because one shot seems to go wild. If the first shot, however, is not satisfactory, the sighting for the second should be changed.

With military rifles, the sights should not be altered for a slight deviation, but a slightly different aim taken.

Every man should invariably shoot with his own rifle, or he can expect to learn but very little.

LIGHT AND ATMOSPHERE.

The condition of the light and atmosphere must be always remembered in long-range shooting. On bright days the target is refracted, so as to apparently stand higher than its real position; consequently, theoretically a lower elevation is required than on a dull day. On the other hand, on a hot, bright day, the powder cakes and fouls in a rifle-barrel, retarding the bullet and requiring the elevation to be raised. A hot barrel, also, drops a bullet, and a clean barrel shoots high. This is the explanation of the sudden dropping of the ball after a few shots which sometimes seems so unaccountable. There is also greater friction in the barrel, on a hot day, even when it is clean. Practically, therefore, at Creedmoor, on a hot, cloudless day, a higher elevation is required at long range than in gray, damp weather, the difference with military rifles shot without cleaning being as great as five points on the Vernier. Many riflemen fire a preliminary shot so as to heat up their rifle-barrel a little before shooting in the match, and thus be able to fire all their shots with the barrel of a uniform temperature and some go up half a point after the first shot. If the weather be cold the effect of its being damp

will not be noticed. Generally, as the day becomes cooler, the shots will be found to drop. The more moisture there is in the air the less elevation is required, the best shooting being done on the damp, gray days.

The English text-books on rifle practice insist that, in practice with open sights at 500 yards, if the target is suddenly lighted up by the sun, the marksman being in shade, he must lower his elevation *two feet*; while if he is in the sun and the target is overshadowed, he must raise his aim a similar distance. The refraction is much less in America, but alternations of bright light and shadow affect both the mirage and the eyesight. They affect individuals differently, and their effect should be studied by those desirous of excelling.

For every increase of 5 degrees in temperature 1 point more elevation is required. In very cold weather the reverse is the case.

HOW TO COMMENCE FIRING.

Before firing at long range, the rifleman should make a careful scrutiny of the wind, light, and atmosphere, and enter them on his register. He should then, from his record of previous practice,

calculate what elevation and allowance for wind is required. If without such a record, he should reason it out about as follows: "The wind is a fresh breeze from IX (or left)—this will require 4 points on the wind-guage, and also one point extra elevation. The weather is damp and sky cloudy—this will require 2 points reduction in elevation. The approximate elevation given with my rifle is $2^{\circ}.5$; the elevation for to-day will therefore be $2^{\circ} 4'$, with 4 points for left wind."

Having fired, the result, if a hit, will enable him to verify and correct his calculations, *provided he is STEADY*. If he has missed altogether, he must decide whether the error was in himself, or in his elevation, or in his allowance for wind. If the elevation is wrong (as is most likely to be the case), he should raise (or lower) his elevation a little less than half the height of the target (or 3 feet), allowing a little margin for an error in holding, which will bring him on, if his ball has just gone over or under. If still a miss, he should, if in the dark as to the difficulty, lower (or raise) his elevation the same distance below the first shot. If still a miss, go up a little less than six feet from the original elevation, and then come down the same distance at the next shot. By "feeling for the

target" in this way, first up, then down, a very few shots will be required to "get on." Care must be taken not to be too firm in adhering to a theory. If after a fair trial it does not give success, it should be abandoned. The proper allowance for the wind is ascertained, in case of doubt, in a similar manner—*i. e.*, by "holding off" more than at the first shot, and then reducing the allowance, and so alternating until the target is struck.

SIGHTING SHOTS.

In most matches a rifleman is allowed to take one or two preliminary shots, known as "sighting shots," which do not count on his score; and by carefully observing the effect of these, he can form a pretty good opinion of the conditions he has to contend against.

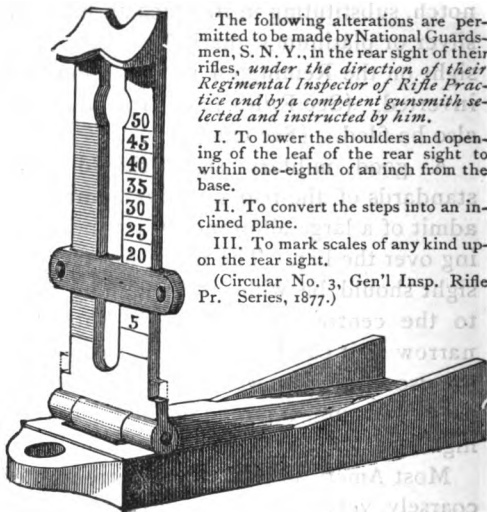
These can be fired in any position, and when the match is to be shot standing, the first of these shots should always be shot lying, so as to get the elevation and force of the wind as exactly as possible. The second should be fired standing, to see how it affects the shooter.

MILITARY SIGHTS.

In discussing the question of the best sights a wide field is presented. In military compe-

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ALTERATIONS IN SIGHTS OF REMINGTON RIFLE.



The following alterations are permitted to be made by National Guardsmen, S. N. Y., in the rear sight of their rifles, *under the direction of their Regimental Inspector of Rifle Practice and by a competent gunsmith selected and instructed by him.*

I. To lower the shoulders and opening of the leaf of the rear sight to within one-eighth of an inch from the base.

II. To convert the steps into an inclined plane.

III. To mark scales of any kind upon the rear sight.

(Circular No. 3, Gen'l Insp. Rifle Pr. Series, 1877.)

titions the shooting is required to be with "open sights," and the question is therefore simplified.

As above stated, many good shots prefer a rear sight on a military rifle without any notch, substituting in its place an inlaid line of silver or platinum to mark the centre. The rear sight on the Remington is now allowed to be inverted. (See Rules, page 213, ante.) It may also be filed. (See cut.)

A good military sight should have the standards of the rear sight far apart, so as to admit of a large allowance for wind in shooting over the bar. The notch for the off-hand sight should be wide and inclining gradually to the centre. The foresight should be as narrow as it can be, and stand without injury the use a military weapon is subject to. To prevent being injured, it should not be too high.

Most American military rifles are sighted too coarsely, very little attention having been apparently paid to that most important part of their construction.

LONG-RANGE SIGHTS.

For rifles used for both sporting and target practice the "Beach sight" is extensively used

as, by turning it up or down, the rifleman can have a globe or open sight at will, a peep sight being attached to the small of the stock.

The practice at Creedmoor has revolutionized the system of sights in use for long range.

The most improved American target rifles are fitted with telescopic sights, with crossed lines with which a rifleman can "draw a bead" on a pigeon at nearly half a mile. These, however, though accurate enough, are only valuable where the rifle is made very heavy (from 15 to 30 pounds), and is fired from a rest—a species of practice valuable for experiment, but savoring somewhat of light artillery, and which is not in accordance with a military system.

They are not, therefore allowed by the National Rifle Association.

The basis of the sights used at Creedmoor in the most approved long-range rifles is the old-fashioned "peep and globe." To ensure accurate shooting, the rear sight is made with a Vernier scale* operated by a screw, by which an alteration of one-hundredth of an inch, and

* The only long-range rifles that have been used at Creedmoor to any extent up to the present time are the Remington and the Sharps. The references made to such rifles will, therefore, of necessity be confined very much to them.

even of half that amount, can be made in the elevation, the result being exact, and recorded in figures—the only way in which a correct record of elevations can be kept.

On the Remington rifle the divisions on the Vernier are termed degrees and minutes, and on the Sharps decimals of an inch. On the former each minute is $\frac{1}{96}$ of an inch, and corresponds upon a 34-inch barrel with $1\frac{1}{8}$ of an inch, at each 100 yards.

On the Sharps rifle each subdivision is $\frac{1}{100}$ of an inch, corresponding theoretically to $1\frac{1}{2}$ inch to every one hundred yards. As no man can hold or sight a rifle at 1000 yards within ten inches, the elevation on both rifles is practically the same, or about two inches to each 100 yards for each subdivision on the Vernier, that is, twenty inches at 1000 yards. The elevations on the Metford and Rigby rifles is about the same.

The subdivisions upon the wind-gauge of both the Remington and Sharps rifles are about $\frac{1}{40}$ of an inch, and are equivalent in practice to two inches at each 100 yards, or 20 inches at 1000 yards, on the 34-inch barrel.

The above figures are official, those given in some of the circulars issued by the companies being incorrect. As the errors incident to aim-

ing at long range will, in most cases, increase the effect of any alteration in the sights, care should be taken to keep well within the elevations which would be mathematically correct. It must also be recollected that the velocity of a bullet decreases with the distance, and as it loses its velocity it becomes more likely to be affected by currents of air. Consequently the effect of any change upon the sights is greater proportionately at long than at short range. The effect of wind, etc., increases in a still greater proportion, that which would require an alteration of 2 points in the elevation at 800 yards, requiring $2\frac{1}{2}$ at 900, and 3 at 1000.

The best riflemen prefer to have the peep hole of the rear sight of considerable size, as affording more light, and consequently allowing a better sight to be taken. In the Metford rear sight, discs having different sized apertures may be used; and it has been stated by some of the Irish team of 1874 that they have, in foggy or dark weather, done good shooting by removing the disc entirely, so as to leave an aperture of nearly a quarter of an inch. Every rifleman should, therefore, have an extra disc, with a large aperture, to use in dusky weather.

The Vernier sight is usually placed upon the small of the stock. General Dakin, and others

who shoot on their backs, have it placed upon the heel of the butt. When the latter is the case, it makes the distance between the two sights nearly a third greater than when placed upon the small of the stock, and consequently a proportionally greater allowance both for elevation and wind will be required.

With the sight in this position, to ensure accuracy, great care must be used to keep the stock of the rifle well oiled, and to preserve it from getting wet, as, if it shrinks or warps in the least, the aim will be greatly impaired.

The front sight, upon all long range rifles, is made to traverse from right to left by a screw, and has a scale marked with divisions so as to permit an exact allowance to be made for wind. To prevent any loss in elevation from tipping the rifle, a small spirit level is placed in front of the foresight, so that, when the rear sight is perpendicular, the bubble is directly under the foresight. In aiming upon ground which is not level it is almost impossible to keep the sights plumb without it.

The makers of American rifles are not as yet sufficiently careful in regard to sighting them. While every rifle varies slightly, from the difference in the shape of the barrel or stock, the sights are made exactly alike, and it

is no easy task to find out the exact allowances required. In consequence, one rifle is no guide to another of precisely the same make.

The proper method is to ascertain the zero of each rifle, both for elevation and wind, by actual experiment, before the sights are marked, and then to put on the scale so that the zero upon it shall correspond. If this were to be done (as is done with the Metford and Rigby), every rifle of the same makers would shoot alike with the same charge (with the exception of the slight difference resulting from the personal equation of riflemen), *and one of the main difficulties in managing a team would be avoided.* In England this zero is obtained by having each rifle fired at a very small mark, at 12 yards, to avoid all effects of wind. This distance, however, would seem too small. Still at the longer ranges and under various conditions of weather, rifles having the same zero will be found to vary somewhat.

When the sight is placed upon the heel of the butt, the divisions upon the sights need to be slightly larger; but this can be easily calculated.

To avoid the difficulty of keeping the eye upon the level and foresight at the same time, a sight has been recently introduced consisting of two

pins placed together, one of which is pivoted with a weight at its lower end, so as to throw it out of line with the other, if the rifle is twisted. It has not, however been tested so as to allow its merits to be known.

In both the Sharps and Remington rifles the globe of the front sight is constructed so as to permit the use of various descriptions of sights, which consist of discs slipped into a slot in the globe and held in place by a screw. What is the best sight is a matter upon which there is a great difference of opinions.*

With the square bull's-eye formerly in use at Creedmoor the caliper sight (No. 8) was preferred by many of the best shots, including Fulton, Coleman, and Gildersleeve. This was held half way up the bull's-eye, so as to just embrace it, and was very sensitive, disclosing the least "wobble" of the holder. It does not, however, appear to give as much satisfaction upon a round bull's-eye, as it permits of too much uncertainty as to elevation. Nevertheless it was used by most of the American team of 1875 in all their competitions. It possesses the advantages that in a mirage, when the bull's-eye seems

* See cuts of foresights allowed by Rules of the National Rifle Association, page 213.

to lengthen, the aim can still be taken at its centre. Also when the outlines of the bull's-eye appear to grow dim from the strain upon the eye in aiming, relief can be obtained by lowering and raising it, without losing the aim. Those using the caliper sight should have them of different sizes both of bar and aperture, to suit different conditions of the atmosphere.

An open bead (No. 1) is used by Colonel Bodine, and is coming into vogue since the adoption of the round bull's-eye.

At the longer ranges it is necessary to have the aperture of this sight of a different size from those generally in use, or the bull's-eye will appear indistinct.

The bar and open bead (No. 14) is hardly as good as the open bead, as it excludes too much light.

Both Hepburn and Yale, in addition to other good shots, adhere to the old-fashioned bead or pin-head, which they place just on one side of the bull's-eye. Others prefer the slit bar (No. 12) which makes a white bead on the target, and, although habitually held just under the bull's-eye, shows plainly on any part of it. It requires, however, two points more elevation than those which embrace the bull's-eye if held under it.

The Goodwin bar, a favorite sight abroad, is

a knife-edged bar, with a platinum line down the centre, and without any globe or shade. It has not been introduced here.

To avoid any glare or reflection from the sun, all sights, whether of military or target rifles, should be blackened with smoke. Burnt rubber is very good, or a wax match, or, better still, lampblack dissolved in ether; the latter must be kept tightly corked to prevent evaporation. In addition, the best shots at Creedmoor make a shade for the whole front sight upon their target rifles by wrapping a piece of stiff paper around the barrel, so as to enclose it, making a tube three inches long. Some have a regular brass shade for the purpose. This would not be allowed upon military rifles.

In shooting toward the sun benefit will be derived from increasing the size of the eyepiece so as to shield the eye. A simple way to accomplish this is by cutting a child's rubber ball in two, and passing the screw of the eyepiece through it, and screwing the disc on, leaving the opening of the rubber toward the eye. Some screw a broad piece of leather, the length of the sight, upon it, in the same manner, for this purpose, as well as to guard against an escape of gas from a bad cartridge.

Many experiments have been made with

crossed hairs, glass sights, etc., etc., but it is believed the foresights above described cannot be improved on. They are the only ones used by Creedmoor out of the many shown upon page 203.

In using the Vernier sight at long ranges, the riflemen must, as it were, feel the pulse of the weather with them. Every change of the wind and weather must be watched, and met by moving the sights, the aim being kept in the same place; and any tendency of the shots to fly high or to drop, from unknown causes, must be anticipated and checked in the same manner. This must be done carefully; often half a point ($\frac{1}{100}$ of an inch) will be just enough to keep you in the bull's-eye.

When it is stated that Major Fulton has been seen, in practice at 1000 yards, to alter his wind-guage twelve feet between two successive shots, and make a bull's-eye both times, the advantage they afford to those skilled in their use will be recognized, as well as the amount of judgment and perception required to use them properly.

RIFLES.

Among other results to which Creedmoor may justly lay claim is the practical settlement

of the much debated question of breech-loader against muzzle-loader in favor of the former.

For sporting or military purposes, the breech-loader has long since driven the muzzle-loader from the field. In match shooting, however, it has been contended, up to the time of the International matches of 1874 and 1875, that the muzzle-loader was the most accurate. All the members of the American team in these matches, however, used breech-loaders, and their score, never excelled upon any previous occasion, may be considered as equally a triumph of American manufacturers as of American riflemen. Their opponents used the best muzzle-loading rifles, and their defeat is to be ascribed to a certain extent to their inferiority in some respects to the breech-loaders used by the Americans.

For long-range shooting, as above stated, but two rifles are used at Creedmoor—the Remington and Sharps. Both are breech-loaders, 44 calibre, and 10 pounds weight, and are so perfect that it is difficult to make a comparison between them. The cartridges made for the former are made, in the author's opinion, with the most care, and are more to be relied on, many good shots using them just as they come from the factory. The bullet also seems to be superior. On the other hand, the cartridges of the latter

contain a lubricator, and may be used without wiping, which cannot be done with the former, with the regular special cartridge; although it can be done by using the new special military cartridge (see page 276).

For short range, the Ballard, Maynard, Winchester, and others, are used, and liked. The former is one of the best sporting rifles in use, and the scores it has made at 200 yards have never been beaten. The charge, however, is too small to permit it to be used over that distance, and even at 200 yards it allows the wind to effect it too much. The Maynard is a capital rifle, particularly since it has been made so as to dispense with a cap. It has made good scores up to 500 yards, but no further, the bullet being too small and the charge too light.

Among military rifles, the Remington, used by the State of New York, has justly given great satisfaction. Though of 50 calibre, and with a charge of but 70 grains, seven successive bull's-eyes have been made with it at 500 yards on several occasions. It would be improved by having the barrel browned, instead of bright.

The new Sharps military, 45 calibre, using 90 grains of powder, has, in the hands of Colonel Gildersleeve, won more prizes than any other

military rifle used at Creedmoor. It also bore off all the honors at the Montreal Rifle Match of 1874 from the best shots of Canada.

Messrs. Remington & Co. have just made a military rifle with a similar calibre and charge, which has done wonderful shooting.

While with these rifles many do very well in matches, for ordinary military purposes, the charge used (90 grains) would seem to be excessive. Seventy grains of powder is as much as a soldier can be expected to fire from the shoulder, and is sufficient to give all the accuracy required for military purposes. With this charge, the Springfield, new model, recoils with a force of 174 pounds, and this is all a man in ranks "can stand up to" with comfort. In addition, there is no object in a soldier using a heavier charge, 600 yards being as far as troops can be expected to shoot with accuracy, and too long a cartridge is a nuisance for military purposes.

In preparing prize lists, it is, therefore, but fair to handicap these rifles as against those of larger calibre and lighter charge.

The new Springfield has given great satisfaction. It is extremely accurate, even at long distances, requires almost no cleaning, and is strong and safe.

The Ward-Burton magazine carbine is well

liked. Up to 500 yards it has shot well. The single-fire model is not particularly admired.

The Peabody shoots well. Its recoil (like that of the Martini Henry) is said to be excessive.

The foregoing rifles are all that have been used to any extent at Creedmoor. There are, however, many other good rifles upon which, in the absence of personal experience, no opinion can be given upon their merits.

The favorite bore for all rifles is .44, .45, or .46. For short ranges .40 calibre does well; but .44 is less affected by the wind, and is also better for game. For long range buffalo shooting, where the game is not alarmed, the long .44-calibre bullet is coming into use on the plains; but for large game "on the jump" .50 calibre is better.

The long, hardened, .44-calibre ball makes a clean hole, often inflicting a fatal wound with but little shock. The .50 calibre, on the other hand, strikes a smashing blow, making less penetration, but disabling an animal much quicker. This is greatly enhanced by the use of a soft bullet, which spreads out on striking, and makes a more severe wound. The lead also melts, and flies all over, producing almost the same effect as from an explosive bullet. This fact was the cause of the complaint of the

French that the Prussians used explosive balls in their late war.

An express bullet is an amplification of this principle, being a long, hollow, pointed bullet of soft lead, whose lightness, with the heavy charge used, gives it great velocity, and a very long, point-blank range. On striking, the front spreads out like a mushroom, tearing a terrible hole; while the shock on the object hit is such as to render the largest game helpless. This rifle is extensively used by English sportsmen in India and is also used to some extent on the plains.

Every man, on purchasing a new rifle, should carefully sight it at every distance by actual practice. Even target rifles vary more or less from the scale elevations, and few military rifles correspond with the elevations marked on the rear sight.

CARTRIDGES.

The most approved cartridges are the brass central fire.

The copper rim-fire cartridges are cheaper, and, although sufficiently accurate for sporting purposes, are not liked (except at short distances), for match shooting, from their deficiency in power and range. At 200 yards the extra long .44 calibre is extensively used; but

the others contain so little powder as to be easily affected by the wind, and therefore not to be depended upon. For hunting, the long .32, .44, and .46 are mostly used.

The brass shells most in use are .40, .44, and .50 calibre. The .40 calibre, with 50 or 70 grains of powder, is extensively used in off-hand shooting, the smaller charge being recommended for hunting purposes, and as being best adapted to the rifle. The .44 calibre is the only bore used for long range, what is known as the "special" cartridge (see cut, opposite page 233) being manufactured for this purpose. The .50 calibre is only used for military purposes or large game upon the plains.

Brass shells can be reloaded, and will stand a heavier charge than copper ones. When economy is the object, and the rifleman has plenty of leisure, this is recommended. Many long-range shots do this; but the majority appear to think that, on the whole, it hardly pays, and only use new shells, even when they load them themselves.

When shells are to be reloaded, none but those of the best make should be used. Before loading them, they should be inserted in the loading chamber. If they are expanded so that they will not enter it (as is frequently the case), they

should be thrown away, for if they will not enter it they will not fit the rifle, both being of the same size.

If shells be thrown in a vessel of water a short time after firing, the residum left after the discharge can be easily removed with a brush, when the shells, after being dried, will be fit for use. If the powder dirt be not entirely removed, the bullet will swell the shell so it will not enter the chamber. Some clean their shells by rubbing them with a mixture of two parts of sulphuric acid, two parts of water, and one part pulverized bi-chromate of potash, and washing them in hot water, which renders them as bright as if new. Cider vinegar is stated to have the same effect.

In reloading, care must be taken to see that the shell is perfectly sound, for, with a heavy charge, they are liable to crack, in which case the gas is bound to come out so as to make a man nervous about his eyes, no matter what breech-loader is used. For this reason, with long-range rifles, a wide piece of leather, attached to the rear sight by the screw of the eye-piece, and extending to the stock, is frequently used at Creedmoor, as previously mentioned.

In loading cartridges for long-range shooting,

great care must be used, and, to secure *certainty*, the marksman must do it himself. No one can expect to obtain accurate shooting unless precisely the same charge is used every time. It is stated that one grain in a charge of 80 grains of powder will make a difference of 9 inches at 1000 yards. At the same time, a difference of that amount, or of five grains, in the ball makes no practical difference. A larger variation, however, is fatal to good shooting. The powder should be of a uniform quality, bought in quantities, and well mixed, that of moderately large grain, and of low density, being preferred. Fine powder both fouls a gun and causes it to recoil. Hazard's F. G., or the American powder, is that generally used at Creedmoor. If allowed to get damp, powder loses its strength, and it should therefore be kept in a perfectly dry place

Weighing out charges is a most tedious process; it is also unnecessary. Flasks can be obtained which will throw a charge within a grain; and measurement by bulk is much more likely to prove correct than by weight, the moisture of the atmosphere greatly affecting the weight of powder at different times. Major Fulton never weighs his charges, but depends on his own flask, and the same was the case

with Rigby and all the Irish team, and their example is generally followed. In using the flask, a certain uniform number of taps should always be given upon the leg to ensure obtaining a similar charge at each loading. Some good shots secure uniform charges by passing a scoop a specified number of times through a quantity of powder in a trough, occasionally weighing a charge as a test. The best shots in Great Britain and Canada insist that no advantage is gained by using a charge of over 90 grains, as that is all the rifle will burn. Mr. Hepburn (who has experimented extensively on the point), and other good shots in the country, are of the same opinion. Yet the tendency is toward heavier charges; and all the American team of 1875 used from 100 grains to 108 grains, and considered that it gave them an advantage, their bullets being less affected by wind than those of their opponents. In using 100 grains, three points less elevation is required than with a charge of 90 grains. In all cases, the charge must not be pressed into the shell so as to crush the powder, as that will impair its strength. If it will not go in it by shaking, etc., a longer shell must be used. By using a funnel two feet long, and pouring the powder in very gradually, 100 grains can be introduced into

the ordinary shell, without tapping or shaking it, and without packing the powder, and yet leave sufficient space for the bullet.

Swedged and patched bullets for long-range practice can be obtained from the various gun-makers. They should always be weighed, and all ranging over six grains rejected or reserved for experiments. A few riflemen, however, make their own. All long-range bullets are now made with a paper patch, which prevents leading the barrel. The model used in the best rifles is long, smooth, and oval-pointed, composed of one part tin to twenty parts of lead, weighing about 550 grains, being that shown in cut, opposite page 233. With a hardened bullet, shallow grooves can be used in the rifle, and the friction and fouling greatly lessened. It also permits of a heavier charge of powder. The experiments at Springfield have demonstrated that no substantial increase in accuracy is obtained by not inserting the bullet well in the shell, or not compressing the cartridge on the ball

In loading shells remove the exploded cap by any one of the tools sold for that purpose. Put on a fresh cap, *being careful to see that it is pressed below the base of the cartridge*, so that it will not be struck by the breech-piece in closing

the gun; pour in the powder, insert the bullet carefully, and press the cartridge into the loading chamber, which straightens it and forces the bullet into the proper distance.

It is most important that the bullet should be inserted in the chamber in a line with the axis of the barrel. Many careful shots take the precaution of inserting their cartridges in a loader before placing them in their rifles, to be certain that this is the case.

For military purposes bullets are made with canelures, which hold the lubrication which is necessary when a piece is not frequently cleaned. These canelures are not used in long-range match rifles. The Rigby and Metford rifles, used in Great Britain, load at the muzzle, and use a greased felt wad, which is rammed down on the powder, at once cleaning and lubricating the barrel

In the Sharps rifle a lubricating disc is placed behind the ball, which it is claimed will dispense with the necessity of cleaning after every shot. Yet the crack shots who use this rifle invariably wipe out their rifles (which, however, is comparatively easy with a breech-loader), preferring the *certainty* which arises from having a perfectly clean barrel.

In the cartridges for the Remington long-

range rifle, as made up to the present time, the only lubrication has been by greasing the paper patch, all lubrication not absorbed by the paper being removed, and the barrel being wiped *perfectly clean* after every shot.

The success of Major Fulton at Wimbledon would seem to show that wiping the barrel is not indispensable. He used the Remington Creedmoor rifle, with the factory cartridge, made for the special military rifle, which differs from the ordinary cartridge only in having a stiff wad placed upon the powder on which is placed a lubricating disc of beeswax and sperm oil, and followed by the bullet, the shell being made somewhat longer. With this cartridge Major Fulton states that he fired his rifle over 100 times consecutively without wiping, and then had such confidence in it that he shot the St. Ledger match with it in that condition, winning it with a *full score* of bull's-eyes.

Upon these occasions the weather was extremely wet, and the result in the burning heats of America might be different, although he states that he has experimented with this cartridge, at Creedmoor, upon some extremely hot days, with the same success. Nevertheless, the others of the team think that it is hardly safe to dispense with wiping in an important match. It

is hoped that Major Fulton's experience will be confirmed, and the necessity of wiping out avoided, as it will add greatly to both the comfort of long-range practice and the speed with which it can be carried on.

Wood powder, which has recently been introduced, is claimed to accomplish this result, as well as to avoid smoke, reduce the recoil, and increase the penetration. It has not so far been sufficiently tested to allow it to be recommended.

In wiping out use a wet woollen rag, and then an oiled one. If there is any powder caked in the barrel, a brush will remove it. The most approved plan is to pass a wet brush through the barrel, which loosens the crust so that it is easily removed by wiping with a woollen rag; and an oiled rag passed through the barrel leaves it in perfect condition. The fouling is apt to cake in front of the cartridge chamber, and it is indispensable that this place be kept clean to secure accuracy.

Always clean from the breech, and wipe the bullet with a greased rag before inserting it in the chamber.

In military rifles wiping out is not permitted during a match. Special care should be observed, therefore, to see that the ammunition

used is well lubricated. After each shot blow through the barrel, as the moisture of the breath will tend to prevent the fouling from caking; and, for the same purpose, keep the breech-block open until it is time to reload, to allow a circulation of air through the barrel.

It must be remembered that a rifle, which is constantly in use, is apt to have its accuracy impaired after some three or four years from the wearing of the barrel. If, therefore, a rifle is found to shoot wild once in every few shots, when it is known that the ammunition is all right and the shooter is steady, the barrel should be carefully examined.

TEAM SHOOTING.

In the shooting of teams, whether with military or long-range rifles, the greatest improvement will be found to result from proper organization and management. Much depends upon the person selected as the "Captain of the Team." He should be a practical rifleman, but, unless a man of remarkable nerve, should not himself shoot, either in the match or in the previous practices, except perhaps occasionally to test some question that may arise.

The final selection of those who are to shoot in the team should take place as early as is

practicable. In the preliminary matches the contestants are competing for places on the team, and are more apt to keep their information to themselves than to help each other, while after their places are secured they will assist each other greatly; the improvement in the shooting from this cause alone being usually fully twenty per cent. In the selection of the team, it must be remembered that steadiness and reliability *in the match* are all-important. Consequently these qualities should control the selection of the men, even when it puts a man with a low score in the preliminary competitions over one with a higher one. The rule of selecting by averages alone threw Rigby out of the Irish team of 1875, although their best shot. Tried men should always be preferred, and erratic shots shunned. As soon as the team is selected its Captain should decide upon the order in which the men are to shoot, which order should always be adhered to. The first men to fire should be selected for their judgment in relation to wind and elevation, and the last should be the most reliable and steady shots in the team. The International match of 1874 was decided by the last shot fired, and a similar occurrence is liable to happen in any match. If more than one

kind of rifle is used in the team, they should be squaded together. The Captain should keep a careful record of the elevation of each rifle in every practice and (as all rifles differ more or less) calculate the exact difference between them, so that each member of the team will know what elevation upon the rifles of their comrades correspond to those upon their own. When match rifles are used, the men should always aim at the same place, making the necessary allowances by moving their sights; and the same rule should be habitually followed even with military sights, as far as the elevation is concerned. With match rifles there is no difficulty in keeping a record of the elevations of the team. With military rifles Remington's Vernier scale should be used for this purpose (see cut, opposite page 243).

If the exact difference between each man's rifle is known, and the men are steady, when one of them "gets on," the Captain can tell the others what their elevation should be; and, in following each other, every change of wind or weather can be noted, so that, if one man makes a bad shot, his successor will make a better.

The practice should always be as a team, and should be constant, and, above all, deliberate,

everything being conducted as in a match. The weaker shots should be prompted by those more skilled, and any change in the wind or elevation at once communicated to those who are next to fire.

In the International match of 1875 a miniature target was erected at each firing-point upon which the shot of each man was indicated by a different colored pin inserted in it, the first man's shot being shown by a red pin, the second by a white, and the third by a blue. A paper was attached to the target ruled with a column for each man, in which, after each shot, he entered the elevation and the allowance for wind he used.

In this way each man could at a glance see how the bullets were tending, and take advantage of the experience of his companions, without having to run around to ask questions.

One of the best captains of a military team at Creedmoor made a practice to measure the elevation of each man upon the Vernier scale before he commenced firing, and to tell him that used by those firing before him, and the result.

In an important match the score should be kept in duplicate by a representative of each team. A similar representative should also be

placed at each target to avoid any error in the marking.

In long-range matches each team should have a telescope "spotter" at each firing-point used by their men. If the system of colored pins is not used, he should be provided with small card targets, on which he should mark the situation of each hit and hand them to the firer after each shot, so as to enable him to know the exact place struck without straining his eyes by watching the target.

In the International match of 1874 a great advantage was obtained by having a member of the reserve stationed at each firing-point watching for any shift in the wind and warning the men firing if any change of aim was required while they were aiming. This will, however, only do where a steady experienced man can be had. Every arrangement for the match should be carefully prepared beforehand, and nothing left to be done on that day which will take up time or worry the men. All teams should be kept together, and their comfort should be specially looked after. Water, etc., should be on hand at all times, and a proper lunch provided. Under no circumstances should they be allowed to be bothered in any way, or allowed to indulge in any excess.

Neither should they be informed how their opponents are shooting, as nothing is more apt to render them unsteady.

Discipline^d and union in a team will always enable inferior marksmen to surpass those who are much better individual shots, but have a poorer organization.

RIFLE ASSOCIATIONS.



General instructions for the formation of rifle associations in different localities, together with a form of by-laws, will be found annexed to the Annual Report of the National Rifle Association for the years 1874 and 1875.

Those associations should confine their attention, in the main, to practice with military rifles, not only on account of the advantages to be obtained from training the National Guard and the public to the use of military weapons, but because the number of those using long-range rifles will of necessity be limited. It will be found advantageous for such association to employ markers by the month, and for the members using them to be charged a certain sum an hour. When not occupied in marking these men can be used in improving the range. Boys should never be allowed to serve as markers. Great care should be exercised in the selection of score-keepers in matches. Unless re-

liable men are employed, the danger of incorrect scoring, through fraud or carelessness, will be very great, and accidents are apt to occur.

Volunteer scorers may be relied on for a short match, but not for a meeting lasting several days.

In all competitions, the prizes should be more numerous than valuable, and a number provided from which previous winners of prizes should be excluded. In this way young shots may be encouraged, and the danger of having all the prizes carried off by a few men avoided.

In matches each man, upon entering, should receive a register ticket, 3x4 inches. The tickets for the different matches, as well as for different distances in the same match, are designated by different colors. Each one should be numbered and contain blanks for the name of the marksman, the target, and hour at which he is to shoot, and his score, having a coupon attached containing similar blanks. (See Form VI., page 303.)

The assignments of the targets should be made by lot, after all the entries are received, and be at once posted upon the bulletin board (which should be placed in a central position), directing numbers so and so to shoot at a such and such targets. Teams should be kept to-

gether. Competitors should then proceed to the targets to which they find they are assigned and hand their tickets to the score-keepers, who should place them in a tin frame holding ten. The men should be called up in twos (except in long-range competitions, when they fire in succession), who fire alternately till they have fired their sighting and scoring shots. As each man's shot is signalled, the scorer should call his name and the value of the shot, as "Brown—four," at the same time entering it upon his ticket. When the score is completed, he should add it up, and announce the aggregate—"Smith—ten," etc.—and tear off the coupon (which is a duplicate of the ticket, and give it to the man), retaining the ticket, which he should hand to the Superintendent, who should take it into headquarters.

Any alteration on the ticket should always be required to be initialled as prescribed at page 155. Any man delaying the match should be passed, and any one acting discredibly disqualified from competing in other matches. The latter regulation should be rigidly enforced in all cases.

Communications with the competitors, during a match, should be by notices posted upon the bulletin board. This they should be required to

watch, and their neglect to do so never be accepted as an excuse.

In order to secure an equality, target rifles, unless handicapped, should not be permitted in military matches. Interesting matches are frequently made by permitting them to be used at longer distances, as at 800 yards as against military rifles at 500 yards. Special military rifles, with small bores and heavy charges, should be discriminated against in a similar manner.

The best way to sort out the tickets is to have a board provided with nails, each of which is numbered from the highest possible score downwards. By having each ticket punched with a hole the size of the nail, it can be placed upon the one bearing a number corresponding to the score entered on it, and all confusion in arranging them avoided.

The entries for each match should be kept in a separate book. If not, delay and inconvenience will be inevitable, as they have of necessity constantly to be referred to.

The general arrangements for a match should be placed in the hands of the Executive Committee or Officer, who should attend to all details. They should carefully watch both markers and scorers. The knowledge that this is being

done will do much to prevent carelessness in the marking.

Protests and complaints not having a substantial foundation should be discouraged. All protests should be heard and decided upon the spot, whenever practicable. If delayed, it is difficult to ascertain the facts in regard to them. While every endeavor should be made to ensure fairness in making a decision, when once made it should be firmly adhered to.

The greatest benefit in developing good shots and building up an interest in rifle practice will be found to result from badges offered for competition monthly, not to become the property of the winner until won a certain number of times. The longer the struggle for these badges continues the more their possession is valued.

RANGES.

The securing of a proper range is the main obstacle with which a new rifle association has to contend with. The land should be purchased, if practicable; if not, it may be leased. Its location is most important. If not easy of access, it will not be successful. Beyond the erection of the necessary butts and targets, no buildings, with the exception of a small storehouse, are necessary. If, however, a building

is provided for the residence of the range-keeper and the storing of the rifles, etc., of the members, it will form a great convenience. The question of laying out the range and the targets is fully treated in the Manual. If iron targets are used, twelve will be sufficient for an ordinary range. This will allow three third-class targets and two second-class, to be used together, and permit of their being converted into two first-class targets, for long-range matches. These can be put up in different manner upon different days, so as to permit the members to practice at any distance by coming at a certain time. Whether the targets should be placed in pairs or upon a line depends upon the ground, and also how it is to be used. If the range is to be used for military class-firing, the targets should be so placed as to allow of their being used simultaneously at the same distances, without one firing party being in front of another. For other practice the firing parties may be placed in front of one another, provided an interval of at least 150 feet is preserved.

A moving target adds interest to a range. At Wimbledon and Creedmoor it consists of a running deer; at Toronto of a running man. In both cases the target is of iron, and runs

upon a railway. At Creedmoor the track is 162 feet long, rising at each end 6 feet. The markers are placed behind a shot-proof butt at each end and start the deer at a whistle from the firing-point. It must be hit while crossing a space of 90 feet in the centre, which it does in 5 seconds. The usual distance for shooting is 100 yards.

In shooting at this target a medium sight should be taken. The aim should follow the deer, and then be thrown from 2 to 3 feet forward of its shoulder and the trigger pulled. If just starting, full three feet allowance is required, and the rifle should be thrown slightly downward as well as forward. At the end of the run less allowance is required and the aim should be higher. The inclination is always to underestimate the speed and not to shoot far enough ahead.

To shoot at a mark of this description with success requires the best qualities of a rifleman.

CONCLUSION.



In conclusion, the author would submit that in all competitions every rifleman should recollect the following advice given by an experienced marksman: *

“That, as every point is a serious consideration, he should devote himself, during a match, entirely to the object in view, and not to allow his attention to be distracted by conversation or argument, particularly while loading. If any disputes arise in regard to his practice or score, refer the objector to the proper authority, and never give way to anger, disappointment, or envy, from any supposed advantage others may have, as regards better ground, target, etc. Refrain also from anxiety as regards the score of others; for, should they be doing better, it may make you over anxious; if worse, it may induce over confidence, and possibly sad disap-

* Russel's Hand-book, p, 105.

pointment. As neither your score nor theirs can be altered by wishing, do not be continually reckoning up your own, as it is a waste of time and distracts the attention. Do not take the advice of *any one*, even of your best friends, but rely upon your own judgment. By this I do not mean to say that nothing can be gained from observing the conduct of good shots who precede you—for many a hint may be stolen in that manner; but even this should be done away with as soon as possible, as it will render you more confident in your own judgment. Never, on any account, permit even a friend to touch your rifle, sights, or ammunition, or load for you; and be sure that your ammunition is where it is not likely to be disturbed. Be on hand in time, to avoid hurry; but if late, take it coolly, for if you run you will destroy your steadiness, and lose anyway; whereas you may be in time and win, if you walk.

“Be as careful as possible in *all* that you do, and take as much pains with your first or any other shot as your last, never throwing away a shot, even when all chance for distinction has passed, and thus never be obliged to say, ‘I never thought such a small score would come in;’ or, ‘If I had only taken more pains in my first shots,’ and so on. Finally, if beaten, never

say you don't care; for what is worth competing for is worth winning, be it only a wreath of perishable leaves, which was the highest reward in olden times at the world-renowned Olympic games of Greece."

To which the author would add: Comply strictly and honorably with every rule of the match, and never object to another's conduct, unless he is taking an unfair advantage. There is no nuisance upon a range like a chronic protestor. If you are the better shot, you will beat him; if not, your complaints will come with a bad grace. Do not experiment in a match or use any rifle, ammunition, method of sighting or position that you are not familiar with. And finally, if, after having done your best, you are fairly beaten, *own up*.

White Disc counts 5, Red 4, Black and
White 3, Black, 2.

Scorers must Indorse these Blanks and deliver to Brigade Inspector.
TO BE USED FOR MEMBERS OF ONE COMPANY ONLY.

SCORES OF RIFLE PRACTICE.

Co. A, Seventh Regiment, Third Brigade, First Division, June 1, 1878.

| Rank. | Name. | Co. | 100 Yards. | | | | | Total. | 150 Yards. | | | | | Total. | Grand Total. | | |
|---------|-----------------------|-----|------------|---|---|---|----|--------|------------|---|---|---|---|--------|--------------|----|----|
| | | | 3 | 4 | 4 | 5 | 4 | | 4 | 4 | 4 | 4 | 3 | | | 20 | 20 |
| Capt. | John Jones..... | A. | | | | | | 3 | 4 | 4 | 5 | 4 | 4 | 4 | 3 | 20 | 40 |
| | Same, Second Practice | " | | | | | | | | | | | | | | | |
| Serg't. | John Smith..... | " | 0 | 0 | 3 | 4 | 7 | | | | | | | | | | |
| | Same, Second Practice | " | 3 | 2 | 4 | 4 | 17 | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 12 | 29 | |
| Pvt. | Walter Edwards..... | " | 2 | 2 | 3 | 3 | 12 | 0 | 2 | 2 | 3 | 2 | 3 | 2 | 9 | 21 | |
| | Same, Second Practice | " | | | | | | 2 | 3 | 3 | 4 | 4 | 4 | 4 | 16 | 28 | |

A Duplicate to be attached here.

I hereby certify, upon HONOR, that this is a correct return of scores made by the men whose names appear herein; that such scores were made fairly, under the supervision of an officer, and with the regulation rifle and ammunition, and by the men opposite to whose names the same are entered, who appeared in person.

HENRY ARNOLD, SCORER,
Company A, 22d Regiment, N. G., S. N. Y.

MARKSMEN.

To be arranged in the order of their scores.

| Rank. | Name. | Co. | Scores. | | Date of Qualification. (In cases where men are returned as qualified on the scores made in any match, state date and match.) | Previous Qualifications. | |
|---------|------------------|-----|----------|-----------------|---|-----------------------------|-----------|
| | | | 200 yds. | 500 yds. Total. | | | |
| Capt. | John Smith..... | A. | 22 | 50 | 42 | August 1, 1878. | 75-76-77. |
| Pvt. | James Brown. | B. | 21 | 50 | 41 | Sept. 23. Marksman's Match. |76. |
| Serg't. | Walter Edwards.. | E. | 20 | 20 | 40 | July 1, 1878. | |

I certify the foregoing to be correct, that the men appeared in their proper person, used the regulation rifle and ammunition; that the practice was fairly conducted in all respects, and that I personally supervised the practice for the "Marksman's Badge."*

CHARLES F. ROBBINS,

Capt. and Inspector of Rifle Practice, Seventh Reg't.

Respectfully forwarded, approved,

EMMONS CLARK,

Colonel Commanding Seventh Regiment.

REMARKS BY BRIGADE INSPECTOR:

* In case of absence from any competition at which the Badge was earned this fact should be stated.

Classification in Rifle Practice of Company A, Twenty-second Regiment, for 1878.

| NAME. | RANK. | Fourth Class. Those who have not Practiced. | Third Class. Those Practicing but not Qualifying. | | Second Class. Those Qualifying out of Third Class. | |
|---------------------|-------------|---|---|--------|--|----------------------|
| | | | Date. | Score. | Date. | Qualifying Score. |
| John Brown..... | Capt. | | | | | |
| Henry Smith | 1st Lt. | | | | May 10, 1878 | 35 |
| Walter Edwards..... | 2d Lt. | | | | | |
| Joseph Bird..... | 1st Serg't. | | May 10, 1878 | 20 | Aug. 1, 1878 | 30 |
| Charles Marsh..... | 2d Serg't. | Fourth Class. (Absent on Leave.) | | | | |
| John Jones..... | 3d Serg't. | Fourth Class. | | | | |

Classification in Rifle Practice of Company A, Twenty-second Regiment, for 1878.

| MARKSMEN. | | | | | | | | | | | |
|--|----------------------|--------------|--|-----|--------|-------------------|--------------|--------|------------------------------|--------|--|
| First Class. Those Qualifying out of Second Class. | | | Those Qualifying directly or otherwise than in Matches. | | | | | | Those Qualifying in Matches. | | |
| Date. | Qualifying Score. | Date. | Score. | | | Name of Match. | Date. | Score. | | | |
| | | | 200 | 500 | Total. | | | 200 | 500 | Total. | |
| May 10, 1878 | 30 | May 3, 1878 | 20 | 20 | 40 | | | | | | |
| | | May 10, 1878 | 18 | 10 | 28 | | | | | | |
| Aug. 1, 1878 | 26 | | | | | Marksman's. | June 1, 1878 | 15 | 12 | 27 | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

FORM I.
RECORD OF CANDLE-PRACTICE OF CO. F, 89D INFANTRY.
N. G. S. N. Y.1872.

| NAMES OF ENLISTED MEN IN THE COMPANY. | REMARKS. | CAP FIRING. | | | | | | | | | | TOTAL HITS. | |
|---------------------------------------|-------------|-------------|---|---|---|---|---|---|---|---|---|-------------|---|
| | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |
| A. B..... | good..... | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 9 |
| C. D..... | medium..... | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 6 |
| G. L..... | bad..... | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 8 |
| T. U..... | good..... | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 8 |
| L. G..... | good..... | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 8 |
| E. F..... | medium..... | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 7 |

FORM II.—REGISTER OF PRIVATE PRACTICE.

Place..... Date..... 1875. Distance..... yards.

Rifle..... Powder.....

Bullet.....

| No. of Shots. | Score. | Wind Gauge. | Elevation. | Direction and force of Wind. | Time. | Light and Atmosph. re. | Remarks. |
|---------------|--------|-------------|------------|------------------------------|-------|------------------------|----------|
| 1 | | | | | | | |
| 2 | | | | | | | |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |

On the opposite page to the above, in each register of practice, should be printed the cuts of the three different sizes of the targets (as shown on pages 165 and 166 ante, but the bulls eye given in outline instead of solid.) Each shot should be marked upon these targets by its number as 1, 2, etc., the place aimed at being designated by a similar number placed in a parenthesis as (1).

FORM VI.—REGISTER TICKET FOR MATCHES.

FACE OF TICKET.

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| N VIII. Army and Navy Journal. 500 Yards | No VIII Army and Navy Journal. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Name | Name, Corps, | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Target No. Corps | Target No. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| SCORE. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Total. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Total. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Register Keeper's Signature, | To be detached by Register Keeper and returned to Competitor. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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- I.—Competitors must inform themselves as to the Regulations of the Association, as the plea of ignorance of such Regulations will not be entertained.
- II.—This ticket must be presented by the holder at the hour and target as announced on the Bulletin Board, or he will not be allowed to compete.
- III.—If the firing is at more than one distance, a new ticket will be given to those entitled to compete at second distance, upon exhibition of the Coupon at head-quarters. Any erasure, substitution of one name for another, or alterations in the score on the face of this ticket will render it invalid.
- IV.—Competitors must remember the number of their scoring tickets, and are recommended to inspect the Bulletin frequently.

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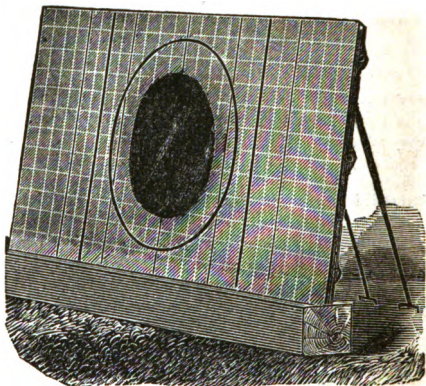
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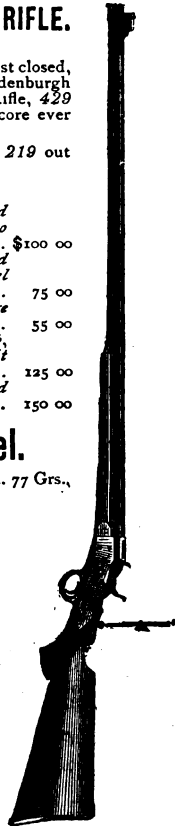
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|---|----------------|
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| " " Round | 22 | 25 |
| Carbine..... | 20 | 24 |
| | | 27 |

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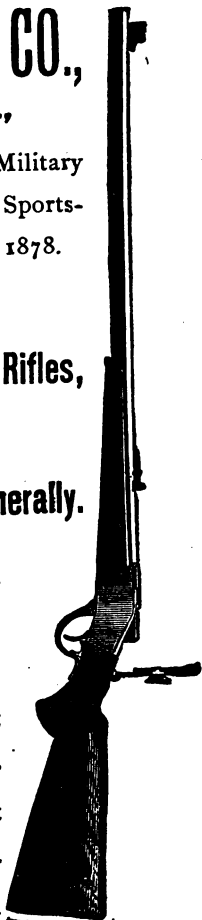
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New Military Rifles
which are giving great satisfaction in Great Britain as well as throughout the United States wherever they have been used.



SOMETHING RELIABLE AND ACCURATE.



THE NEW IMPROVED AIR RIFLE.

DESIGNED ESPECIALLY FOR TARGET PRACTICE.

The attention of Military, and Sporting Men, and Rifle Clubs is particularly called to the advantages of this Gun for Target Practice; being in many respects superior to fire arms; besides the expense of ammunition is much less.

There is no report or danger attending its use, or any auxiliaries required to operate it. It can be loaded with ease and rapidity. It is extremely simple, and has no delicate parts to get out of order, or wear out.

PLENTY OF TESTIMONIALS CAN BE FURNISHED IF REQUESTED.

PRICES.

Browned Frame, and Nickel Plated Barrel,.....\$9.00 | Full Nickel Plated..... \$10.00

The prices include the Gun boxed, together with 6 patent darts, 6 paper targets, 100 patent slugs, one ramrod, together with a combined claw and wrench.

For Sale by the Trade generally. Sent upon receipt of price, or C. O. D. Send for Circular.

H. M. QUACKENBUSH, Patentee and Manufacturer, Herkimer, N. Y.

The United States Cartridge Company,



LOWELL, MASS.,

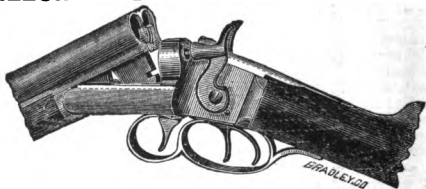
MANUFACTURERS OF THE
BRASS, SOLID HEAD, CENTRAL FIRE, RE-
LOADING SHELLS AND CARTRIDGES,
Adapted to all Military and Sporting Rifles and Pistols,
and in use by the ARMY AND NAVY OF
THE UNITED STATES, and several
Foreign Governments. Rim-fire
Ammunition of all kinds.

Special attention given to the manufacture of CART-
RIDGES FOR TARGET PRACTICE.

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FOWLER & FULTON, 300 Broadway, N. Y.

STEPHENS' PATENT BREECH-LOADING SPORTING RIFLES.



DOUBLE AND SINGLE BARREL SHOT-GUNS, POCKET
RIFLES, POCKET PISTOLS, AND THE NOTED HUNTER'S
PET RIFLES. Special attention is called to our Double
Breech-Loading Guns. They are simple in construction
and manufactured with great care from the very best
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in the market for the money.*" Send for Catalogue.

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FOR MEERSCHAUM AND CIGARETTES.

DOES NOT BITE THE TONGUE.

Our Cigarettes are as fine as can be produced. Only the best French Pure Rice Cigarette Paper is used, which is free from injurious substances.

GARDEN CITY HOTEL, CREEDMOOR, September 17th, 1877.
Messrs. WM. S. KIMBALL & CO., Rochester, N. Y.

Gentlemen: Pray accept my best thanks for the package of Vanity Fair Tobacco which I found here yesterday. It is the best tobacco I ever smoked, and will be a great source of enjoyment to me on my western trip. Believe me yours truly, H. S. J. HALFORD.

Our PEERLESS FINE CUT is unsurpassed, the only brand receiving the Venna Award (5 Prize Medals.) PEERLESS TOBACCO WORKS.
WM. S. KIMBALL & CO., Rochester, N. Y.

NEW ENGLAND MUTUAL Life Insurance Company, OF BOSTON.

Statement for the Year Ending December 31, 1877.

| | |
|---|----------------|
| Total income..... | \$2,862,282.02 |
| Total disbursements for death claims, endowments, distributions of surplus, etc..... | 2,437,100.26 |
| Total cash assets, as per Insurance Commissioner's report..... | 14,466,920.53 |
| Total surplus, do. do. do. do. | 1,621,078.63 |

This Company insures the lives of Officers of the Army and Navy without extra premium, except when actually engaged in warfare, which premium if not paid at the assumption of the extra risk *will not invalidate the policy*, but will be a lien upon it.

New Policies issued, 1,871. Terminated, 1,665.

The Directors' Annual Report, containing a detailed statement, together with the results of the investigation of the Insurance Commissioner of Massachusetts can be obtained at the

**OFFICE OF THE COMPANY,
POST OFFICE SQUARE.**

BENJ. F. STEVENS, President.

JOS. M. GIBBENS, Secretary.

ORIENTAL POWDER MILLS,

BOSTON,

MANUFACTURE THE CELEBRATED

ORIENTAL "DIAMOND GRAIN,"

ORIENTAL "FALCON DUCKING,"

ORIENTAL "WILD FOWL SHOOTING,"

ORIENTAL "WESTERN SPORTING RIFLE,"



For Target Practice use "Falcon" or "Wild Fowl"
Brands.

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ESTABLISHED 1840.

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Comprising the largest variety of stock in this country. Telescopes for target shooting, Pocket Aneroids for measuring heights, Brazilian Pebble Spectacles and Eye-Glasses of all grades and to suit all Eyes, Artificial Human Eyes, etc., etc. Awarded the U. S. Centennial Medal of Merit, Diploma of Honor, and Judges' Special Report: American Institute, 1876; Vienna, 1873; and World's Fair, Crystal Palace, 1853. Illustrated Catalogue of 62 Pages sent on receipt of 40 cents postage. Please mention this Book when you write.

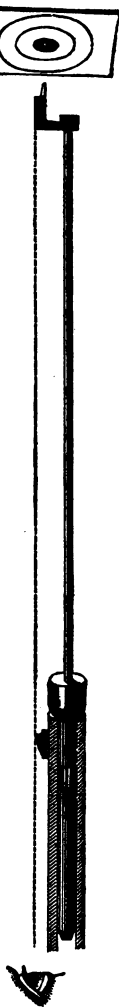
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2500 IN USE.

WINGATE'S INDICATOR FOR AIMING DRILL,

INVENTED BY GEN. GEO. W. WINGATE, GENERAL INSPECTOR OF RIFLE PRACTICE, STATE OF NEW YORK.

FOR DESCRIPTION SEE PAGES 186 TO 194.



**GIVES THE SAME PRACTICE AS AT THE RANGE, MAKES NO
NOISE AND COSTS NOTHING TO USE.**

PRICE \$1.50 EACH.

For Sale by WINCHESTER REPEATING ARMS CO.,

No. 245 Broadway, New York.

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