

# Thoughts on The Manipulation of the Bolt Action Rifle

The following research and discussion of the manipulation of the bolt action rifle was posted on the Gunsite Alumni's discussion group, by list member Ben Burroughs. It is so full of useful knowledge I have reproduced it here with the permission of the author.

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**8 Oct., 2007 @ 0657 hrs**

As I explained in a previous posting my coherence in the organization of these notes is somewhat (somewhat, hah! More like grossly) lacking. There is a sad lack of order in the sequencing of topics discussed. But I feel I must discuss a given subject as it occurs to me before I lose it. Please bear with me.

In the article he wrote for the Personal Survival Newsletter the Colonel [Jeff Cooper] made a statement to the effect that sometimes, when we do something so long that it becomes second nature, we forget what we are doing. When we then try to explain it to someone else it may become advisable to return the classics from which we learned. It was in this context that he presented extracts on bolt manipulation from Whelen's *The Hunting Rifle* and Crossman's *Military and Sporting Rifle Shooting*.

The topic I wish to discuss here is an adjunct to bolt operation but affects the ease with which the operator can perform the manipulation. Ease of operation can be enhanced in two ways, both of which achieve the same result albeit in different positions. In prone, both Whelen and Crossman (and the Marines as well) recommend thrusting the muzzle down and to the right as the bolt is retracted. (You left-handers with bolts on the left reverse the procedure.) In standing try keeping the barrel horizontal but twisting it clockwise (again for righties) as the bolt is manipulated to the rear and counterclockwise, back to vertical as it is thrust forward. This, in both standing and prone, reduces the distance the hand must move to the knob and, because the hands are working in opposition, increases the power available to operate the bolt. It does, however, disturb the sight picture somewhat, particularly if your butt plate shifts about on your shoulder. It was the Colonel's recommendation that you try both and see what works best for you. I twist the rifle about 20 degrees in standing and shove it down and to the right an unknown amount in prone. What ever is comfortable and works for you is appropriate. You certainly may choose to make no changes but now you are aware of other options.

**11Oct., 2007 @ 0902 hrs**

In the 1890's the U.S. Army adopted its first bolt action rifle, the Krag-Jorgensen in .30-40 caliber. As the designated military rifle this was the predominate rifle used in the National Matches until the 1903 Springfield became widely available after WW I. Shortly after its introduction into the matches the concept of rapid fire was deemed worthy of inclusion into the course of fire. The designated

format was sitting position at 200 yards. Almost immediately, the shooters began looking for a technique that would minimize the interval between aimed shots as the range was (relatively) short and the time for the string limited.

Some participants took advantage of the characteristics of the course of fire to develop the following technique (as described by Whelen in his autobiography, Mr. Rifleman). You are in the sitting position, the elbow is on the knee where it is desirable that it remain. The rifle is grasped normally. Immediately upon firing the shot the grip is released and the hand brought up under the bolt. The index finger stays curled while the middle, ring, and little fingers are extended forward. The middle finger cams the bolt upward to its fullest extent and then, in concert with the ring and little fingers, retracts it rearward. Upon completion of this rear stroke the bolt is pushed forward and down by the index finger which is curled in behind and then on top of the bolt stem.

This technique is possible because of the low pressure of the round which keeps it from sticking and the low area of contact of the the lug on the bolt and the chamber. The camming power is quite low. The advantage is that the wrist can be very flexible as the bolt is flicked. The disadvantage is that it is not suitable for rifles requiring the application of more power to operate the bolt. However, the Krag was, and is, a very easy rifle to operate. The Colonel often commented in his writings how he never found another rifle as smooth as the old Krag he learned to shoot his first big-bore shots on in ROTC.

**11 Oct., 2007 @ 0903 hrs**

In an earlier presentation in this list I mentioned the Colonel's article in Mel Tappan's Personal Survival letter. Not being able to access the article immediately I paraphrased what he had said. In the time since I have located the article and would like to present the quote I spoke of:

*"As a boy I was taught the bolt action rifle, at public expense, in high school R.O.T.C. I was taught sighting-and-aiming, positions, trigger control, and rapid operation of the bolt - in that sequence. I got to be good enough at these drills to earn a place on several inter-unit rifle teams, but the instruction was given to me so long ago that its actual details fade in memory. When one has shot much and pretty well for nearly fifty years the operation becomes so automatic that analyzing its elements becomes difficult. I have therefore gone back to some of the original texts on the subject and dragged them out for your benefit."*

And the "original texts" of to which he referred: Captain E.C. Crossmam, in *Military and Sporting Rifle Shooting, Small Arms technical Publishing, 1936*

*"The ability to work the bolt smoothly, certainly, and easily is not to be gained by merely reading a book. It hinges entirely on thoughtful practice."*

*"The beginner should study, by slow operation of the bolt, the easiest way to effect the turning motion and upward bolt lever thrust with the minimum motion of the right hand and arm. Experience has shown that this may be aided to a marked extent by rolling the rifle toward the bolt lever, resisting the tendency to roll the rifle to the left on its long axis and aiding right in its work."*

*"Therefore, in operating the bolt from the shoulder (in the off-hand position). as the upward thrust is put on the knob the rifle should be rolled to the right with the left hand. This results in shortening the apparent motion of the right hand and moves the path of the bolt to the right, missing the face and obviating having to duck the backward travel of the bolt.*

*"It is important for the novice to learn that correct and fast operation of the bolt action rifle in rapid fire is not 'one, two, three, four', but rather one continuous series of motions with the wrist playing its correct part in controlling the four stages of the stroke.*

*"The bolt knob rolls in the grip as the hand pivots at the wrist, knuckles starting in nearly a vertical position and winding up nearly horizontal. No amount of dexterity can alter the mechanical motions of the bolt knob, but there is no need for hand and arm to follow them through their rectangular motions as long as the wrist has joints in it and bolt knob may be rolled easily in the grip of the hand.*

*"The need for the bolt knob to roll easily in the grip of the hand, permitting minimum motion on the part of the hand itself, is a fine illustration of the folly of those who manufacture bolts which are not round and smooth to grasp.*

*"Until the bolt can be swiftly and smoothly opened and closed with a single sweeping motion of the hand in each direction the shooter has not passed the beginner stage.*

*"Remember that in all rapid fire practice with a bolt gun, and in all practical fast shooting with the rifle on game or otherwise, the rifle is never removed from the shoulder. Some men make a practice dropping any rifle to the hip line after the first shot at game to see what the effect of the shot is going to be. This is all right but at the same time the ability to swing that bolt fast and easily should be cultivated.*

*"Rapid fire from the sitting position should be done as in offhand with minimum elbow motion. It is not necessary to move the right elbow from knee contact, and the nearer this is approached the smoother will be the bolt operation. Roll the rifle to the right as the right hand grasps the bolt handle and avoid cramping or jamming the bolt by too much effort, hurrying too much and getting all hot and frenzied about the matter. ["Smooth is fast": API Doctrine.]*

*"In prone the beginner is a sad spectacle. He does almost everything but sit on the rifle and pull up the bolt handle with both hands, and he gives the impression that this will be his next move.*

*"Neither elbow should be lifted off the ground in operating the bolt action from prone. The rifle muzzle is swung over some five or six inches to right as the bolt handle is gripped, which swings the muzzle low and right. Operating the bolt prone without this aid is quite difficult and somewhat likely to poke the shooter in the beak or the forehead with the end of the bolt.*

*"Obviously the faster the bolt is operated - as long as it can be done smoothly and positively - the better off is the shooter because of the added time he has to aim.*

*"Care must be taken from the first to see that the bolt handle is pressed clear down in closing the bolt, and that it is not raised by the knuckle of the rifle hand in gripping the stock or other operation.*

*Probably seventy-five percent of the faulty runs in rapid fire due to misfires, and these are due to a bolt handle which has not fully closed."*

We will include Colonel Whelen's take on the subject, including instruction on the operation of a right-hand bolt action by a left-hander, as detailed in his opus, "The Hunting Rifle", in our next segment.

**11 Oct., 2007 @ 1134 hrs**

As matter of interest, the following extract (corrected version) from THE GUN ZONE is offered for your consideration.

In the book *Silent Night* it is noted that, during the strange 1914 Christmas frontline truce, a German officer's comment to his British opposite number that he was surprised to find that the British had hidden their machine guns, while those of his Saxon regiment had been left in plain sight.

The British officer replied that his troops had no machine guns to hide. What, then, the German officer asked, was the source of the withering fire from the thinly-manned British trenches, which was always successful in repulsing his regiment's attacks? It wasn't machine guns?

No responded the British officer, it was merely the British Army's standard rapid-fire musketry...15 aimed shots to the minute from every rifleman on the line, continuously sustainable as long as his ammunition supply lasted. That is an average of one aimed shot every four seconds, including one two-stripper-clip reload every minute.

(Note that the British definition of "aimed" included the requirement that the rifleman achieve a high percentage of hits-per-shots-fired on man-size targets, even at the highest regulation speed. Note also that the top speed of 15 rpm, you actually get only three seconds to make an accurate shot, because each reload takes at least 10 seconds out of every measured minute.

This almost incredible rate of highly accurate, sustained fire was possible because "Thomas Atkins" (the ordinary British infantryman was referred to as "Tommy Atkins"), spent lots of time at rifle practice. He was required to dry-fire every day, constantly refining his bolt manipulation and sight reacquisition techniques, and he also spent more time on the range with live ammunition than did his German, French or American contemporaries.

Practice was the key to Tommy's fast and accurate sustained rifle fire. Lot and lots of practice, each and every day.

**11 Oct., 2007 @ 1434 hrs**

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**11Oct., 2007 @ 1959 hrs**

Here is the second of the two sources cited by Jeff in his article in *The Personal Survival Newsletter*: Townsend Whelen, in *The Hunting Rifle*, Stackpole 1940, "Rapid Operation of the Breech Mechanism"

*"You need a great deal of practice in this. It is extremely important that a hunter be able to operate his rifle for a second shot instantly, absolutely, and surely without jamming it and without looking at it. The operation should become subconscious so that you do it naturally without thinking about it, and it should almost be made a sleight-of-hand performance, so fast that the eye can hardly follow it. This is not difficult but it takes practice; perhaps ten minutes a day for two weeks and then about one or two practice sessions a week to keep your hand in. There are certain exact ways of doing this operation which make it very much easier and faster.*

*"Instantly after the shot] release your grasp on the pistol grip, seize the round knob of the bolt handle with the thumb and the first two fingers of the right hand, thumb on top, and thrust the handle straight up as you move the left hand down and to the right, causing the muzzle to move about eight inches. This movement of the rifle makes it very easier to lift the bolt handle. In the offhand position the muzzle is kept as nearly as possible pointed toward the target while the bolt is operated and always the rifle is kept at the shoulder, the left hand pulling back on the rifle so as to press and hold the butt plate in place. Now retract the bolt straight back to its fullest extent, pulling straight through the slideways in the receiver without pressing it to one side or another which might cause it to bind. The two motions of raising the bolt handle and retracting it are not in fact two motions. They should merge into one smooth and quick motion and the bolt should be jerked back hard to its fullest extent. Don't be afraid of injuring the bolt by working it hard and fast - you cannot do it. The entire motion should be fast, positive, and hard - and to the fullest extent of the mechanism. If the action of the rifle is in good condition the only way you can make it jam is to fail to pull it all the way to the rear before you start to push it forward. Therefore pull it back hard, but not so hard as to unbalance you or move the butt plate off the shoulder. As soon as the bolt has been retracted as far as it will go then push it all the way back forward and slam the bolt handle down shut, all in one smooth, quick, and powerful motion. As you slam the handle down move the left hand back up and to the left into firing position. As the muzzle comes back onto the target the right cheek presses against the left side of the stock and comb. Now regrasp the pistol grip with the right hand, right forefinger on the trigger, and take out ninety percent of the pressure necessary to discharge the rifle. The muzzle will now be swinging slightly from side to side, making it difficult to steady down to a good aim. Stop this side-swing by*

*pressing the right of the grip of the rifle with base of the right thumb and against the left side of the stock with the right cheek squeezing the stock between the face and thumb.*

*"We must not forget the 'south-paw.' If, because you are left-handed or because of defective vision in the the right eye, you have to shoot left-handed do not think that you will be handicapped badly with a bolt action rifle. It is almost as easy to operate a bolt action rifle left as right-handed if it is done right. As the left hand releases its grip on the pistol grip the right hand should twist the forearm a little to cause the rifle to cant slightly to the left. The left elbow must be raised from the ground or the left knee. Without taking the butt of the rifle from the shoulder, reach over the action with the left hand and grasp the handle with the thumb and forefinger, thumb under the bolt, knob back in the crotch of the thumb and forefinger, last three fingers on top of the receiver. Now by twisting the wrist, assisted by pressure of the little finger on top of the receiver, raise the bolt handle all the way up with a rapid, powerful twisting motion of the wrist. Now pull the bolt all the way to the rear, keeping the hand on the bolt in the same position and with the heel of the hand on top of the bolt-sleeve and rear end of the cocking piece. Be sure you pull the bolt hard all the way to the rear. Keep the knob of the bolt handle deep in the crotch of the thumb and the forefinger, then at once push the bolt forward with the heel of the hand contacting the rear of the bolt. At once push the bolt handle down with the forefinger and a twist of the wrist. The second finger also assists in this pressure. This method, when learned, is very much easier and faster than trying to grasp the bolt handle between the little finger and the palm of the hand as many attempt to do. Left-handed operation is slightly slower than right-handed, not because it is any more difficult when learned, but because it is necessary for the left elbow to be removed from the ground or knee. Nevertheless it is quite easy and very fast."*

Jeff's comments follow. *"In scanning the foregoing two extracts we see the Crossman recommends twisting the rifle to the right with left hand in order to minimize the arc of bolt rotation, while Whelen does not. I suggest that the student try both methods and see if he gains anything by twisting the rifle. We note that both masters emphasize and re-emphasize the necessity to get the bolt all the way to the rear before starting it forward again. I witnessed a very dramatic case of this in Africa a couple of years ago when my partner, using my rifle, did not retract that long bolt fully and closed it on an empty chamber, while looking a wounded elephant right in the face at a range of eleven steps. This sort of thing can be very embarrassing.*

*"The operation of the bolt is something that can be learned completely before even taking up the matter of shooting and we strongly suggest that anyone who intends to undergo rifle instruction master it prior to attending school."*

*'Nuff said."*

**13 Oct., 2007 @ 0714**

Well, here we are, the last installment of (at least) this series of reviews of all (or least most) manner of ways to operate a bolt action rifle. I have saved this one for last because it is personal, the result of my inquiry that began near forty years ago with the purchase of a Winchester Model 70 with a band of checkering around the knob. My latest, and favorite, bolt rifle is a Steyr Scout with a round smooth

knob and medium length shank. There are two other incarnations of the SS: One in the original configuration, carrying a "butterknife" bolt and yet another less often seen version bearing the "sniper's bolt" which projects below the bottom stock line of the rifle. Let us address the "butterknife" styled bolt first.

We have seen from a few comments in this series that the experts do not find this to be the style of first choice in that with the bottom of the "spoon" curving upward the open palm tends to slip off on the upward stroke and the narrow edge (the least engagement area) is against the thumb on the forward stroke. The 'butterknife' interacts optimally with the configuration of the hand on the down stroke, closing the bolt.

Another mode of manipulation is more suited for this shape of bolt. Simply pinch the curved "spoon" between the thumb and forefinger, keep the knuckles vertical and the wrist stiff throughout the stroke. This is less flexible, not quite as fast, and necessitates more elbow movement in prone and sitting but is, nevertheless, satisfactory. I used this technique at 270 in 1983. It was necessary to do so because the Remington 600 I used during the course had a bolt with a knob flattened and checkered on the bottom. It would not roll in the hand. So, when the Steyr Scout came out I hesitated to buy one. I am glad I did. I have not used the bolt on the "Sniper" version of the Scout which has a considerably larger knob and longer lever.

The way the SS is set up the trigger is farther forward than on some other rifles, the Remington 600 and the Lee-Enfields for instance, and therefore the hand must move forward slightly to engage the the bolt. I, like Cooper and Miculek, keep my right thumb on the right side of the stock and do not cross it over the grip. When the shot is fired the hand stabs forward, the fingers still semi-curved and the thumb at an angle approximately 30 degrees to the horizontal. The forward motion of the hand is blocked by the knob encountering the thumb where it settles into the recess at the base of the thumb and above the pad at the base of the thumb. It is secured there by the curled index finger. Pressure is applied to break the bolt lugs out of their locking recesses by rotating the hand outward, bringing the knuckles to nearly horizontal. As the lugs pop free use the strength of the wrist to bring the now horizontal knuckles up and to the rear. The round smooth knob permits this. Immediately, upon complete retraction of the bolt, rotate the bolt forward and down using the muscles in the wrist. The short length of the .308 cartridge permits this and longer cartridges may be unsuitable. The fact that the knob is closer to the wrist reduces the leverage required and the length of the stroke, requiring very little movement of the forearm. The result is a powerful stroke that is still very fast.

Summary: Well, we have reached the end of the journey. I have enjoyed it. Looking back on it I have several impressions. There is one word that appears in every article except mine. Practice. Practice, practice, practice. Regardless of the mode of operation you choose, practice!

Another observation. A rearward mounted telescope limits your choices. Consider that in choosing both your telescope and operational mode.

Recommendation. - Attempt to select a universal(?) way of manipulating the actions of your rifles that will suffice for all. You do not want to have to change operational modes for different situations.

Caveat: I know you are tired of me but I reserve the right to bring forward other observations that may occur to me in the future.

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