

TRAINING NOTES



DEPARTMENT FOR YOUTH, SPORT AND RECREATION

in conjunction with

WESTERN AUSTRALIAN RIFLE ASSOCIATION

RIFLE
TRAINING NOTES

APRIL, 1984

RIFLE TRAINING NOTES

FORWARD

It is hoped that these notes will pass on some knowledge. Not mine, but that of international experts that I have gleaned over the years of my shooting experience. This can not be fully conveyed in these short notes but we will cover as much ground as possible.

Hopefully the reason for reading these notes is a desire to learn...A vital part of any project.

REASONS FOR COACHING

To impart knowledge
To amass knowledge
To instil correct thinking habits
To correct faults

Correct thinking will come from training and experience. A good training program would consist of 40 shots or more, this will induce muscle strength and tone. Muscle tone can be defined as the body's ability to withstand pain and discomfort without affecting performance. Training will also over a period induce strength in the eyes.

PRIME NEEDS FOR GOOD SHOOTING

1. CORRECT RIFLE SIZE
2. HOLDING
3. AIMING
4. BREATHING
5. TRIGGER RELEASE

CORRECT RIFLE SIZE

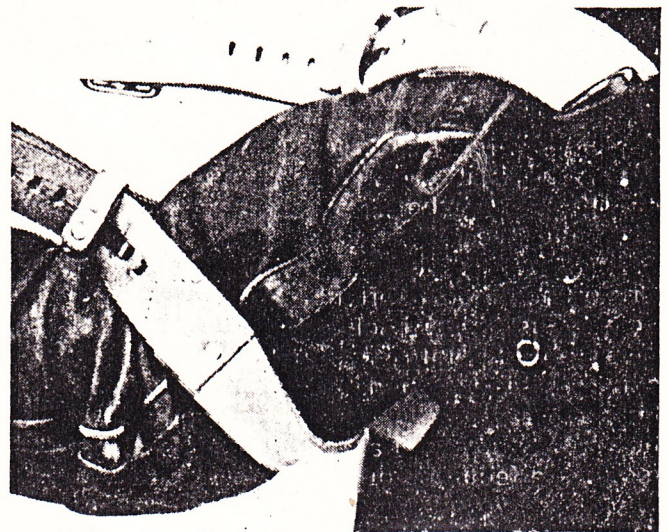
The correct method of fitting the rifle to the shooter is to place the rifle in the crook of the bent arm of the trigger finger, which should be able to reach the trigger at the second finger joint, without any undue stretch.

HOLDING

Holding or better still position of the body and head with correct sling tension. Estimated time to adjust to a new position and attain some degree of proficiency with it would be 4 to 6 months.

For best sling results adopt either a high or a low position on the arm and not in the middle of the arm, as this is one cause of numbness.

When a sling is used pressure on and behind the hand supporting the rifle and the sling on the arm position should all feel equal if the sling is correct. If the pressure is not equal, check your position. The same pressure should also be felt on the the shoulder with the butt.



Correct Sling Positions

Unequal pressure at the shoulder is one cause for shots at 5 o'clock. too loose a sling will cause 10 o'clock shots

The hand supporting the rifle should be far enough forward as to form a equalateral triangle with the rifle when viewed from the side. The front elbow, the left in a right handed shooter takes the weight of the rifle through the forearm, with the point of the elbow pointing inwards. This will take the pressure off the nerve centre in the elbow and will eliminate one cause of numbness.

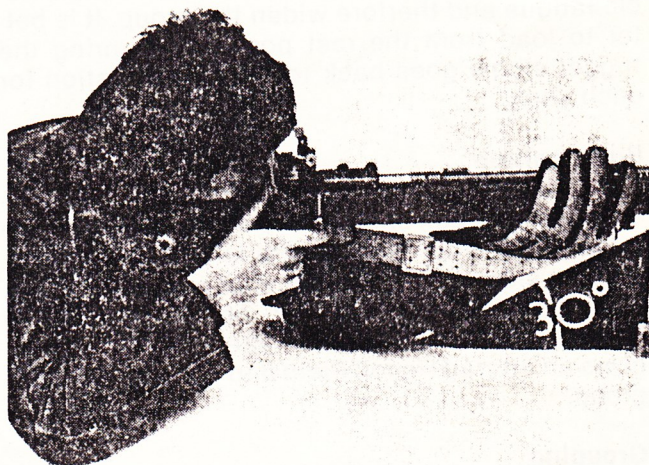
The left foot should be pointed inwards with the toes resting on the ground. This will apply pressure on the thigh and with the right leg angled or slightly bent, lifts the right side of the body off the ground. With the body not flat on the ground this allows greater movement of the diaphragm and also avoids the pulse sometimes felt through the body from the artery in the lower abdomen, which is transmitted to the rifle. Body pulse through the diaphragm will give 10 and 2 o'clock groups.

The left shoulder should always be slightly lower than the right for a right handed shooter. To find the correct position for the right elbow, rest the trigger hand on the butt and then rest your head on your arm. Your head should be level and in this position the muscles of the arm bunch up to protect the artery at the sling position. A bunching of the neck muscles indicates the butt is too long, or the right elbow is out too wide, therefore giving a lower aiming position which can cause a blind shot. The advocated position is a relatively high position which gives protection to the artery at the sling position and also results in correct weight distribution to the elbows. Uneven weight distribution can cause 2 to 7 o'clock movement of the barrel when aiming and breathing through the target. Check your elbow positions during your dry shots and rectify if need be.

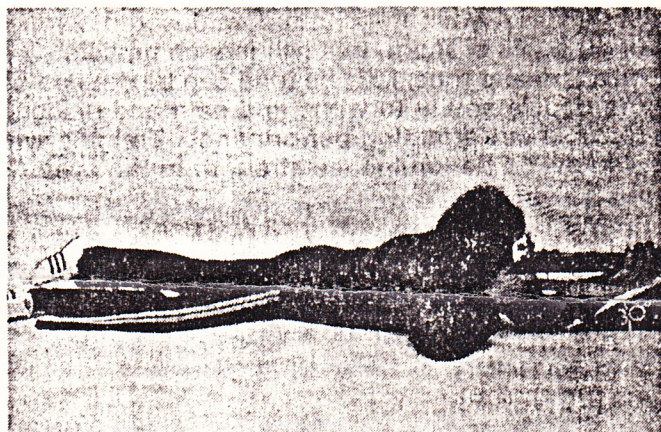
On recoil barrel movement is to 10 o'clock. This means the right elbow is too far back. If the recoil is to 2 o'clock, the left elbow is not far enough under the rifle.

One of the most important areas of incorrect position is muscling. Muscling a shot means pushing the rifle to a point of aim instead of being at the correct aiming position. The result being sooner or later a shot will appear in your group in the direction from which you are muscling. Perfect shots require perfect co-ordination.

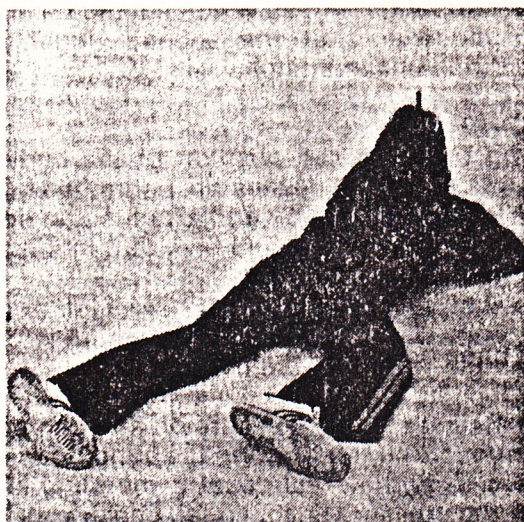
At all times the hand supporting the rifle and the trigger hand should be level.



Correct Hand Positions



Correct Body Position



Correct Body Position

It has been suggested that reloading at the aim position is good. It is not, as this can cause muscle fatigue and therefore widen the group. It is better to load from the rest position, ensuring the trigger elbow goes back to the same position for each shot.

Butt Position

The rifle should be at the same point on the shoulder for each shot, with the rifle level with the target. Pivot your body on the left elbow forward, back or sideways to correct your position. Do not alter the position of the butt on the shoulder to alter your aiming point. An altered butt position gives an altered Recoil Field and hence a different group.

Grouping

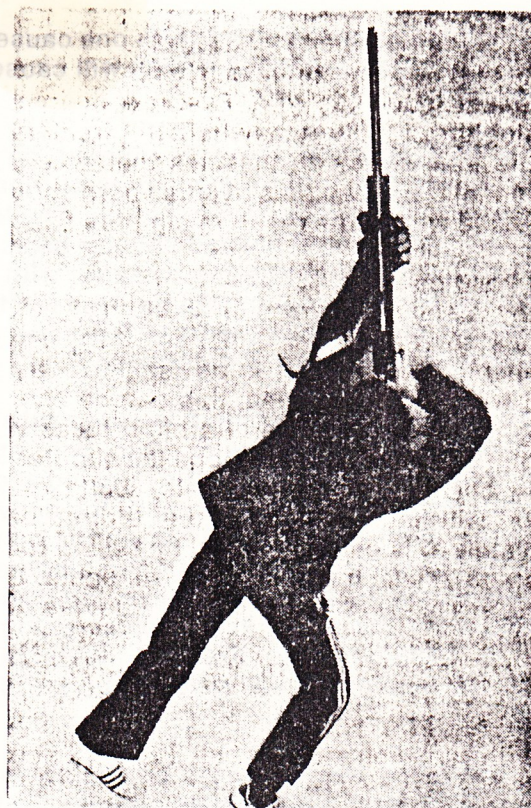
The rifle's ability to group is firstly governed by the ammunition. Even if the rifle was held in a vice it will not place shots on the same spot, so any altered position will alter the grouping and usually to the detriment of your score.

The Recoil Field is governed by the hold and Lock Time. The Lock Time is the time taken from the time of the trigger release to fire the cap, which in turn fires the charge and propels the projectile out of the barrel. The estimated time for this to take place is 1/10,000ths of a second, hence the importance of Follow Through.

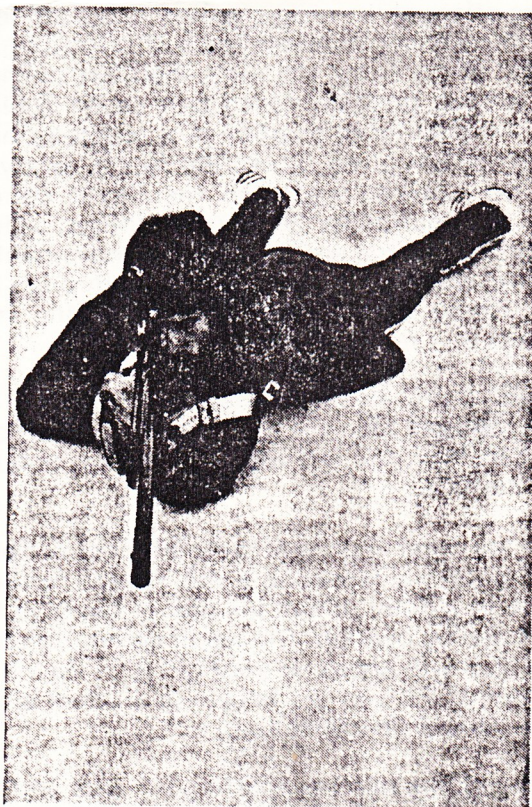
Within that fraction of a second the shooter can flinch, close his eyes, lift his head or move other muscles therefore widening the group.

The correct method of attaining the proper position to your target is to take aim, close the eyes and breathe in and out two or three times with the trigger hand off the rifle, on opening your eyes you should be aiming directly at the Bulls Eye, if not you should pivot your body on your left elbow without moving it. If the aim is high ease the body forward on the left elbow to correct the aim, if the aim is low, ease back the body. If the aim is either left or right ease the body sideways to correct the aim. When you breathe through your target the rifle should rise and fall from 12 to 6 o'clock. If on recoil or breathing through the target the rifle drops or lifts on an angle through 2 to 7 o'clock, move the Left elbow further under the rifle. If the angle is through 10 to 5 o'clock, move the Right elbow back or forward to correct the aim but only a fraction at a time.

The hand supporting the rifle and the trigger hand should be level. The triangle formed between the forearm supporting the rifle and the ground should be as near as possible a equilateral triangle.



Correct Body Position



Correct Body Position

Cheek Position

Should be firm on the stock, with the idea of locking the butt into the shoulder. No other part of the head must touch the rifle. Eyebrow or forehead touching the sight arm may transmit tremors into the rifle from twitching muscles therefore affecting your aim. This applies to small bore shooting. A cut head will be the result in big bore shooting.

Head Position

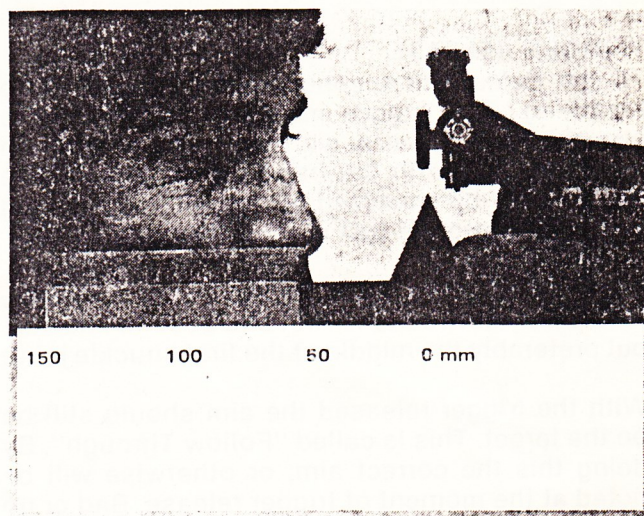
Your eyes should be level or to within $\frac{1}{2}$ inch of level and to within $1\frac{1}{2}$ to 2 inches off the peep for reasonable eye relief. It is advisable to try and shoot with both eyes open, this can be achieved through training. The use of a blind takes vision from the other eye but also stops the shooter from seeing changes in the wind etc. Quite often a shooter will find his sight picture blurred or lost completely, this can be caused by having too low a position in which a blind spot will occur. Being too low the eye is rolled onto the target instead of straight sighting through the centre of the pupil, if the eye rolls to far upward vision will be lost.

AIMING & BREATHING

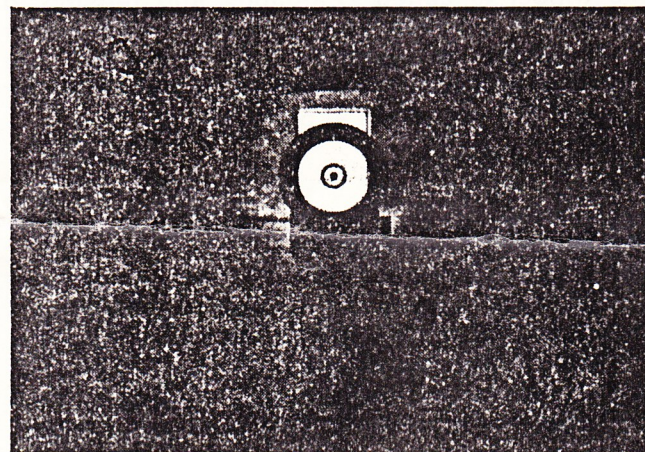
Aim with your sights level at all times. The correct aim is the one where the target appears in the centre of the foresight, neither high, low or slightly off centre. This can be achieved by positioning the body to the target correctly and then "Breathing on". The shooter should be able to breathe in and then out, and at the point where the lungs are empty of air the shooter should be centrally on the target. Another breathe in and out then squeeze the trigger when holding the breath. The best result for a good trigger release will be within a 4 to 7 second period. If the trigger is not released whilst comfortably holding the breath, the whole process should be started again. Always ensure the rise and fall of the rifle is directly through the target ie., the "arc of traverse", is vertically through the target and not diagonal.

Holding your breath too long will cause a lack of oxygen to the brain and will result in blurred vision and a faster pulse rate. Blurred vision usually causes shots to appear at 10 o'clock.

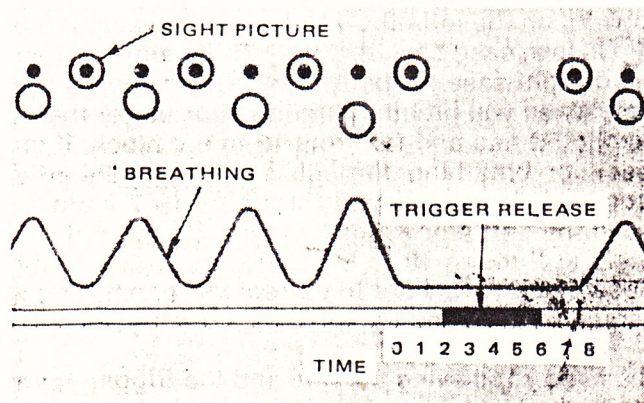
If after firing a satisfactory group in your first application, and in your second application your initial shots are high, do not alter your sighting, correct your position.



Good Eye Relief



Correct Sighting Picture



Breathing on to Target

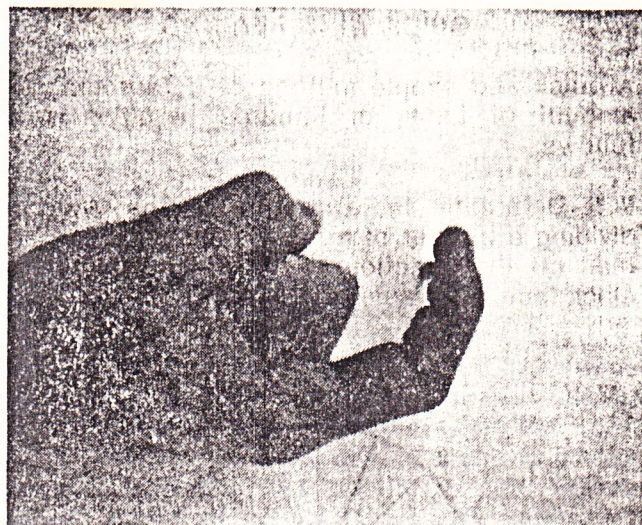
TRIGGER RELEASE

Trigger Release is second only in importance to breathing. The trigger must be released in a straight back squeeze, with the same tension on the pistol grip with the hand for each shot. The trigger must be squeezed as if you were pressing your finger into the ball of your thumb.

The most sensitive portion of the finger is the ball, to mid-way between the first and second knuckle, but preferably the middle of the first knuckle joint.

With the trigger released the aim should still be on the target. This is called "Follow Through". By doing this the correct aim, or otherwise will be noted at the moment of trigger release. Bad or no Follow Through will give 12 o'clock shots on the target.

The trigger hand should be firm on the pistol grip without tension, with only the trigger finger free. Closing the hand at the same time as releasing the trigger is called "Palming" and tensing in muscles in doing this will cause shots to appear at 2 o'clock. The trigger must be "Squeezed" not jerked or snatched. A snatched or jerked trigger release will give shots at 5 o'clock.



Reccommended Trigger Position on Finger

Physical Fitness & Condition

A high degree of physical fitness is not required for shooting, however with fitness of the body will come fitness of the mind, and through that control of the body added concentration and importantly relaxation. A relaxed shooter suffers less mental and physical pain over a long shoot. Physical fitness can best be described as the body's ability to quickly recover after strenuous mental or physical effort, in the shortest possible time. This will induce a "Rythm to Shooting", (see remarks on muscling).

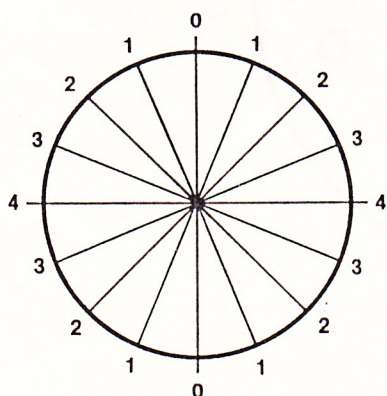
Dedication

Dedication will determine the degree of perfection and performance that you will attain....

QUICK WIND READING

A quick and simple method of determining the amount of Lines or Minutes required is as follows:—

1. Determine the Direction of the Wind by dividing a quarter of a clock face into four, and read off the direction of the Flags against the clock face as a value of 1 to 4.



2. Determine the Strength off the Wind by comparing the flags with the chart and read of the Strength as a value of 1 to 5.

3. Now calculate as follows:-

$$\frac{\text{DIRECTION} \times \text{STRENGTH} \times \text{RANGE}}{10}$$

Example:

$$\begin{aligned} &\text{Direction 3} \times \text{Strength 3} \times \text{Range 7} \\ &\quad \div 10 \\ &= 6.3 \text{ or } 6\frac{1}{2} \text{ Lines or Minutes} \end{aligned}$$

ALLOWANCE for DRIFT

Reverse for right wind (do not allow for Drift)

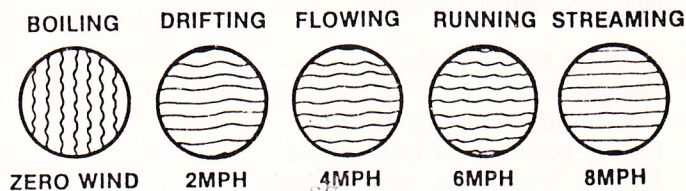
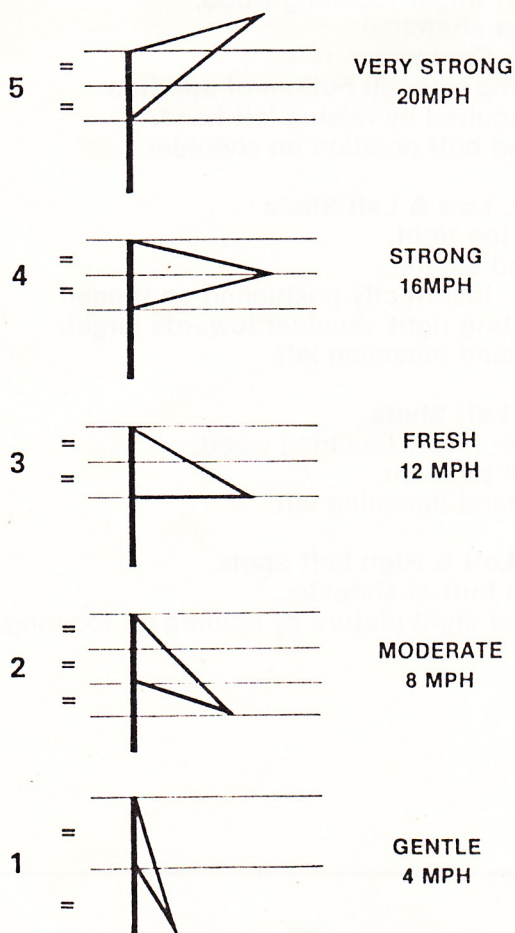
Allow ½ min. @ 700yds.
Allow 1min. @ 800yds.
Allow 1min. @ 900yds.

READING THE MIRAGE

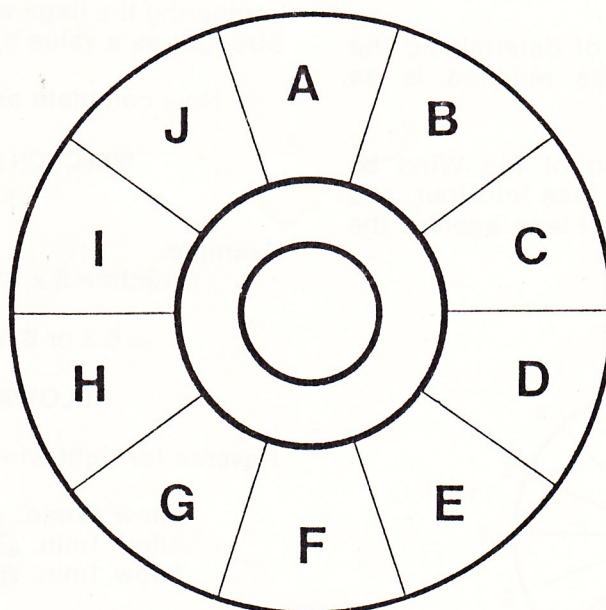
Focus your spotting scope approximately to half way between yourself and the target this will give you the best image of the Mirage.

Another method is, focus your scope onto the target then turn the focus ring anti-clockwise until you can just discern the white rings on the target.

The objective is to focus the scope on the moving mass of air because that is what is going to affect your shots.



MISPLACED SHOTS & POSSIBLE CAUSES



Misplaced Shots on Target

A. High Shots

Incorrect Breathing.
Sighting through top of aperture.
Aim acquired by dropping Left hand.
Butt too low on shoulder.
Failure to relax Left arm or hand.

B. High Right Shots

Loose sling.
Left hand too far back.
Looking through Right side of aperture.
Applying pressure across trigger instead of straight back.
Palmed Shot.
Not Following Through.

C. Wide Shots Right

Loose Sling.
Left hand muscling to right.
Faulty position of Left elbow.
Trigger finger touching wood.
Out of position.

D. Wide Shots Right

Loose sling.
Trigger finger touching wood.
Trigger snatched.
Sights Canted.

E & F. Low & Right Shots

Loose sling.
Trigger finger touching wood.
Trigger snatched.
Sights Canted.
Sighting through bottom of aperture.
Aim acquired by raising left hand.
Altered butt position on shoulder.

F & G. Low & Left Shots

Sling too tight.
Canted sights.
Finger incorrectly positioned on trigger.
Thrusting right shoulder towards target.
Left hand muscling left.

H & I Left Shots

Trigger finger touching wood.
Out of position.
Left hand muscling left.

I & J Left & High Left Shots

Loose butt at shoulder.
Blurred sight picture by holding on too long.

INSTRUCTIONS FOR THE CARE & CLEANING OF BARRELS

Most barrels are not cleaned often enough or are cleaned improperly. Barrels have been ruined after a few hundred rounds by incorrect cleaning, and barrels after only fifty rounds have had the 'gilt edge' removed for all time by not cleaning at all.

Carry out the following procedure which has produced prolonged barrel life with consistent accuracy.

Equipment

Use a plastic coated cleaning rod which is straight and in good condition. Chamfer the part of the rod where it meets the bottom of the jag or brush, and do the same to the jag or brush. Select a lint-free thin material for patches and use only the best brushes of the stiff bronze type only slightly larger than the bore. Hoppe's No.9 solvent should be used exclusively, **never** use an abrasive paste. If a barrel is in a state where cleaning will not remove the fouling it should be lapped, rechambered and crowned to restore its former accuracy.

New Barrels

Firstly push through a couple of clean patches to remove any dust etc., fire 2 or 3 shots, then clean it. Fire 5 to 7 shots and clean it. Assume a regular cleaning procedure after every 10 shot application (and their sighters).

Cleaning Procedure

After firing, dip a patch about 12mm into Hoppes and push it through the barrel and out of the muzzle. Remove the patch before withdrawing the rod. Dip a bronze brush 12mm into Hoppes and push it through the barrel and out of the muzzle completely and then pull it back to the chamber. Stroke the brush and rod going right through and out each end. Never reverse the brush in the barrel, i.e. scrubbing one spot. About 10 strokes through and back should be sufficient. If you are going to shoot again soon, dry out the barrel with patches before shooting. Wipe the muzzle face and chamber before putting the last drying patch through the barrel.

If you have finished for the day or for some time, wipe out the barrel with a patch and repeat the bronze brush procedure. Cleaning again after a day or so or at night during a long competition will help where a barrel is inclined to foul more than normal. Always remember to dry out the barrel and check for obstructions before firing.

Smear a little grease on the cocking cam, extraction cam and behind the bolt lugs every 100 rounds. Keep Hoppes off the bedding, stock and away from the trigger mechanism, etc., as it is only meant for the barrel.

The use of a bore guide is not always recommended it sufficient enough to keep the rod in line with the bore and guide it with your fingers. If you have difficulty in doing this use a properly machine fitted guide.

Do not store your rifle vertically Hoppes may seep into the bedding

WIND CHART FOR 7.62mm

RANGE YARDS	WIND STRENGTH																		
	1	2	3	4	5														
200																			
300																			
400																			
500																			
600																			
700																			
800																			
900																			
WIND DIRECTION		WIND ALLOWANCE IN MINUTES																	
3,9	90°	½	1	1½	2	2½	3	3½	4	5	6	7	8	9	10	12	14	16	20
	75°	½	1	1¼	1¾	2¼	2¾	3¼	3¾	4¼	5½	6½	7½	8½	9½	11½	13	15	19
2,4,8,10	60°	½	1	1¼	1¾	2¼	2¾	3¼	3¾	4¼	5	6	7	8	9	10½	12	14	17½
	45°	¼	¾	1	1¼	1¾	2	2¼	2¾	3¼	4	4¼	5¼	6	6½	8	9½	11	13½
1,5,7,11	30°	¼	½	¾	1	1¼	1½	1¾	2	2½	3	3½	4	4½	5	6	7	8	10
	15°	0	¼	½	¾	1	1¼	1½	1¾	2	2½	3	3½	4	4½	5	6	7	8

RANGE TO RANGE
ELEVATION ADJUSTMENT (IN MINUTES)

RANGE	300	500	600	700	800	900	1000
300		7	11	15	20	27½	38½
500	7		4	8	13	20½	31½
600	11	4		4	9	16½	27½
700	15	8	4		5	12½	23½
800	20	13	9	5		7½	18½
900	27½	20½	16½	12½	7½		11
1000	38½	31½	27½	23½	18½	11	

TARGET SIZES

YARDS	INCHES						LINES	
	AIMING MARK DIA	BULL		INNER	BIRD	OUTER	CENTRE TO EDGE	
		V DIAMETER	5	4	3	2	AM	O/TG
300	21" LINES	¾	6¼"	13½"	21"	35½"	3.5	8
500	33" LINES	6"	13½"	33"	48"	71"	3.3	7
600	33" LINES	6"	13½"	33"	48"	71"	2.7	6
700	33" LINES	9"	18"	33"	48"	71"	2.3	5
800	40" LINES	12½"	25"	40"	56"	R/TG	2.5	4.5
900	40" LINES	12½"	25"	40"	56"	R/TG	2.2	4

3

5

6

7.

8

9



Feet From Eye