

The Gibb Rifle (.451) & Paper Patching

A Penny For Your Thoughts

About a year ago my trusted Hawken proved too temperamental and being designed for patched ball not so good at shooting over 100m; it became time to sweet talk the good lady into a birthday present of my own choice and so we waved good bye to the Hawken, but with what should I replace it!

So, with a simple criteria:

- Good at long range
- .451 (as that's the slot available on my ticket)
- Off the shelf
- Not overly expensive

It was to the well eared copy of Kranks catalogue to see what is on offer, a few jump out but not many so we have to turn to the trusted internet and check a few articles. (When looking for big guns be careful some of the sites are not for the faint hearted and should not be shown until after the watershed)

However, one rifle started to reappear in a number of articles so I decided to do a bit of digging to see what more information was available. After a number of conversations at Weeton and a trip to the David Pedersoli site on the web my decision was made - it was to be the Gibbs.



A reproduction of one of the most famous rifles in the field of precision match target shooting, made in 1865 by the English gunsmith George Gibbs.

A rifle born to satisfy both aesthetic purists and shooters who wish to challenge in the 600 - 1000 yards target shooting and longer ranges if you can see that far. Blue steel octagon to round barrel. The walnut stock is chequered, oil finished and completed with a premium figured wood butt cap and nose cap. The pistol grip shape enables a comfortable grip and a very good balance. Equipped with a precision Creedmoor sight with windage and elevation adjustment of the eye piece up to 3" about (76 mm), spirit level tunnel front sight with windage adjustable by a micrometer screw, complete with a set of 15 interchangeable inserts. Cal .451, with 6 Grooved button rifling and a 1:18 inch twist

So now I was drooling and wanted nothing more than to jump in the car and rush off to the shop and purchase the chosen implement of joy. Common sense kicked in and I decided to call ahead to reserve the rifle of my choice only to find a 6 month waiting time and no compromise. Not to be out done it was back to the trusted keyboard and a search of gun smiths ended with a number for sales at Viking arms and a nice man called Steve. Telling him of my dilemma and response from Kranks he said "Lets check, yes we have just what you want but you can't buy direct go back to Kranks". Not what I wanted after the first phone call I informed Steve. "Ok" he said "Where are you based?" I relayed the information and he promised to call back. 10 minutes later I had a call, the rifle was being shipped to McAvoy's and would be in store in 3 days and cost £150 less than Kranks listed price, what a blessing, quick and cheaper. A quick call to McAvoy's to confirm all was well with the order and we were on our way.

To Patch or Not to Patch with Paper



One of the many conversations at Weeton had covered the issue of paper patching and so with some time to kill, I returned to the web and inserted into the search engine 'paper patching bullets' and after several hours of searching I found a small article about paper patching for muzzleloaders using mini bullets for hunting. There is some interesting information in the article but it did not sell the idea to me, so back to the long wait. The call arrived, your new prized possession awaits your arrival.

So I rushed to the shop, wallet in hand, and the young child in me is back in the proverbial sweet shop with so many choices but as always one stands out, it is my Gibbs. Cash is exchanged, the paperwork completed and at last I am the proud owner of a fine piece of history. The Rifle comes in a shoddy cardboard box with a little bit of paper work and a sales video and not a lot of other information, but a quick guide to fitting the sight is supplied in the paperwork, which is very good.

So I read the booklet on the sight and its fitting, study the sales video and the information says a .451 canular bullet is fine. I have plenty of those so I check that they are sized and load the recommended powder into phials and off we trot to Altcar. The results are poor. A number of bullet types and powder loads are recommended and tried to no effect, she is not performing as promised. I check and recheck to no avail so it's back to Weeton to check the zero and play with the loads group. It is an improvement but still not right, then a man of knowledge (Ray Stones) steps forward and puts forward an idea. We clean the bore and inspect the rifling, a decision is made, the rifling is fine and buttoned and because of the fast twist we should be thinking of paper patching, but being a good man of knowledge he said I will get back to you after I check a few things. A few days later good to his word I receive a call and I am informed of the news, it is to be paper patching but the road we must take is long and hard and not for the faint hearted. A date is set for the trial to begin, "Bring your rifle we need to do some checks."

Size does matter what ever she says

I arrive at the agreed hour and straight to work we go, I have followed the instructions given by phone.

The bore has been soaked in cleaner and degreased and all the fouled lead has been removed from the lands and groves, the rifling is shinier than a silver dime fresh from the mint.

Ray has prepared for my arrival and we get straight to the point and check the bore, the measurements are taken and checked not once but twice and then again just to be safe, the calculation are done the sizes are written down and there are three:

Bullet size from mould	-	0.4425"
Bullet size after sizing	-	0.4405"
Bullet when patched	-	0.4485"

Now before, I was under the impression that .451 used a .451 bullet, how wrong I was, there is a lot of variation to the size of bullet to bore. The size and type of rifling have a large part to play on this calculation and you can misshape the bullet if it has to be forced down the barrel, resulting in a loss of accuracy.

Paper patched bullets will wear out the rifle a lot quicker than without so it is important to have the correctly sized bullets for your rifle. The bullet should slide into the barrel and slide down under the weight of the ram rod alone. It should be noted at this point that the bullet rotates clockwise when being fed into the rifling. My luck was in when we checked Ray's prepared bullets and the calculation, my bore diameter is the same as Ray's so that confirmed the size of mould and die I required.

A point to note with the rifling is that the Gibbs has smooth button rifling whereas other rifling can have sharp edges to cut into the paper to assist gripping (eg Rigby rifling) but this did not appear to effect the way the button rifling gripped the paper patched bullet when tested.

When fired, the paper patch should come away from the bullet and be left with tell tale marks cut along one edge like the Indian tassels on an old jacket and no blacking of the paper.

Earlier production of Gibbs rifles has a 1:24 inch twist making them more suitable for canular bullets thereby limiting their target range to 600 yards.

The equipment you will require

The equipment can be broken down into two groups the basic casting equipment and the specialist equipment for the specific task of paper patching production.

The Basic casting equipment:

A suitable melting pot with thermostatic controls, I use a lee production pot Mk 4



Thermometer to ensure lead is at the correct temperature to pour



Single stage press for sizing, I use a Lee but any will do.



Special equipment:

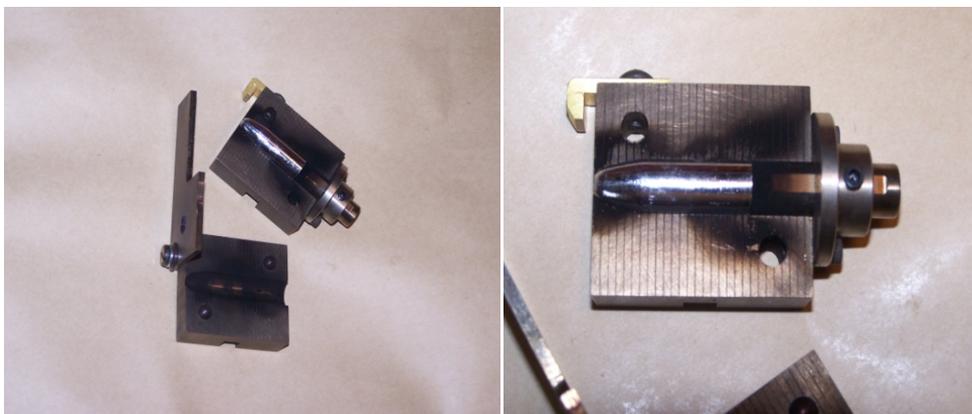
Lead hardness tester to ensure the correct level of tin-lead alloy, 5% tin is recommended by the master so 5% it is to be.



Sizer to ensure the naked bullet is the correct size before paper wrapping



Mould from Dave Hedge, who is a producer of specialised dies for the target shooting fraternity



The mould incorporates an adjustable base plug to facilitate the casting of bullets from 500g to 600g in weight. Some shooters prefer a heavier bullet for long range use in extreme wind conditions.



Cutter template for the production of paper patches, unlike the young pups from across the water this is not a square patch.



Punch and cutter there are a few designs out there, I adjusted a metal punch to the correct size for my purpose.



And finally a kettle or pan and colander to steam the patched bullet to tighten up after wrapping, no picture included because we are modern men and know how the kitchen operates in these modern times.

The materials you will require

Lead, a good quality lead should be used where the hardness is known. Tin alloy to ensure you can produce the right hardness of your lead tin alloy, alternatively you can purchase the lead/tin alloy already mixed to the correct consistency - hardness from Mr J Starley at Midlands the web address is on the FCMLS web page and at end of this article.

Paper should be 0.002" thick 'Onion Skin' 25 % cotton paper, this can be purchased from a good stationery supplier or from the web, this is very hard to get in the UK.

100% cotton paper appears to be no longer available.

Vegetable card matting (for wads) which can be purchased on the web. Ray has not found a retailer in the UK, but gets his sent from across the pond.

Rapine mould preparation fluid for lubricating the moulds and dies and assisting with smooth casting and sizing and preventing rust forming on precious equipment. Alternatively you can smoke the mould with a candle (Bees wax has been mentioned but you will probably have to make your own.)

Making the paper patched bullet

This has been broken in to two parts casting and wrapping:

Casting:

Ensure you have enough time to carry out the set task as if you rush you will cut corners and the casting batch will be useless and you will have wasted precious time.

Ensure your work area is clean and tidy, well ventilated and no risk of lead contamination can occur. **Warning, lead is a heavy metal poison, be careful not to contaminate your surroundings, do not eat or drink whilst casting with lead alloys. Wash your hands before eating or drinking and ensure you have adequate ventilation at all time and keep away from food sources. Dispose of all waste according to environmental regulations to prevent contamination getting into the food chain.**

Ensure you have enough space in which to work

Pre warm your lead pot and ensure you have the correct mixture of lead/tin alloy.

Prepare your mould, ensure its smooth operation and that it is set to the correct size and weight for your set task, 530 grains is the recommended weight. Do not bang the base plug as it may slip and cause a variance in bullet weight, consistency is imperative at all stages if you are to succeed and shoot well, preparation is a valuable key to success.

Once the lead alloy has melted check that the temperature is correct at 750 to 800 Degrees too hot or cold will cause irregularities in the bullet and air bubbles or deformed castings. Temperature must be kept constant as far as possible as a difference in temperature will result in a change in bullet weight due to expansion.

Pre heat the mould so lead does not cool as soon as it touches the mould, a blow torch is good for this but don't over heat the mould as this can cause irregularities in the castings.

Pouring the lead alloy into the mould should be a smooth regular run (do not leave a gap between mould and spout as this allows lead to cool and skins to form and you end up with a very naff casting fit only to go back into the Pot), allow to cool for 10 seconds and use the spruce cutter to cut off excess metal, empty casting from mould into a bucket of water with a soft cloth in the base to prevent hot casting falling onto a hard surface and deforming. Be very careful not to get water in the mould as this will cause a steam explosion of molten lead next time you pour lead into the mould.

Once casting has been completed pour remaining alloy into ingot mould and label so the alloy mix is known for future casting sessions.

Ensure the pot is turned off and allow to cool before placing away.

Clear casting area and wipe down to prevent build up of lead particles.

Place cast bullet blanks onto a towel to dry off and check for deformities. Discard any bad castings, checking the weight is a good way to ensure that there are no air bubbles inside the bullet blank. Once you are satisfied put aside ready for sizing.

Sizing:

To size the bullet blanks they must be passed through a sizing die, there are numerous dies on the market from hand and hammer operated to all singing and dancing self pressing electric models for industry, but we will use a press operated die for consistency and price.

Ensure you have enough time and space to carry out your sizing, don't rush as you will make mistakes. Lay out your work area to make life easier, ensure the press is secure to the bench and greased for smooth operation. Time in preparation is not wasted as it will speed up a repetitive task.



Check batch to be sized, discard any which are not up to standard, lightly lubricate the remainder for sizing.

Ensure the correct die is securely screwed into the press, it should be 0.4405". Place the casting onto the plunger and with a smooth action pull the press lever to the full extremity of its action, the smoother this action is the smoother your bullet will size. Once sized, check for burrs on the base and trim if required. All off cuts are to be recycled or disposed of correctly not into the children's butties. Check weights and batch accordingly, discard any which have too great a variance as they may contain bubbles. Once all bullets are run through the sizer and batched, clear away and ensure sizer is cleaned and packed away, you are now ready to wrap the little darlings in their paper jackets.

When checking the weights you should mark along the bottom of a piece of card the weight variation with target weight (530gn) in the centre and going out each way in 1gn intervals, you should end up with a pyramid shape with the high point on target weight and moving out. Use target weight for competition and next two weights for practicing, any odd balls can be used as warmers into sand or back into the pot dependant on how odd they are.

Patching/Wrapping the bullet:

Preparation is the key to wrapping your bullets, ensure your work area is clean and tidy, organise you materials for ease of access and use but don't clutter the work area.

First task is to make the paper patches they are made from 0.002" 25% onion skin cotton paper. This must be cut into the correct size swatches to wrap your bullets in 45mm wide x 70mm with a 20mm sliced angle giving full length of 90mm.



Once you have cut your supply of paper wraps you are ready to start wrapping. Slightly damp your finger to aid in the wrapping it will make it a lot easier to handle the paper. You can make a rolling jig, there are a number of designs out there to try, a simple one is a groove for the bullet to sit in and guide lines to aid in rolling straight.

You must take care when wrapping to allow the paper to follow the rifling when loading. The bullet will rotate clock wise so you must wrap in a clock wise direction so this action continues to wrap the paper onto the bullet and not unwrap the paper patch when loading.

The paper patch should sit just over the shoulder of the bullet so the whole of the bullet surface in touch with the rifle is covered. This, if done correctly will show on the used patches in a tassel effect pattern.



Once you have wrapped your bullets you must steam them for 3 - 5 seconds in a colander over the steam from a pan or a kettle, this will shrink and tighten the paper wrap and hold it in place, this is why glue is not required. Your bullets as they can now be called are ready to go in their shooting block or storage box ready for the trip to the range even if only one way it will protect them from damage.

Shooting and Sight Setting

Sights:

The sights on the Gibbs are broken down into 3 parts to assist in the correct sighting and zeroing of the rifle. The sight work on a vernier scale will allow adjustment of 1 minute which is a sixtieth of a degree or 1 minute of angle at 100m equals 1.08 inch of strike movement so at 600m it will be 6.48 inches and so on. The adjustment of sight relates to the length of the sight base (Distance between front and rear sight - not relevant on modern rifles but your sight supplier should send a small table to show this and Pedersoli do)

Sight sections:

Rear sight height adjustment

Rear sight windage adjustment

Front sight azimuth adjustment with level



Rear Sight in travel case (Old glasses case is an ideal item as they come in a plastic bag) with fitting tool screwdriver and allen key, sights are precision instruments and must be protected for travelling and storage to prevent damage.

Sight setting:

First of all the rifle must be zeroed in to the individual firer as each person holds and reacts to the firing of a weapon differently and this action will affect the position the bullet strikes on the target. This action of adjusting the sight to bring the fall of shots onto the centre of the target is known as zeroing. With modern sights the scales are then set to zero to allow for correct reading from sight dials in correlation to the numbering on the sight drums /scales.

The vernier scales do not allow the scale to be zeroed so you must record your setting and adjust accordingly against a known scale range table which will be covered in the next section. (A copy of which can be found courtesy of Ray on the FCMLS web Page)

To adjust the sight you must first fit it to the rifle ensuring the correct vertical alignment in direction (left/Right - Forward/Backward there are adjustment screws and shims for this, once the base is set it remains on the rifle)

To adjust the vernier scales you must release the eye shield to allow the adjustment screw free movement and remember to re-tighten before shooting otherwise the sight will loosen with vibration of shooting.

The reading of vernier scale is not a black art as some people would make out, I was taught mills which is the metric equivalent of minutes (1 mill equals 1 cm at 100m - 1 MOA (Minute of angle) is equal to 1.08 inch at 100m both of these are dependant on the sight base length (Distance between front and rear sight) a table for the Gibbs is attached in inches and MOA's which relate to 34 inch base line from a 30 inch barrel length).

The vernier is broken down into 2 scales one with inches with twentieths marked on and the corresponding scale with fifths marked on. When a setting is recorded only 2 of the lines should ever line up and the correct reading is the 2 closest lines on the scale read against the zero line as 1st figure. See samples below:

- | | |
|------------------------------|--|
| a, Sight body scale | j, Main base retaining screw |
| b, Sub division body & scale | k, Eye cup |
| c, Windage scale | 5, Spring clip to hold front sight element |
| d, Windage slide | m, Windage adjustment screw |
| e, Retaining screw | n, Sight body head with locking pins |
| 7, Azimuth scale front sight | o, Elevation adjustment screw |
| g, Spring clip | y, Allen key lock nut |
| h, Vertical adjustment screw | 2 & 4, Spirit level and retaining screw |
| I, Lock screw for H | Front sight double adjustment screws |

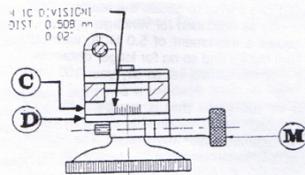
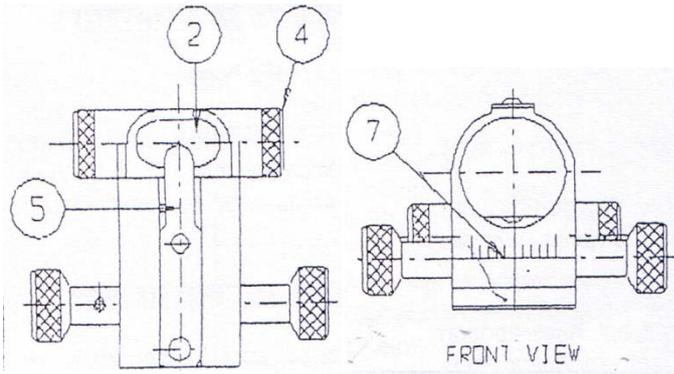


FIG 1
SETTING 1 25°

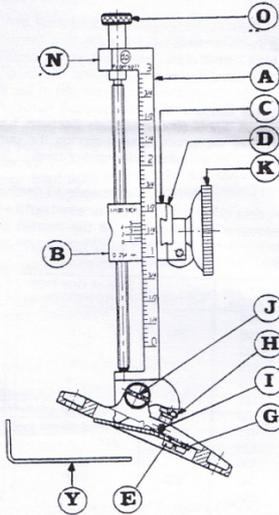
ALIGNED

FIG 2
SETTING 1 26°

ALIGNED

FIG 3
SETTING 1 27°

ALIGNED



Using sight settings and range tables

To start with there are a few points you need to address. The first is where you aim is the called the point of aim (POA). Where the bullet strikes the target is called the POI (Point of impact). The centre of this group is called the MPI (Mean point of impact). Each string of shots is called a group and to zero in the sights a firer must be able to consistently group their shots tighter under 150mm/6inches at 100m once this is achieved the sight can be adjusted to move the MPI into the centre of the target thus zeroing the rifle (at this point the sight can if slip scales are fitted be set at zero thus the term zeroing the sights). This does not happen on vernier sights, a record of the zero must be recorded in your shooting log. Now I hear you shout that sounds easy and it is, but us homo sapiens are all different and what a dull world it would be if we were all the same and we group to different sizes so there is a permissible variation (PV) allowed, which relates to half the group size (6 inch group PV is 3 Inches).The rule for adjusting zero is if your MPI falls within your PV to point of Aim (POA) your rifle is zeroed also if your MPI falls within the adjustment for 1 MOA (Minute of Angle) i.e. if your shots at 300m are 1 inch left of you POA you would not adjust as your MPI would move 2 inch's right of POA which falls within the PV simple! Yes if you would like a practical demonstration we can go over this on any range day just ask me I do not bite much.

This table shows what movement of fall of shots that can be gained by a 1 MOA adjustment at each range this is an approximate scale and has been rounded off for ease of use. A range height adjustment scale is available on the FCMLS web page in both Excel and adobe formats.

Yards	Meters	Size of 1 MOA (in Inches)	Yards	Meters	Size of 1 MOA (in Inches)
100		1.04	700		7.33
108	100	1.08		700	7.56
200		2.09	800		8.37
216	200	2.16		900	8.64
300		3.14			9.72
325	300	3.25	1000		10.47
400		4.19	1083	1000	10.80
417	385	4.36		1100	11.88
433	400	4.53		1200	12.96
500		5.24		1300	14.04
541	500	5.66		1400	15.12
600		6.28		1500	16.20
	600	6.48			

Shooting:

When shooting, it is important to have consistency with the load and the way you load as each thing you do differently will effect the way the shot is fired, the force used to push the projectile from the barrel and the muzzle velocity and energy gained from the shot.



So now we know each shot must be exactly the same lets look at the order we should carry this out so we can make each shot the same as the last, repetition is the name of the game here.

First of all we should prepare our rifle and ensure the barrel and breach is clear of oil and fouling. So remove oil and fouling before and after each shot:

Swab out the bore with a cleaning cutting mix (I use a cutting oil diluted 20-1 sprayed onto a patch) clean the bore then repeat with a dry patch on your jag we are now ready to load the powder.

It is better to use Swiss powder as it burns a lot cleaner than TPPH and number 3 or 4 has the correct burning rate we require in the Gibbs (Number 2 is too fast) The recommended load starts around 70grains and can go to 100 grains but Pedersoli do not recommend exceeding this, I am set to start at 72 grains and move to 85 grain which should give me in the region of a 1250ft/sec as a Muzzle velocity (Which is within the military limits).

The powder should be poured in using a long funnel and should be weighed out before hand into phials again preparation is the key to accuracy. Once the powder has been poured in you should place in the over powder wad which slightly compresses the powder and protects the base of the bullet.

Once the wad is in place, the bore should be wiped with a damp patch then dried to remove any powder granules not seated by the wad, the bullet should then be placed into the muzzle with care not to damage the paper wrap, haste is not the key to speed here, consistency is. Once the bullet has been gripped by the rifling allow the bullet to rotate clock wise as it is lowered, the bullet should go down in one smooth motion under the weight of the ramrod, you should not force it as this will damage the bullet and you will end up with a flyer. To seat the bullet it only needs a gentle tap. The key to accuracy is repetition every time you load it must be done the same way.

The rifle is now ready to fire, enjoy the pleasure of a job well done and apply the 4 marksmanship principles and release your well aimed shoot true to the target and look for the bull at last. Once fired it is back to cleaning in preparation of the next load and again the call is for repetition, repetition, and finally **Repetition**.



I know it's a large group at 35mm but I am woos with a sore thumb and it was the first go with paper wrapped bullets, so watch this space for an improvement, the fun has just begun.



To help prevent loading errors a loading block is a good idea, a minimum of 12 rows are required 10 to count and two warmers into the bank, the design and make up is your preference but the minimum is space for phials and bullets, you can add rows for card wads or pins for caps.

Elevations

Anticipated elevations for initial settings are listed over page. Adjustments may be required to accommodate wind and lighting conditions.

Metford.

The standard elevations for the Metford were established mid 19th century and based upon the following criteria.

Powder 80g no.6 (make unknown)

Bullet 570g

Zero 100 yds

Sight radius... 38"

The Metford zero in the graph over page has been adjusted to 200 yds to make it comparable to the Gibbs.

Gibbs

The standard elevations for the Gibbs were established at Altcar up to and including 300 yds. Beyond 300 yds the data subscribed by the Long Range Muzzle Loading web site in the USA was used with some confidence because their data for 300 yds compared exactly with that obtained at Altcar.

Criteria

Powder.....85g Swiss no.3

Bullet.....530g

Zero.....200 yds

Sight radius.....36/38"

Comparison

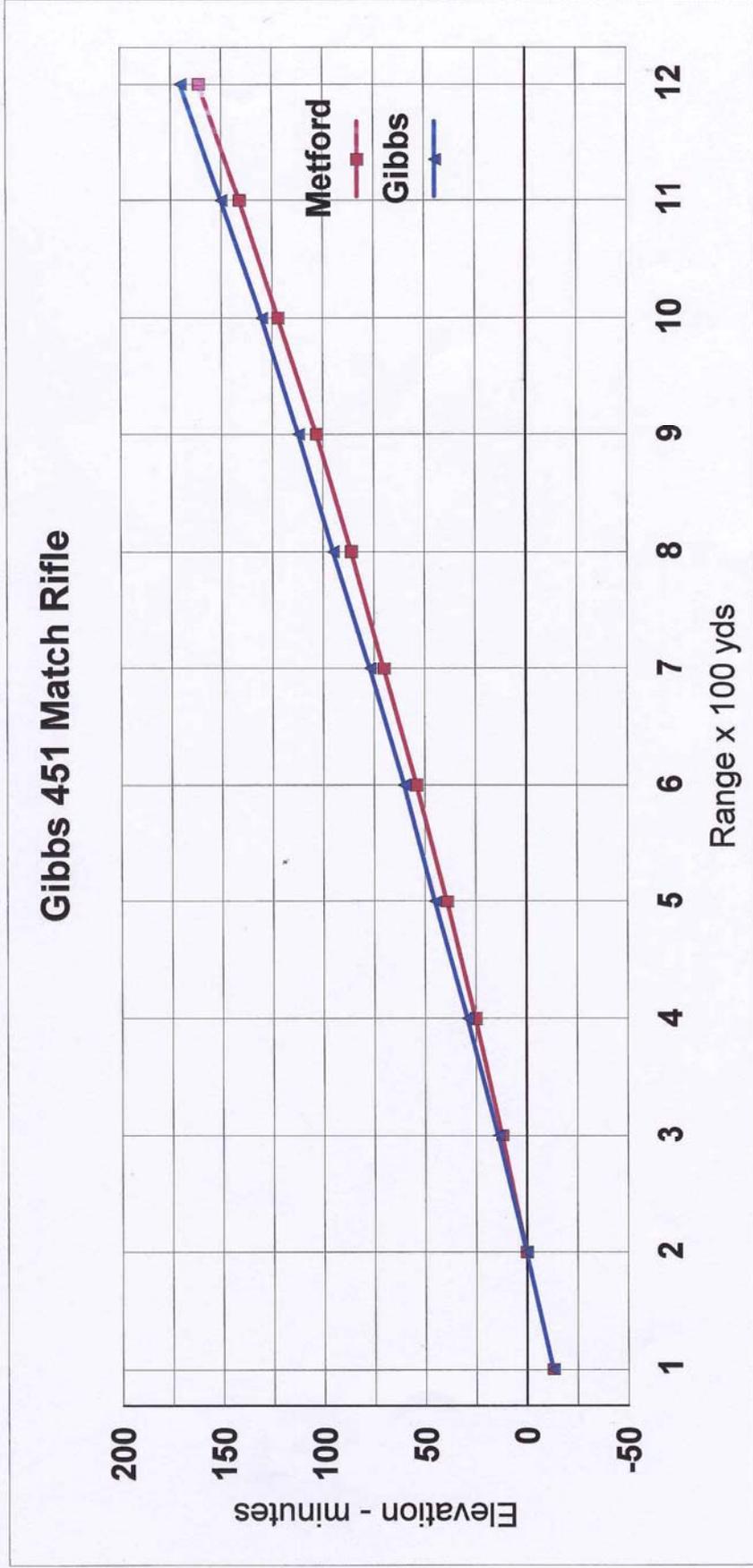
It is of academic interest to compare the stated elevations of the two rifles.

At 1000yds there is only 8 minutes of angle between the two.

The characteristic shape of the two graphs is identical.

Metford	-13	0	12	25	39	54	70	86	103	122	141	161	Minutes
Gibbs	-13	0	14	29	45	60	77	95	112	130	150	170	Minutes
Range	100	200	300	400	500	600	700	800	900	1000	1100	1200	Yards

Gibbs: Blue data verified. Red data extracted from tests on Gibbs rifle and published on Long Range Muzzle Loading web site.



In Conclusion

This article is aimed at those like minded individuals who come shooting to have fun and achieve a result with which they can be pleased.

There is more information out there if you are prepared to look for it, not forgetting the wealth of knowledge which is at the range hut each time we shoot so don't be afraid to ask the club members around you as this information gets harder to locate with the passing of days and setting of suns as time passes us by.

I would like to take this opportunity to Thank Ray Stones for all the invaluable information, time and help received in getting me started on the fine art of paper patching and getting the Gibbs to fire like it should always have done and to Dave Hedges for the speedy service with my mould and sizer in his busy schedule at the armoury.

Please see over page

Here are a few people and places that I visited and from whom I received assistance in my hunt for a Gibbs and paper Patching.

Web Site address:

McAvoy's - Gun Shop Standish - <http://www.guns.gb.com/#344X0>

Henry Kranks - Gun Shop Pudsey - <http://www.henrykrank.com>

Midway UK - On line gun shop - <http://www.midwayuk.com>

Useful Contacts:

Dave Hedge - Quality Mould/Sizer maker - 0121 3530889

Alan Myers - Powder supplier All Swiss - 01995 604251
and TPPH Garstang

FCMLS - Shooting society - webadmin@fcmls.org.uk

Peter Starley - On line gun Shop - warwick.rfd@virgin.net

END

.....
Author: Vincent S. July 2008