

Wind – how to cope – an outdoor target shooter's guide.

No, not the effect of the nice cabbage and bean soup you had last night – this will affect all prone shooters and can hardly be recommended. What my old mentor, Geoff Morton, calls Vertical Wind.

No, the other stuff, across the range if you are lucky, or almost straight towards to you or away from you and veering between the both if you are unlucky.

All outdoor shooters have to compensate for wind, and to say that the judgement of the amount of wind prevailing at any one time is a Black Art is putting it very mildly. Nevertheless, there are scientific aids to reduce the uncertainty and this article explores the correct use of the wind chart for the full bore long-range target rifleman.

But before we get into the niceties of plotting, some home truths.

A very well-aimed shot will be much less affected than a poorly-aimed shot. This is on the face of it illogical – what has direction of aim got to do with ballistics? But it is nevertheless true, as any wind-coach will tell you. Partly due to the awkward fact that a poorly-aimed shot is an unreliable base for future decision-making; partly due to the phenomenon caused by canting, whereby a rifle not held perfectly vertically will throw the round left and down, or right and up (depending on the direction of the rifling in your barrel, and the direction of the cant and of the wind); and partly to some mysterious factor that only affects beginners and leaves the pros alone. Watch the pros shooting their strings and never touching the sights, while the beginners are winding like dervishes, if you don't believe me.

All those splendid flags are not all telling the truth. Your bullet flies below them, above them and then down below them. It only crosses the zone where the flags are operating twice, and briefly at that. The flags tell you what is coming (upwind), and what has gone (downwind), but not very much about what is happening right now – your eye being used for peering down the sights at the key moment. And some flags are just damn liars.

Mirages are misleading – ask any desert traveller. Mirage is the wobbly stuff that makes the target look fuzzy and jumpy. What is it telling you? Mostly that things are fuzzy and jumpy – and that the sun is out and it is another nice day. You can focus your spotting scope at different focal distances, crudely, to get an idea of the general flow of air directly between you and the target, at different stages down the range. At ground level. Again, your bullet isn't whizzing along at ground level, it is spending most of its time quite a bit higher, above the flags 20ft above your head. And anyone who has really studied the mirage at Bisley has seen it moving left, right and in circles at different points down the range.

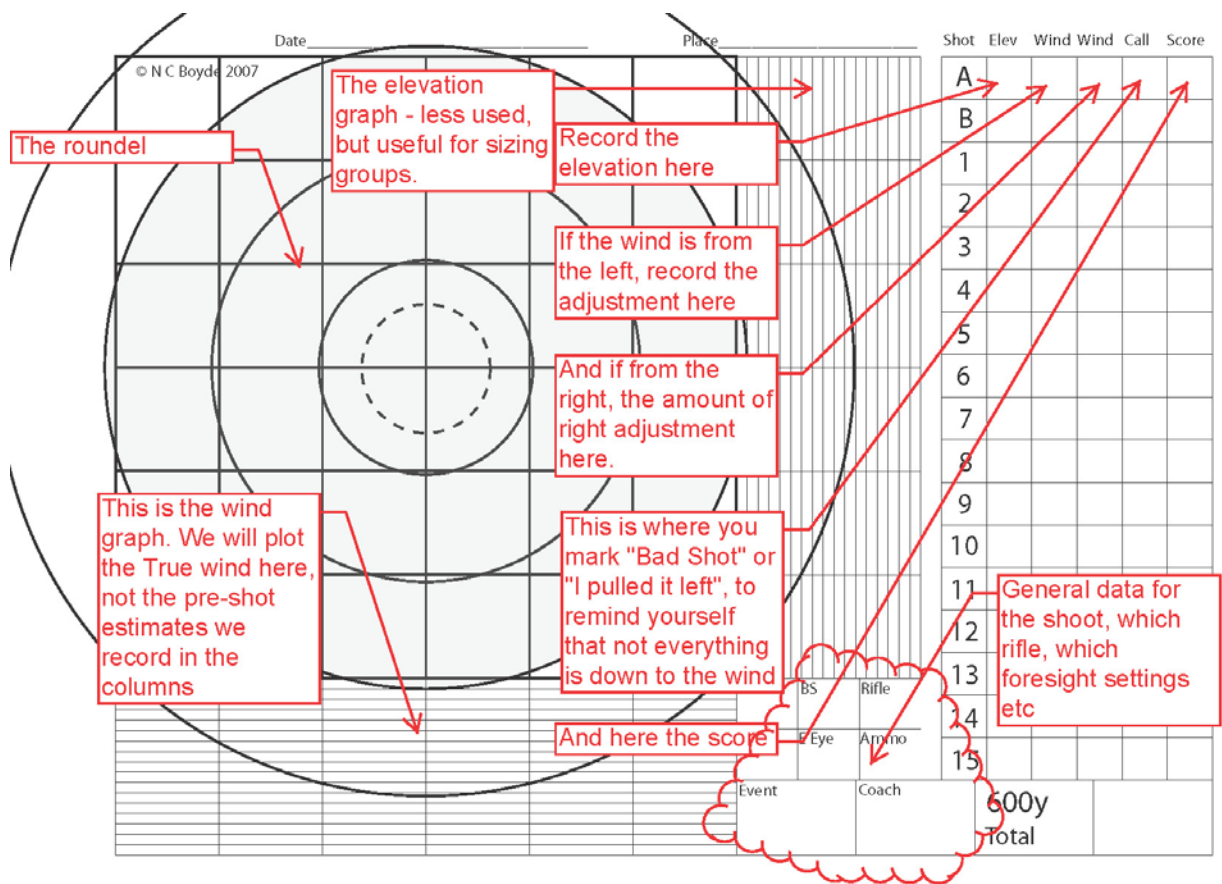
Finally, back on the subject of aim, just to rub it in, you aren't going to have a windage spread smaller than your elevation spread. If you can keep your elevation spread down to half a minute you might be able to get your windage down to that level, but no further. (Unless you have Morton's vertical wind!)

In short, you need to use all your wits, and learn by experience what the various flags, mirage movements and puffs of sand are telling you.

Nothing tells you as much as a well-aimed sighting shot fired under prevailing conditions. This is your best test. Study the conditions, decide what the norm for the day is, and fire your sighter during a norm period.

The wind chart.

There are many variations, but they all have a target roundel, a vertical graph and a horizontal graph, and a series of columns for recording sight data, wind estimates and other shot-by-shot data.



Are you lying comfortably?

The we'll begin:

We set our elevation to 14, the best average of the last shoot over this distance. Your rifle will almost certainly be zeroed differently from mine, but 600 yards should have an elevation 9-10 minutes higher than the 300 yard usual starting point. But for the sake of the demonstration about to unfold, let us say 14.

We eye the flags expertly, and as it March and cold, we don't bother looking for mirage. We take a good look at the danger flag, the red one. It is usually higher than the wind flags and sees the higher-up wind. Also a damned liar on occasion too.

The flags seem pretty steady, and our wind-reckoner provides us a starting point of 3 minutes of wind, at 90 degrees from the left – a moderate day at Bisley. We write all this down – except the wind – as we usually end up fiddling with this right up to the point of releasing the shot. In any event, as soon as the shot is fired, we write down our guess about the wind. 3 minutes Left.

Here is our wind chart:

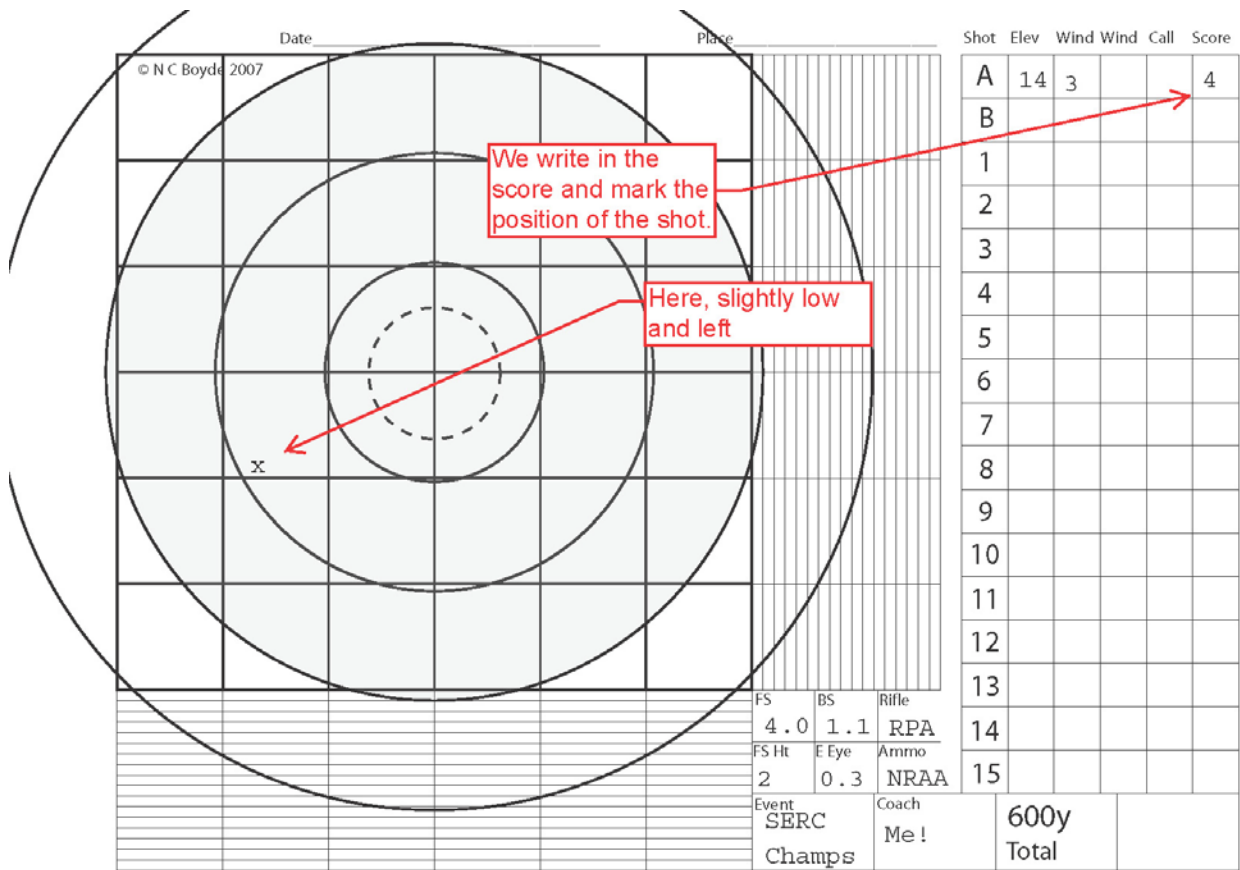
Date _____ Place _____

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Shot	Elev	Wind	Wind	Call	Score
A	14	3			
B					
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

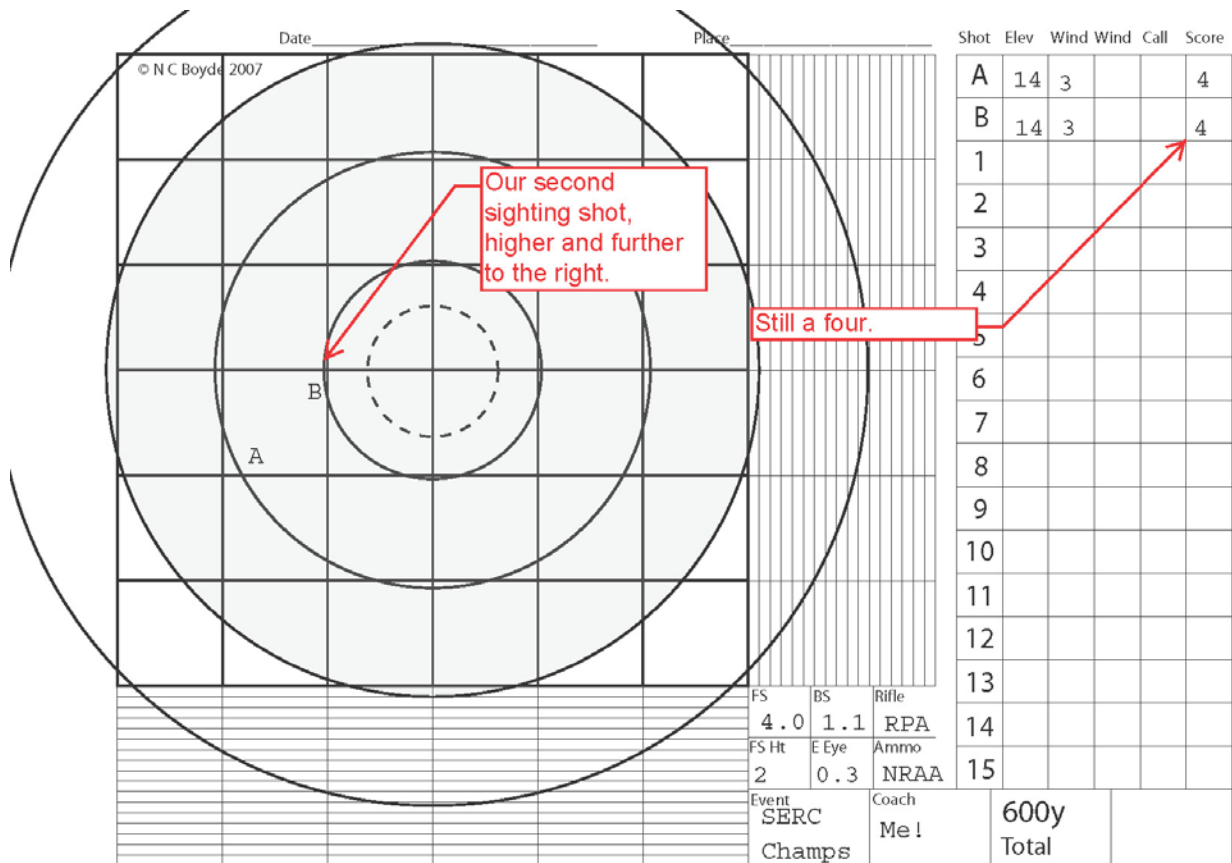
FS	BS	Rifle
4.0	1.1	RPA
FS Ht	E Eye	Ammo
2	0.3	NRAA
Event	Coach	
SERC	Me!	600y
Champs		Total

The target is marked and up comes the shot. Write in the score and mark the position of the shot, here shown with an 'x'. Hereafter we'll use the shot number (A, B for sighters, and 1,2,3 etc for the counting shots).



It is good advice not to adjust based on the first shot's outcome, especially if you have a clean barrel or are new to the sport, new to the range or just new to the weather.

So we fire again, with no adjustments: "B" goes a little higher, and not quite so far left.

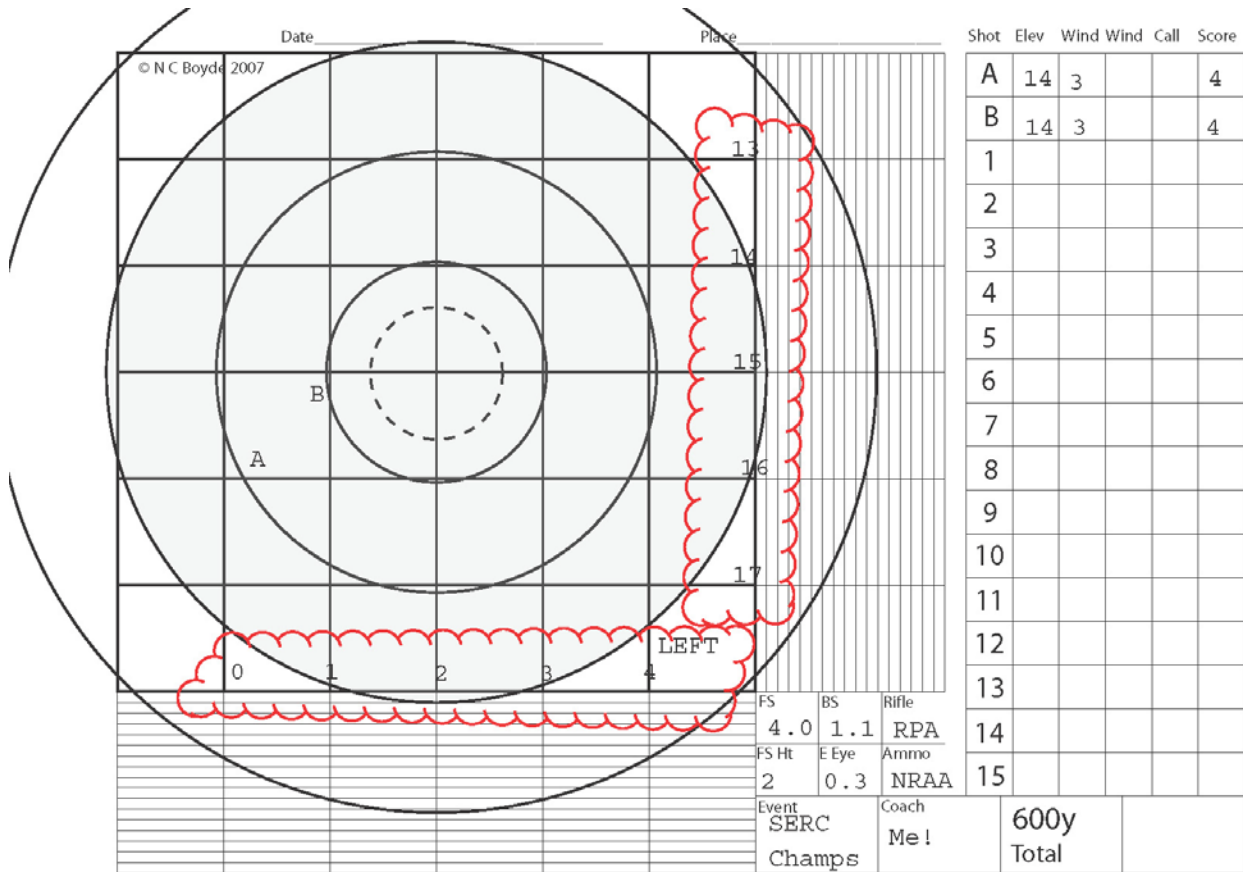


Both shots felt good, neither better than the other, so a fair assumption is that they are part of the same group and we should adjust our sights so that, if we had guessed correctly in the first place, both shots would be in the bull. So we increase our elevation a little, and decrease our wind. But by how much?

Now we come to the graphs.

After the first shot we have a fair idea of how much wind there really is and how close our elevation estimate was. We mark out the scales of our graphs accordingly.

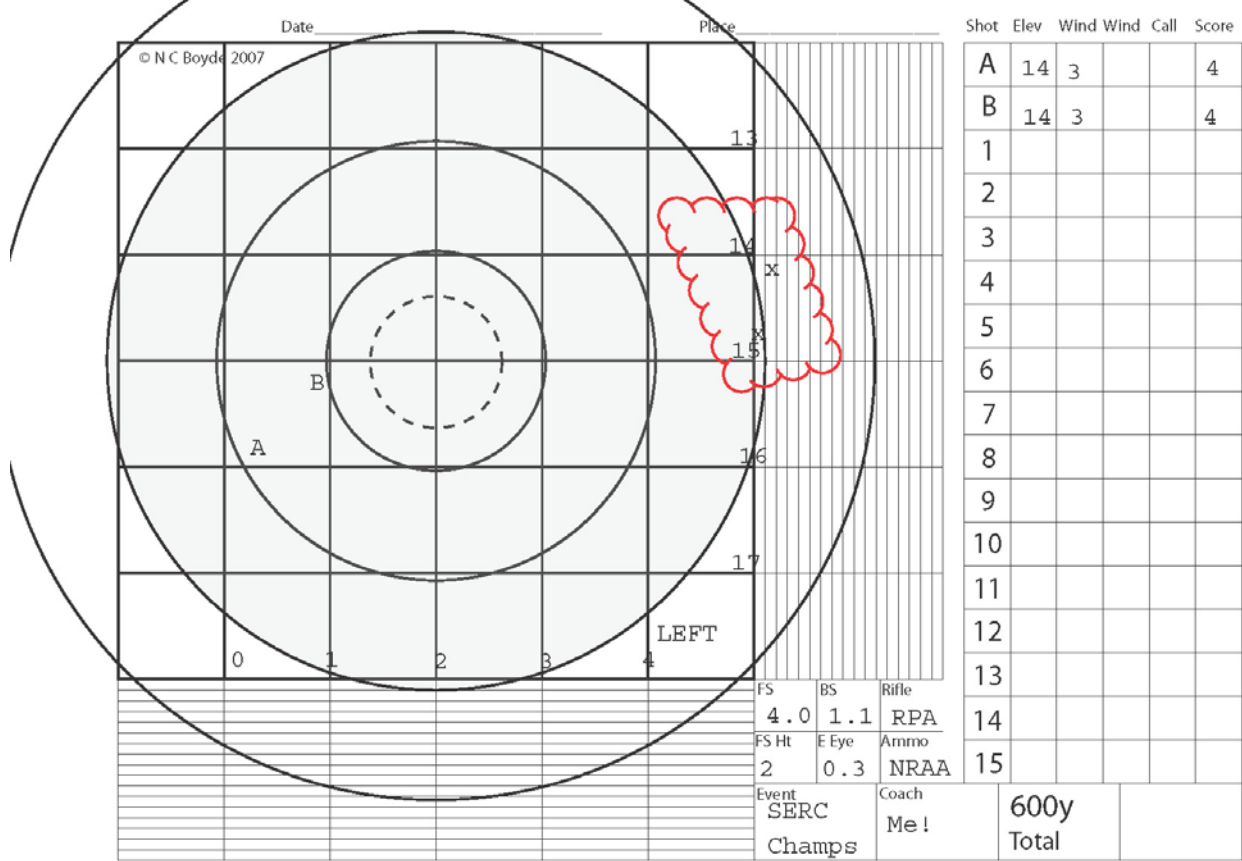
The marked-up scorecard :



Note that the word “left” is displayed to the right of the horizontal wind graph. If the wind was coming from the right, the direction of the numbers would be from the right, increasing down wind, and we would write “right” on the left hand side.

We centre each scale on the nearest round number to the best guess of elevation and wind, so 2 for wind (it is clearly less than three), and 15 for elevation, 14 looking a bit low.

Now we plot the first two shots on each graph – and we adjust the points as we go. First elevation:

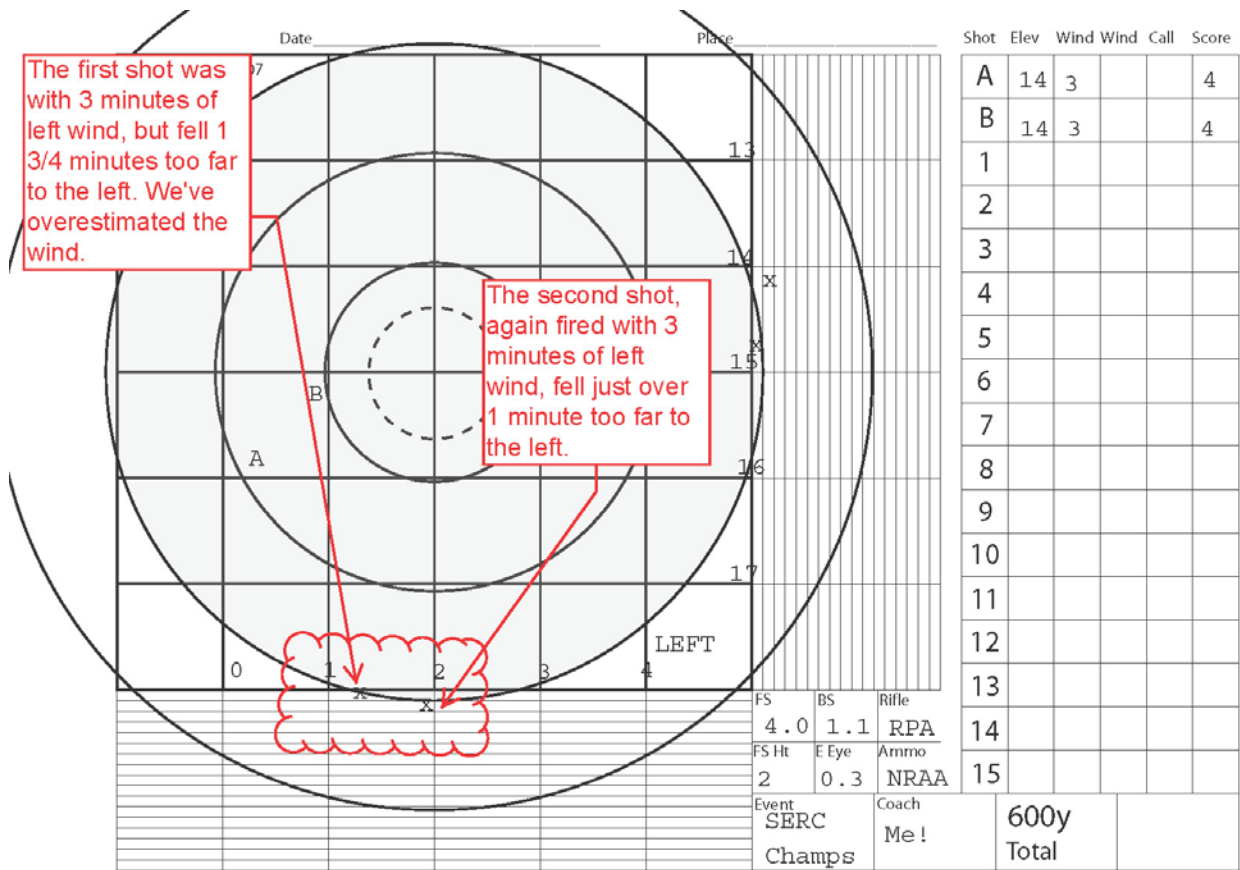


The first shot, A, was fired at an elevation of 14. It struck the target about $\frac{3}{4}$ of a minute too low, so we plot the shot in the first column with an 'x' at about $14\frac{3}{4}$, between 14 and 15.

The second shot, B, was also fired at elevation of 14. It struck the target about $\frac{1}{4}$ of a minute too low, so we plot the shot in the second column with an 'x' at about $14\frac{1}{4}$, between 14 and 15.

Now the Wind.

We plot the same two shots, but now on the horizontal graph:



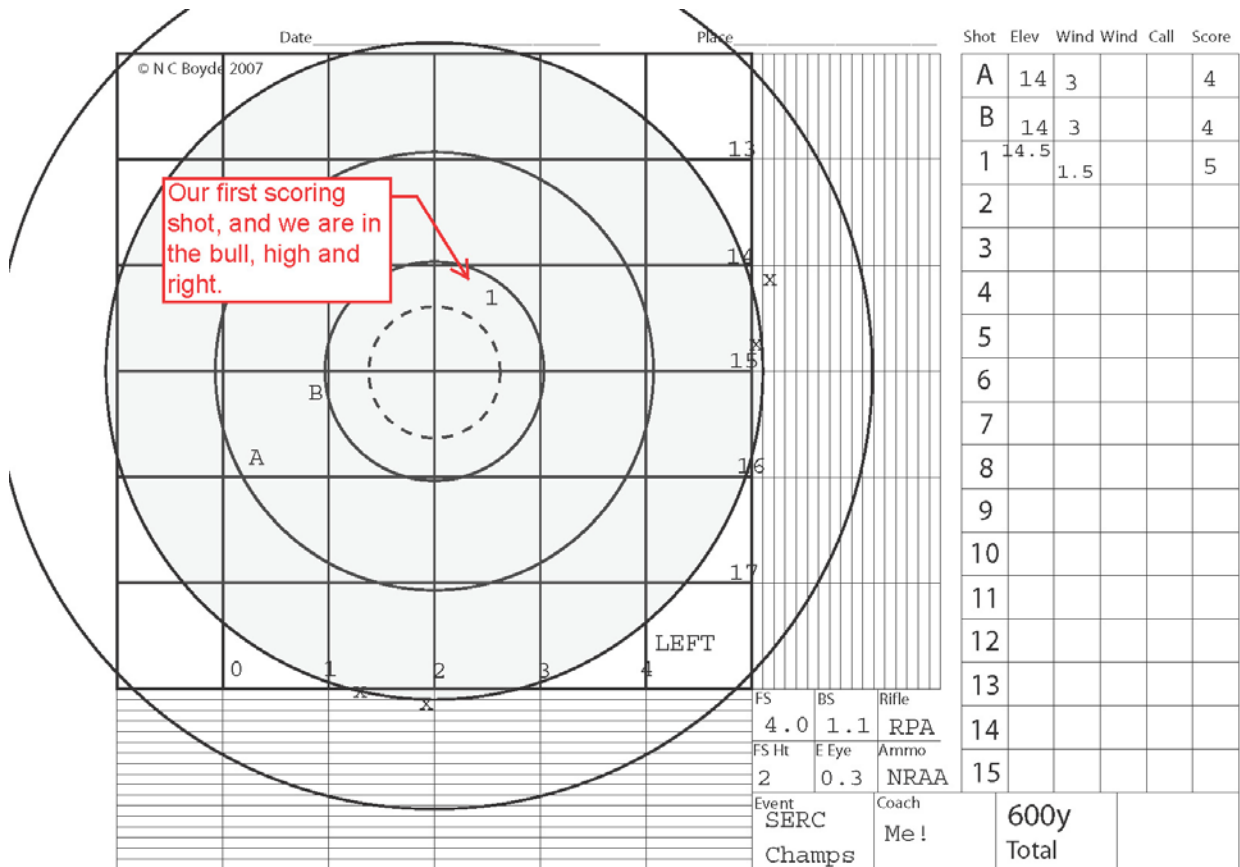
So our two sighters were between a ¼ and ¾ low, and 1¼ and 1¾ too far to the left.

To centre this little two-shot group, we need to adjust the sights and fire our next, scoring, shot.

Rather than do all these fractional sums in our heads, although you can if you like, **just read the graph.** Take a point roughly in the centre of the shots so far.

Our elevation should be about 14 ½ and our wind should be about 1½ Left

Our first scoring shot is in the bull, slightly high and right. We write down the wind estimate (having written down the elevation before getting in to the aim), then as the target comes up, we write down the fall of the shot, and get ready to plot the two graphs.



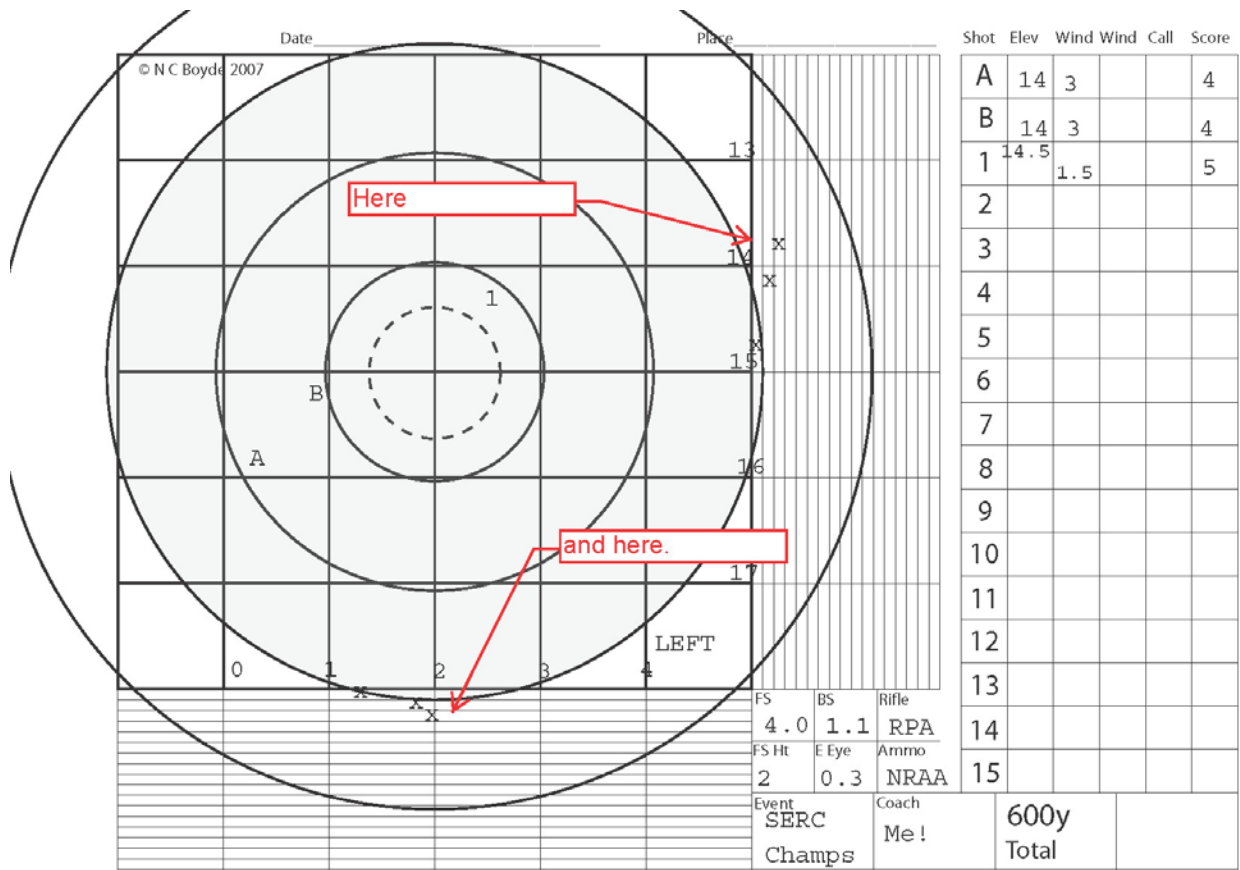
Again we need to adjust our estimates, (the settings on our sights), and plot the actual truth on the graphs.

First elevation: we fired with 14 1/2 on the clock.

Now with your pencil, put the tip at the 14 1/2 point on the graph – here is your new baseline – and with your eye, move the tip up by the same margin the shot appears to be above the centre line – about 3/4. Make your mark. This will be at about the 13 3/4 level.

Now the wind. With the tip of your pencil at 1 1/2 Left, move the tip rightwards, by as much as the shot fell to the right – about 1/2. Make your mark at 2 Left.

Thus.



Now our group is starting to develop. Taking the majority vote so far, from the graphs, we should be at 14 rather than 14 ½ and at 2 minutes Left, rather than at 1½.

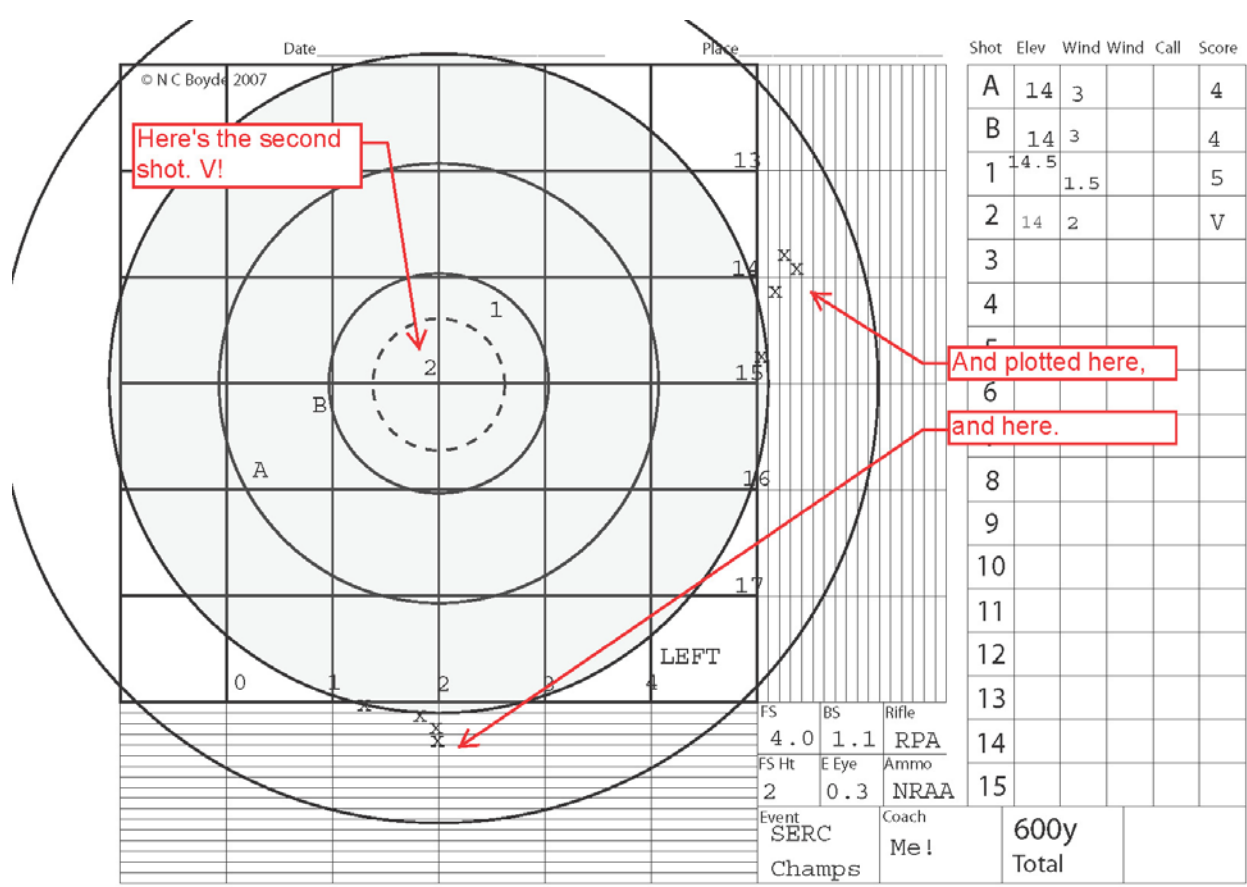
See? No sums, no worrying about denominators. Just read the graph.

You can also see the folly of just plotting the fall of shots on the roundel – this will tell you nothing useful unless you never adjust your sights. Useful in military rifle shooting, where infantrymen were trained to aim off – in this case to have aimed a little high and right, but in target shooting this won't do. We are trying to be **accurate**.

The spread of shots on the roundel, left to right, is 2½ minutes, and vertically 1½ minutes. No sign of a group at all in fact. The graphs tell the true picture -wind variation within a minute, and elevation within 1¼. Quite respectable really, and it is looking like our first shot was a dud, as first shots from clean barrels so often are.

Now adjust your sights, and on we go.

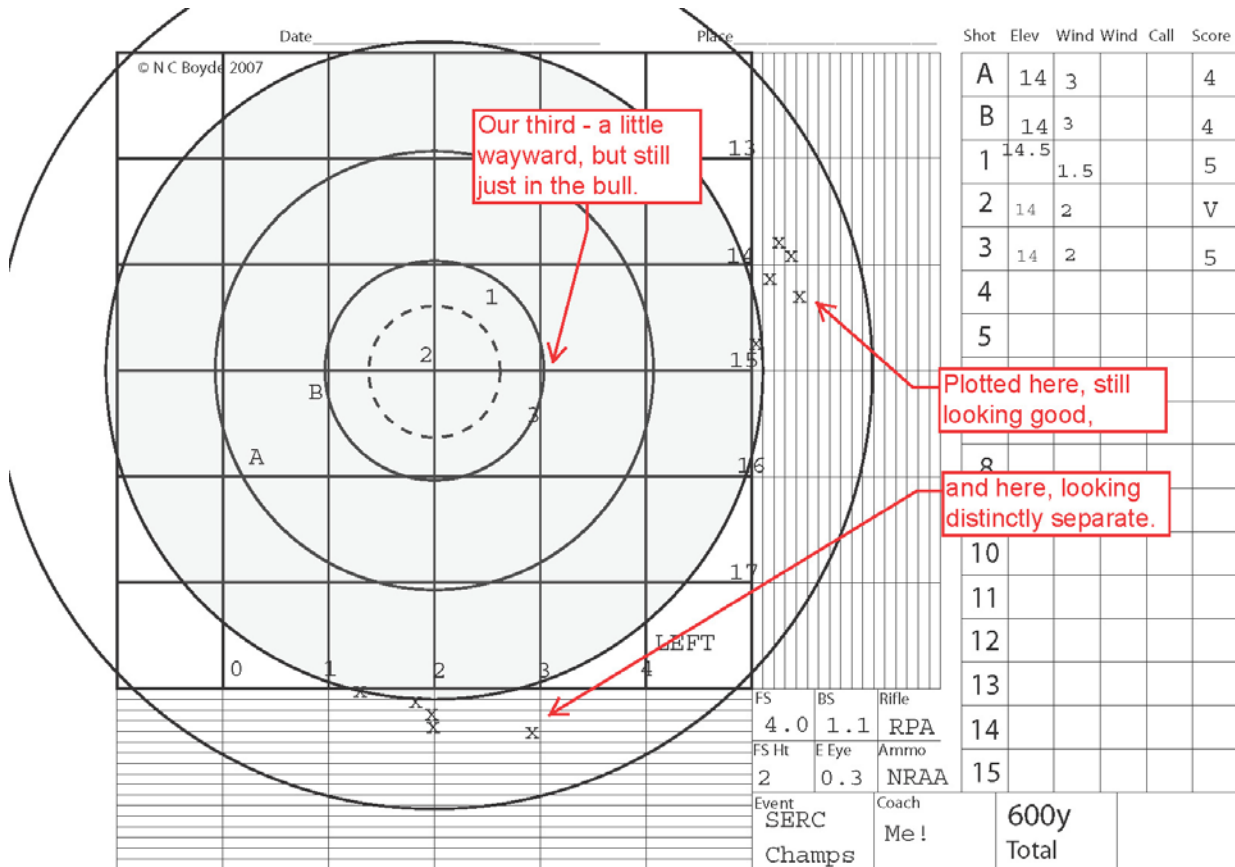
Here is our second shot, and our vindication. A Perfect central V. And easy to plot. We put our pencil an the elevation chart at 14, and plot the shot at a fraction above the line. And as for the wind, we put our pencil at our shooting wind estimate, 2, and plot the shot a smidge to the left.



Another 8 of them, and it's in the bag.

We proceed.

Our next, number 3, a little low, and well to the right, just clinging to the bull.

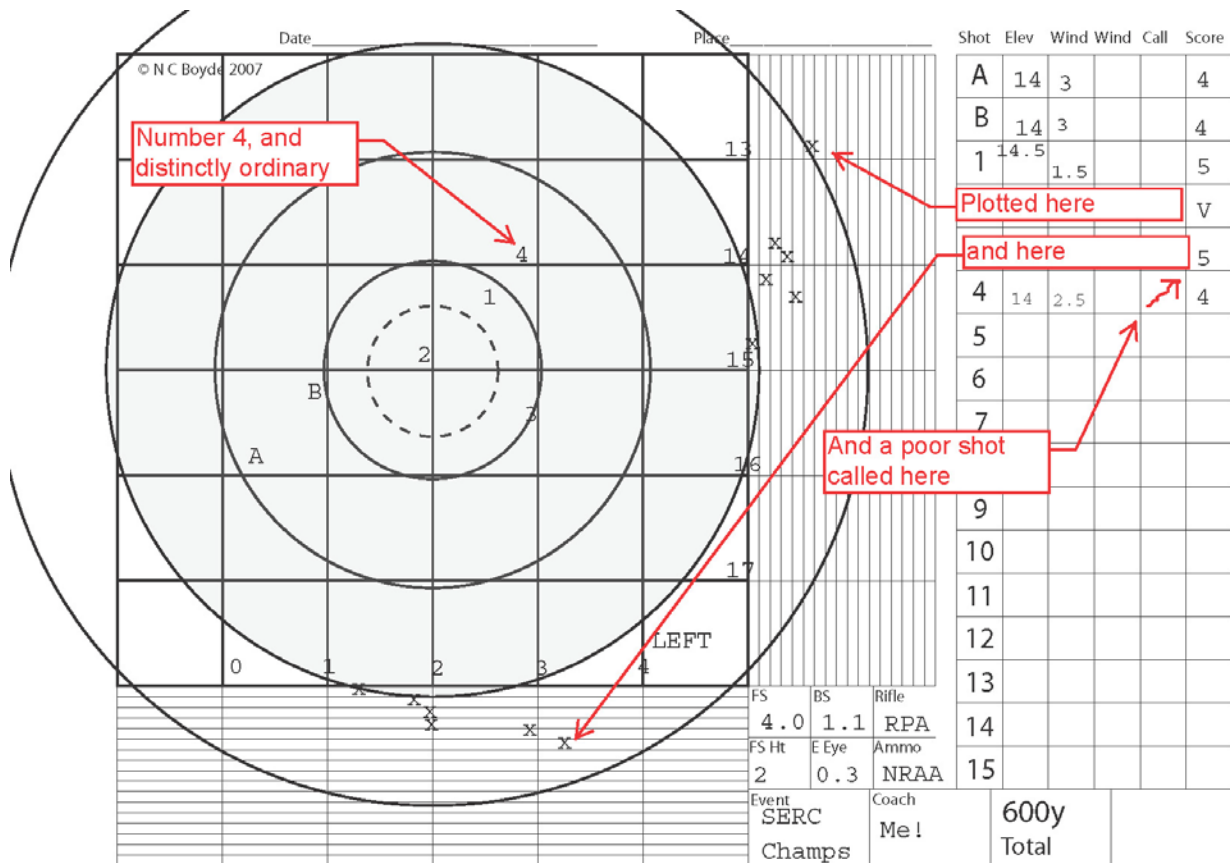


We recorded the elevation and wind before the target went down, and as it came up again we plotted the fall of the shot on the roundel and recorded the score. Now we work out the elevation and wind graphs.

Put your pencil on the 14 mark, and move it downward about 1/3. make your mark. This is how far the shot fell below the line. For the wind, put your pencil at 2, our estimate of the wind, and move your pencil rightwards the same distance as the shot – about 1 minute. Make your mark.

Now we reflect. Was this as good a shot as the last, or did something change? It's a bit late to look at the flags now: try to get into the habit of comparing the flags as soon as the bullet is away, with the mental picture you retained from just before going into the aim. And remember, it is the direction of the flag as much as the strength of the wind that matters.

Decision – the breeze is getting up. Our shot was good apparently – we are holding good elevation – and we can feel the westerly freshening on our left cheek. Time for number 4, but how much wind to put on the clock? Split the difference and go with $2\frac{1}{2}$, so we add $\frac{1}{2}$.



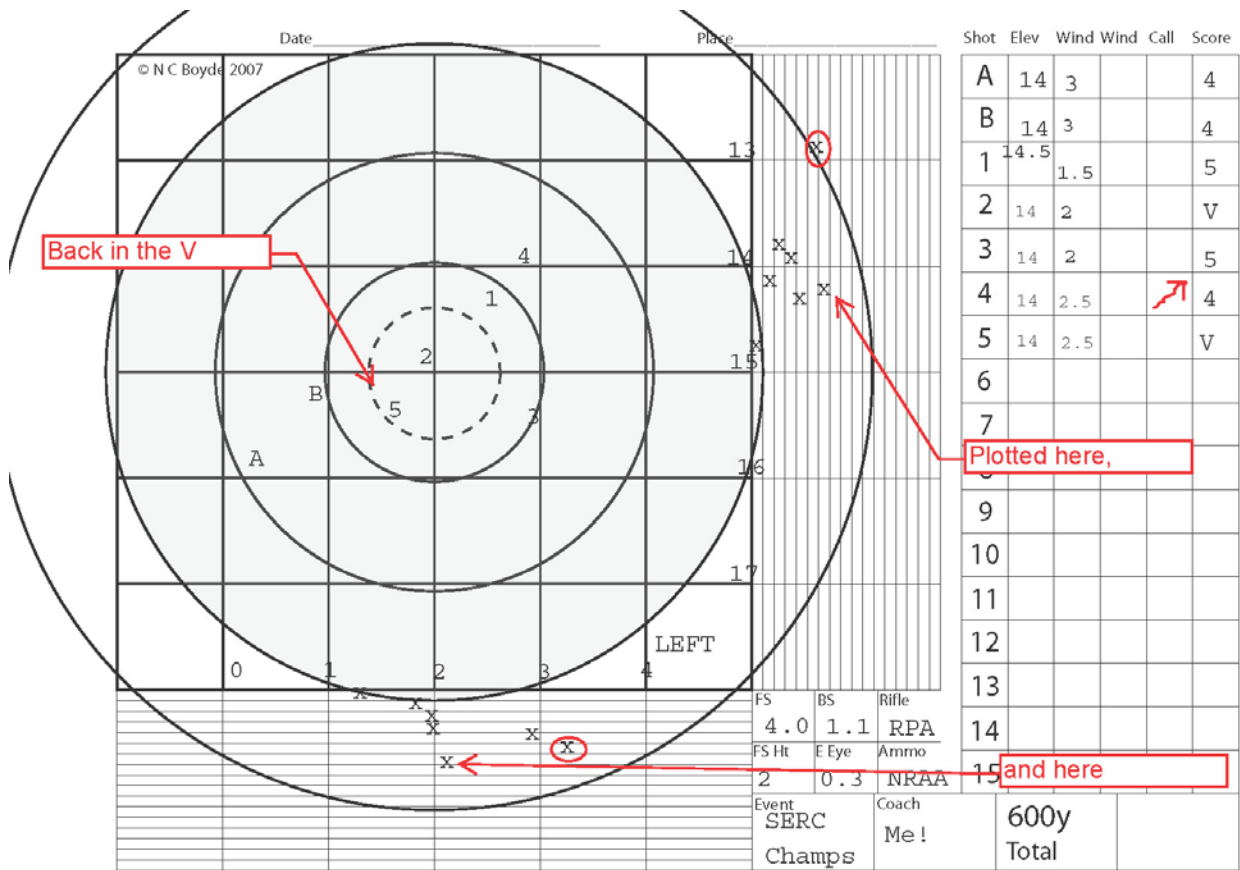
Regrettably we felt this one go wrong after we had pulled the trigger. *C'est la vie*. But we must record it so. In team shooting it is essential to call your shots after you make them. Gives the coach a clue as to what is going on.

Mark the poor shot – a wobbly arrow in the direction of where you think the error went, and then wait for the target to come up.

Yes, a four. At least a minute higher than the group as the graph makes clear, but only a fraction more right than the last shot.

On reflection you decide that there is no point in adjusting the elevation. You haven't moved your position, you felt the shot go high and right, and the last 4 have been grouping very nicely, thank you. What about the wind? Again you consult your memory of the flags, and all seems as before. The shot as called did have a rightwards element to it, so it is possible that there isn't as much wind as the graph indicates.

We put a ring round the 'x's on the graph and proceed as before.



Our calculations paid off.

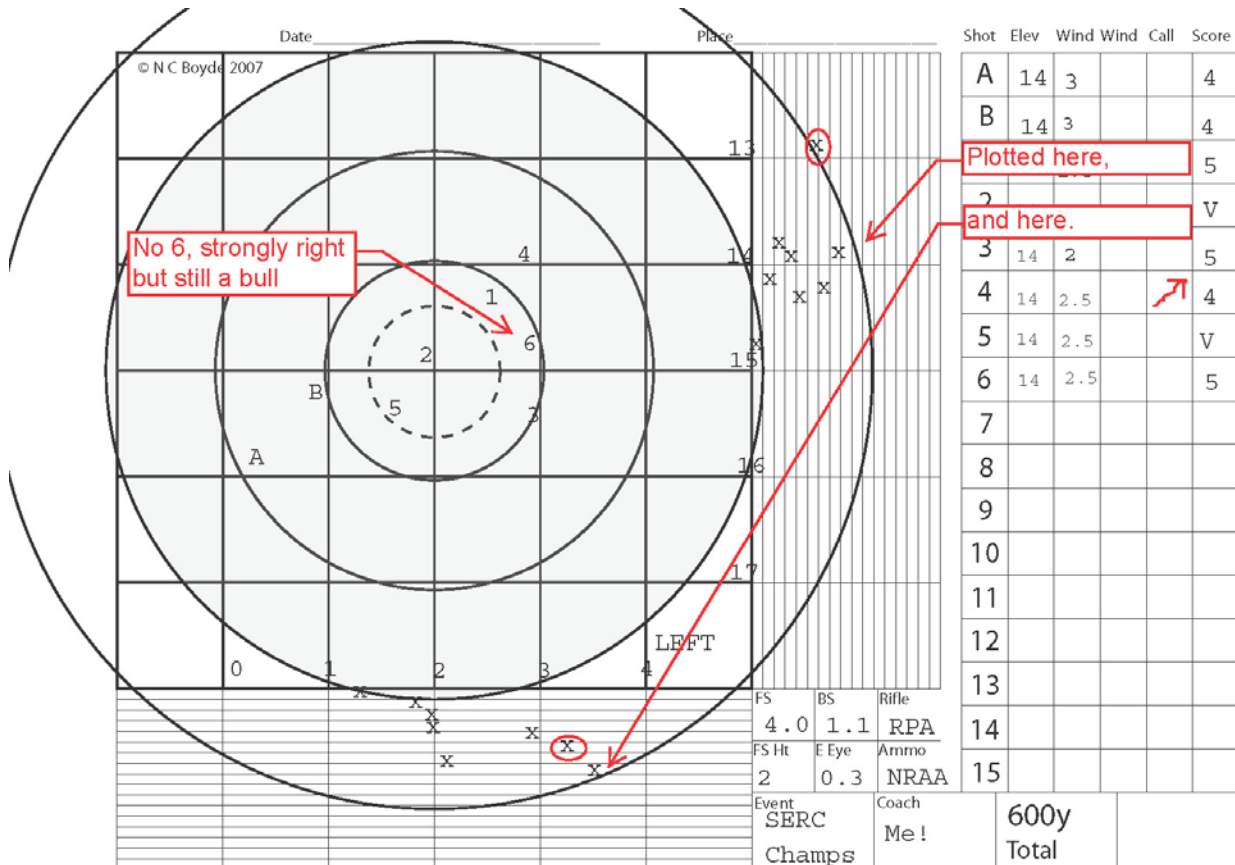
Our shot is in the V, lowish and leftish, our elevation plot proves that we are squarely back in the group, and our plotted wind is in line with the past wind at about 2.

Although our last shot was low and left, we leave the sights strictly alone, as our graphs prove that our group is dead-centre.

No 6. A minute out to the right, and slightly above the line. A 5.

Putting your pencil on the estimated elevation, (still 14), move the pencil up the same distance as the shot rose, about 1/4.

Put your pencil at the 2 1/2 Left wind point, and move it rightwards almost a minute – the same distance as the shot moved right. Plot.

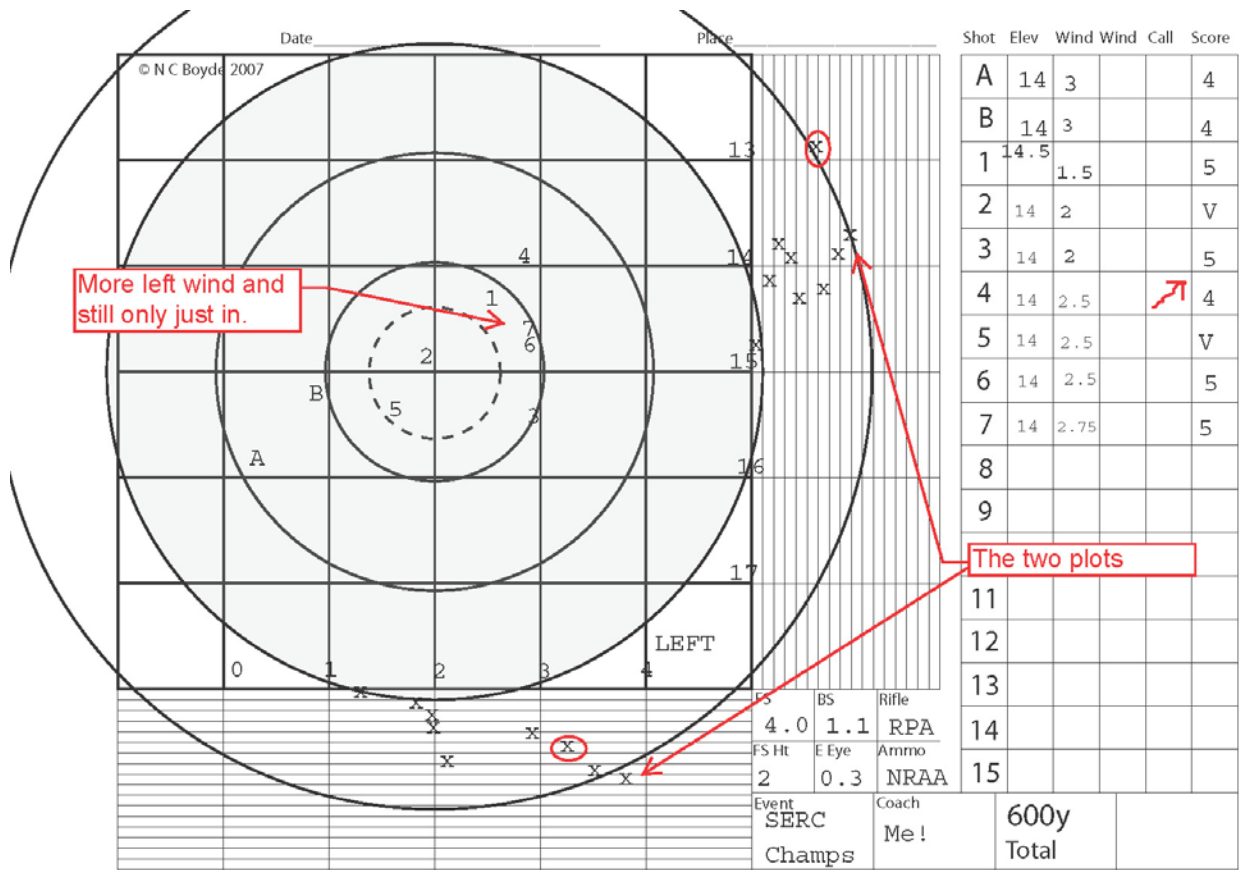


Our elevation is excellent, but something is definitely happening to the wind – we've either got two groups, or a large group, nearly 2 minutes wide from the graph. And as the bull is just 2 minutes wide, that group is a little wide for comfort.

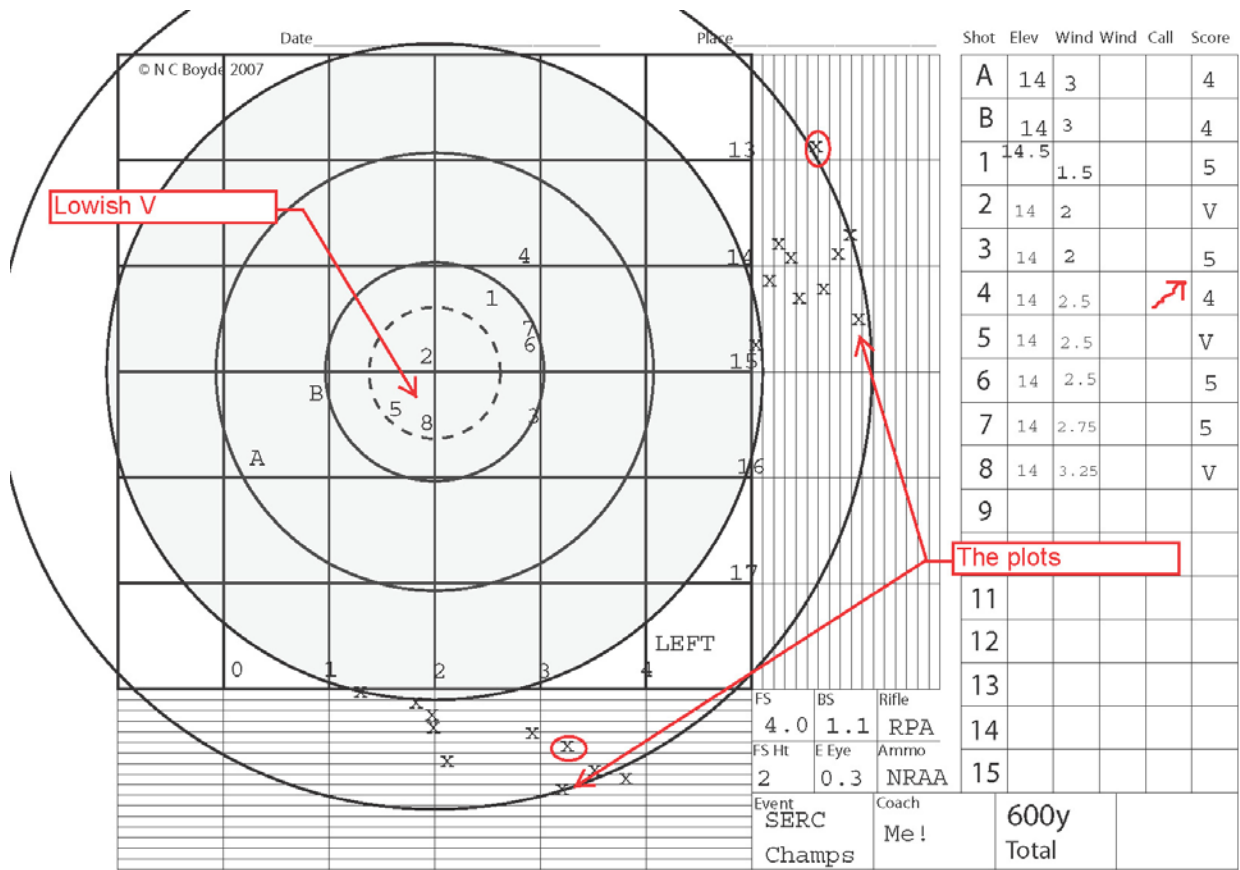
The rifleman's dilemma through the ages. (We count longbow men as riflemen when discussing Wind).

Add a half to 3 and the shots clustered about 2 (if the wind dropped) would be in risk of falling out to the left, do nothing, and another shot like No 6 could drop out to the right. Add 1/4? There are savants who reckon moving anything less than a 1/2 is for fairies who can't shoot, but why else make sights with quarter-clicks?

Add 1/4.

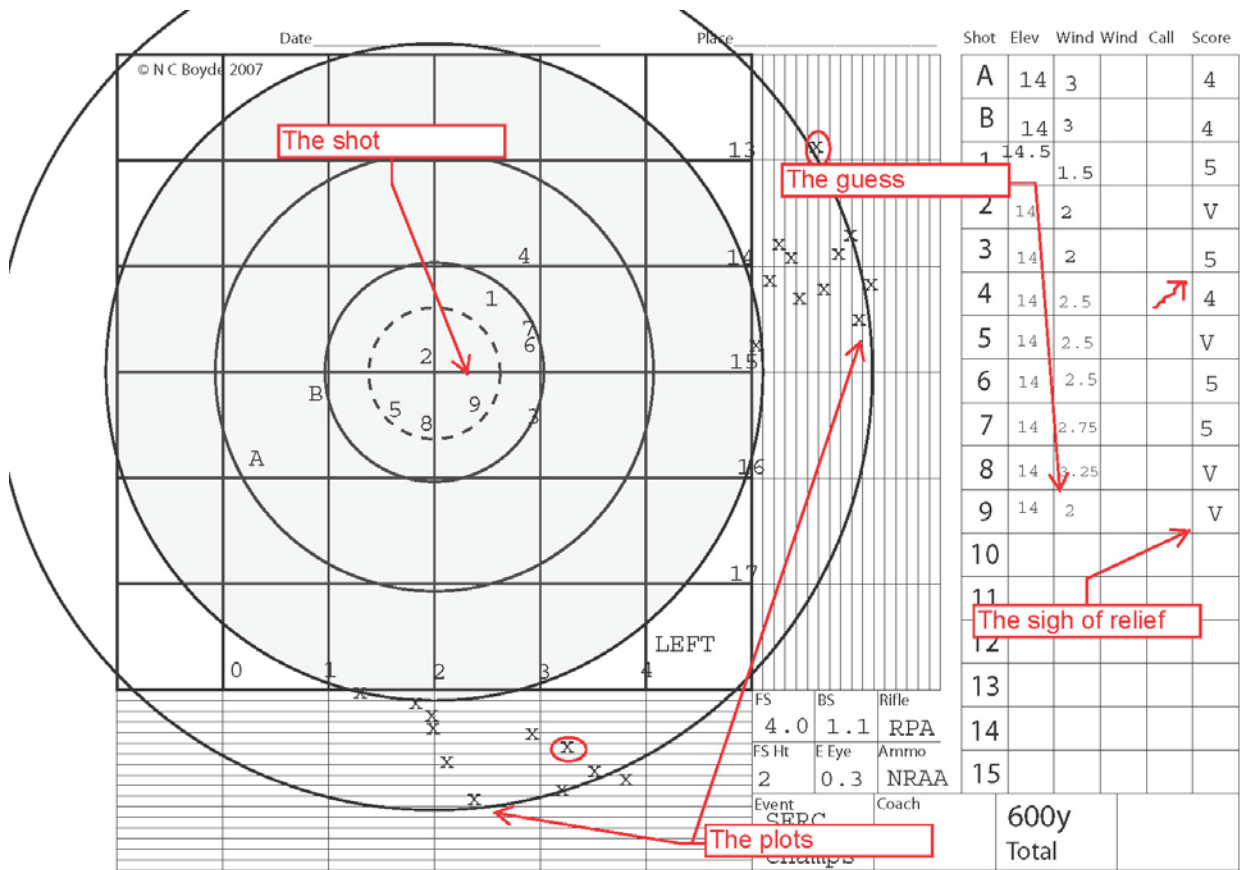


At last, a clear trend. We would have noticed it earlier if the duff shot at No 4 hadn't obscured things. There are definitely two kinds of wind. One lot at 2 minutes Left, another at 3½ Left. Our elevation is still good, so we are apparently aiming well. We look around. We look at our competitors' targets. Any signs of others missing to left and right? Watch the flags. Are they higher generally, are they squarer to the range? For the time being things seem steady, but we must be alert for a drop-off back the 2 minute level. We proceed with 3¼ Left on the clock.



No 8 is in the V, confirming our opinion of the wind, and our elevation, while within the group, is at the low edge of it – caution – we may be getting tired. We watch the wind, and there is a definite slackening. We wait. And wait. Looks like the slackening is here to stay. Into the aim, and whip off 1¼ and fire.

Why 1¼? Because we have been testing the wind for 10 minutes or more with the most accurate tool we possess and we know there are two states. This is the lower one at 2 Left.



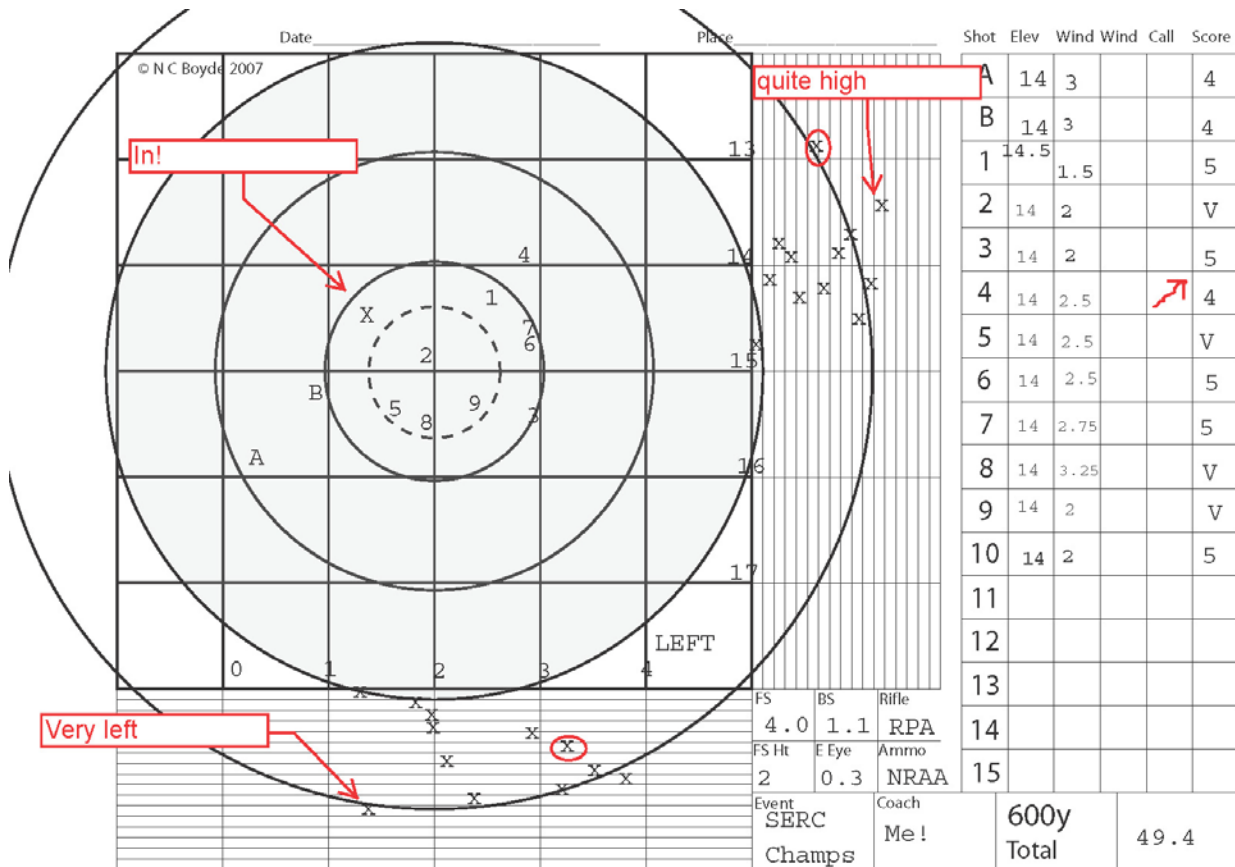
Let us again follow the rule for plotting the graphs. Put your pencil on the graph at the elevation setting of 14, and move it downwards the same distance that the shot fell below the line. Mark. Now put your pencil at your estimate of wind of 2 Left on the wind graph and move it right the same distance as the shot went – nearly ½ a minute. Mark. Looking good.

Now for the last shot, and you are in danger of psyching yourself out. Watch the flags. Decide.

Can't tell if there's been a change? Then maybe there hasn't Proceed.

Last shot. Steady. Control the breathing and the pulse. Gone.

Target comes up, panic over, it's a bull, but we sit still and plot it, because there is still something to learn.



A little high and left, and well within the bull – almost a V. Good shot.

Now we plot. The elevation is a full half minute above the line and a minute higher than No 8. We **were** getting tired. We put our pencil on the 2 Left mark, and go left $\frac{3}{4}$ or so. We are well out of the wind group. Good shot? Maybe. Maybe not. Decide, and mark it accordingly, and keep the score card.

This score card tells your shooting captain that you can hold an elevation group to within half a minute, barring the last few shots perhaps, which is very good indeed. It tells him that when you call a bad shot, you call it correctly. This is hugely important in team shooting. If your coach can trust you to call a bad shot well, he or she won't adjust and no more shots will be lost. It also says that you can read the wind, because all-up there seems to be 2 ½ minutes of variation, top to bottom, and all your shots, bar the duff one, are in. And finally it tells the captain you can plot, and centre the group, as even the weak last shot was comfortably in the bull.

Finally, let us rehearse the routine – you will find that you have plenty of time if you stick to the routine.

Set the elevation

Record the elevation

Watch the flags, guess the wind, set the wind

Aim and fire

Head up, look at the flags. Did they change while you were firing? Take this into account. Record the wind setting.

When the target comes up, record the fall of shot, then the score, then plot the elevation, then the wind.

Read the graph – consider – begin again.