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INTRO

Welcome to the world of rifle accuracy. There is great satisfaction in watching bullet after bullet go into the same hole on the target. That is the quest of the accuracy shooter. Perfect accuracy cannot be achieved. In this book, the author will direct the reader and his equipment to perform as close to that ideal as present technology will allow. There is a certain mystique that surrounds the benchrest shooter. I urge the new shooter not to be intimidated. The techniques used to improve rifle accuracy are well within the capabilities of almost anyone.

Before going any further, it would be helpful to define just what an **accurate rifle** is. I do not think there is a single definition that will fit all shooting sports. What might be a very accurate rifle at 100 or 200 yards will probably not be the best choice for 1000 yards. Likewise, the accurate 1000-yard rifle would not be a good choice at a silhouette or 100 yard benchrest match. We can name many types of competitive shooting sports (*group benchrest, score benchrest, Palma, 1000 yard benchrest, silhouette, the Camp Perry National Match, or even a match between friends with hunting rifles*), yet, in every instance, an accurate rifle is still an accurate rifle. A rifle that is capable of winning at the sport it was designed for is an accurate rifle. Between accurate rifles, the components, calibers and shooting styles can be quite different. The techniques used to load ammunition and tune the rifles end up being very similar.

I have always enjoyed talking to shooters who have shot both group benchrest and other shooting disciplines. Many of the details vary between disciplines and there are significant levels of equipment specialization. In every instance, the equipment can be every bit as accurate as benchrest equipment.

This book focuses primarily on 100, 200 and 300 yard group benchrest shooting. This is the type of shooting that I have competed in for the last 30 years and feel the most comfortable writing about. I hope that the non-benchrest shooter does not put this book down, assuming there is nothing in it for him. I believe that any reader can transfer the knowledge of loading ammunition, rifle tuning, modifying a rifle for improved accuracy, etc., to fit his particular needs.

I will be providing you with the techniques that I have found to work best for me. That is not to say they are the only techniques that work. Where possible, I will also provide you with alternate techniques that may work better for you. There is hardly ever a single process that works exclusively in these sports. And if you were to ask ten competitors at a benchrest match the best way to do something, there is a good chance that you would get a wide range of opinions. Some competitors believe that their “pet” method is the best while others could care less about it! I ask you to give my methods a fair chance, but if you have found something that works better for you, keep using it!

There are times when I will not be able to tell you why something works. I wish this was

not the case and that I had an answer for everything, but I do not. There are just some things in this game that are not what they are supposed to be. While I have always tried to find the reason why something works best, **I will do what works best on the target**, not what “should” work best.

A thorough comprehension of the contents is essential to obtain the best accuracy from both yourself and your equipment. Do not be surprised if you read the book more than once. I have included a number of examples specifically for **hunting rifle** applications. I feel the hunting rifle, being the most popular rifle in use today, can greatly benefit from benchrest know-how. As you read, be open to change as this is a sport where change happens all the time. You do not have to go with every new equipment fad that comes along, but keep your eyes open. If you see something that seems to work, do not be afraid to give it a try.

Since I have started shooting benchrest, there has been a constant stream of innovation in everything we use: rests, stocks, actions, scopes, triggers, cleaning materials and wind flags. Even the lowly shooting stool has been improved. The aim of the sport is to **constantly improve rifle accuracy**. Every shooter you will compete against will be thinking of ways to do that. **If you are not winning you have to change something!** It may be your posture or what condition you choose to start your groups. It may be that a new innovation in equipment has come along and you did not take advantage of it. Always be open to change!

CHAPTER 24

CONDITION READING



Flags at the Super Shoot—"Welcome to sunny Ohio!"

This is the hardest chapter for me to write because only the fundamentals can be taught. Much has to be learned by practice and observation. As we discussed in the flag setting section, you need flags in order to learn the effects of wind. If you do not have flags then buy them or make something up with poles and surveyor's ribbon until you can get some.

If you ever get a chance to observe a wheat field from above (stand on the bed of a truck) you will see the complexities of the wind. In one area the wind will ripple from the right, while just beyond another wave may come from the left. Next to that the wheat is standing perfectly straight. A lot of activity is going on: waves, bursts, swirls, updrafts, downdrafts and calm. Observing that wheat field will help you understand that more is going on than a few wind flags right in front of you can ever show.

Everything around you is a wind indicator. The way the wind feels on your body, the way the grass moves, the way the trees sway, the noise from the daisy wheels as they speed up. If you are observant, there will be many early warning indicators of change. Just sitting at the range observing a set of flags can be more educational than firing shot after shot. You might see some grass move then the flag closest to it pick up, then another and another. You might see one flag just twirling round and round, indicating a little vortex. When it leaves that flag another flag starts twirling. You might feel a breeze hit your body and a few seconds later the flag closest to you shows it.

There are times when a loud “\$%#^” from a competitor a few benches away has caused me to stop shooting. A sudden condition change probably caught him unaware and it might have caught me too.

Many competitors concentrate only on their flags. **They have tunnel vision** and it keeps them from seeing what is coming. Flags do not instantly show condition changes, there is inertia to everything including a light piece of surveyor ribbon. It takes time for daisy wheels to spin up and spin down. It takes time for wind direction changes to manifest themselves on the flags and it takes time for humans to react to the changes even after they show up on the flags. Seeing changes coming from far out in the field gives you extra time to react. You will be able to see a condition coming that will give you the “start” signal for your group or just as likely it will tell you to hold differently or even to stop.

The first step in condition reading is achieving a wide visual focus. This will take a lot of practice, especially in competition when the adrenalin is flowing and you want to finish the group as quickly possible. We end up focusing more on the target and the flags just in front of us than on the whole field. Sometimes, even after we spot a change we still shoot—sort of “wishing” the bullet into the hole.

Practice with three rows of flags, one row out to the right at least 5 or 6 yards, one row to the left the same distance and one row in line with the target. If you go to the range with buddies it makes this easier. If you can set your warning flags even further out, say 10 benches to each side. Practicing with the warning flags out will start to widen your focus. Forcing yourself to see the whole field during competition will give you a winning edge.

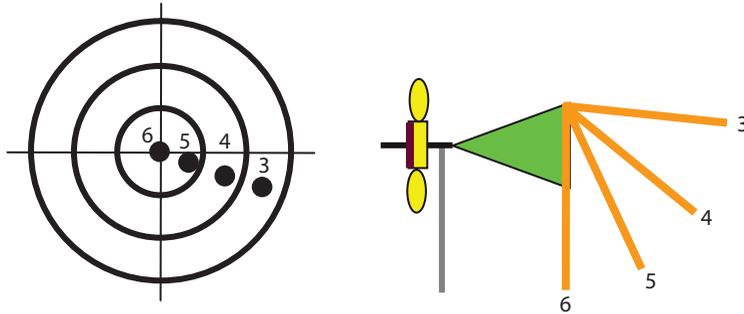


A two bench private range in Florida with permanent flags in place; two outside rows of warning flags, one row for 100 yards and one row for 200 yards.

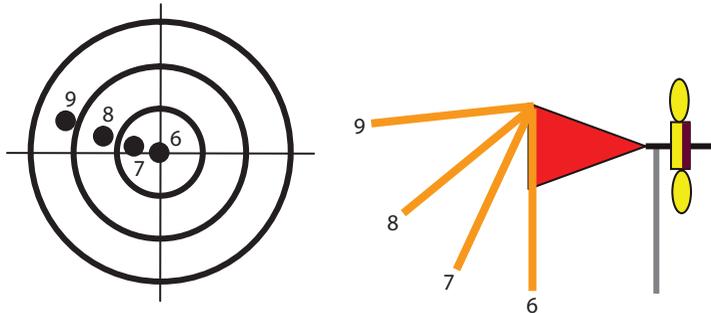
So how does the wind affect the bullet? A great deal of the determination is made by how well you have tuned the barrel. If the barrel is well tuned, it will lessen the effect of the wind. Other factors such as bullet shape and weight also come into play.

I will start by broadly describing wind effect using a range such as the one pictured above. The ground is flat, there are no major obstacles affecting the wind and the wind is very true.

At such a range, wind from 9 o'clock to 3 o'clock will move the bullet to the right and slightly down. Wind from 3 o'clock to 9 o'clock will move the bullet to the left and slightly up. The reason there is a vertical component associated with these pure crosswind examples is that the bullet is spinning clockwise from the rifling, sort of like slicing or hooking a golf ball except on a different plane.

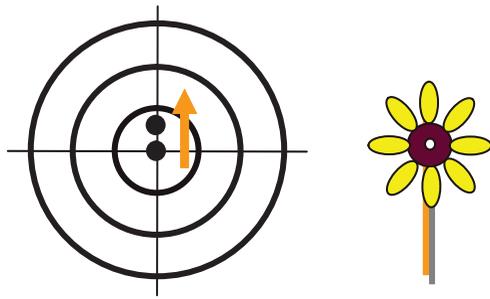


Example of pure crosswind from 9 o'clock—bullets go right and down.

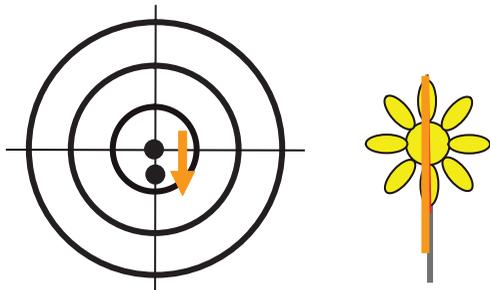


Example of pure crosswind from 3 o'clock—bullets go left and up.

Let us continue on our “pure wind range” and analyze the effect of headwinds and tailwinds. A headwind will drop the bullet more than still air and a tailwind will drop it less than still air. Please notice that I did not use the term lift because in a pure head or tailwind there is no lift. In still air the bullet has to travel through the air between the muzzle and the target. In a headwind the bullet is traveling through more air relative to its path, in a tailwind it is traveling through less.



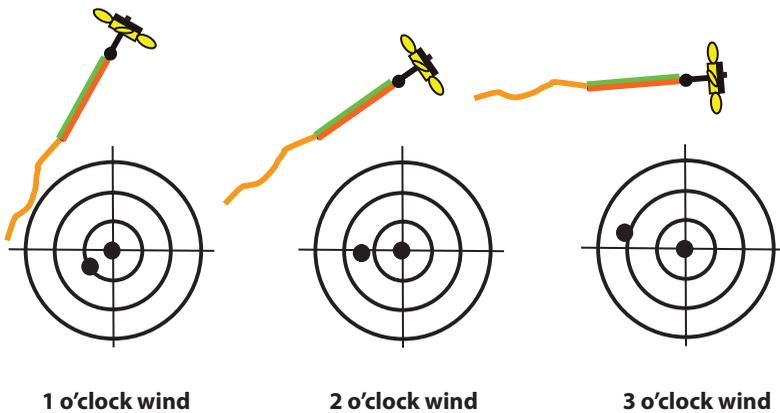
**Example of pure tailwind—
bullet goes up a small amount.**



**Example of pure headwind—
bullet goes down a small amount.**

In a simplistic manner, the surface presented to the wind by a bullet going into a headwind is less than the surface presented to the same bullet in a crosswind. The total deflection to the headwind is therefore less. A 10 mph crosswind will therefore move a bullet more horizontally than a 10 mph headwind will “move” a bullet vertically.

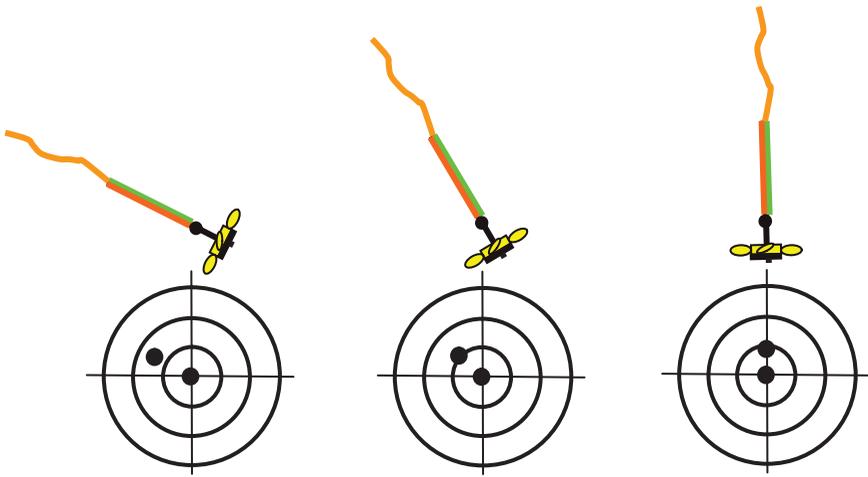
From our pure wind examples it then follows that every other type of wind is the resultant of vertical and horizontal components. Below are a series of drawings illustrating bullet movement for the same velocity of wind coming from different directions. The accompanying flags are drawn from a top view to make direction indication easier.



1 o'clock wind

2 o'clock wind

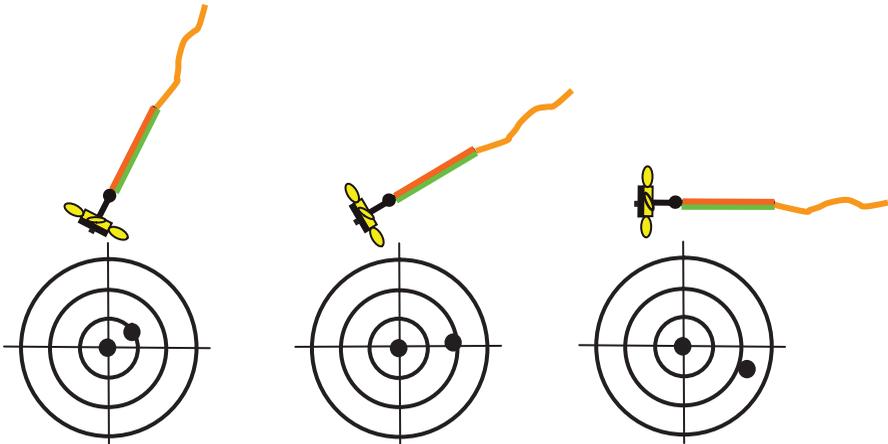
3 o'clock wind



4 o'clock wind

5 o'clock wind

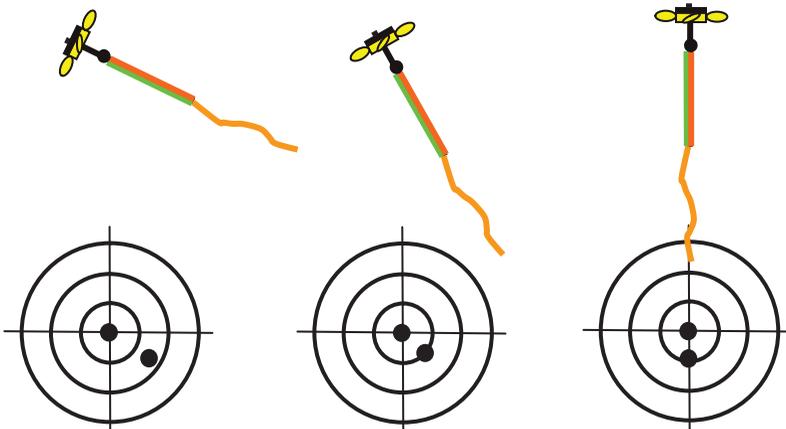
6 o'clock wind



7 o'clock wind

8 o'clock wind

9 o'clock wind



10 o'clock wind

11 o'clock wind

12 o'clock wind