CRAIG
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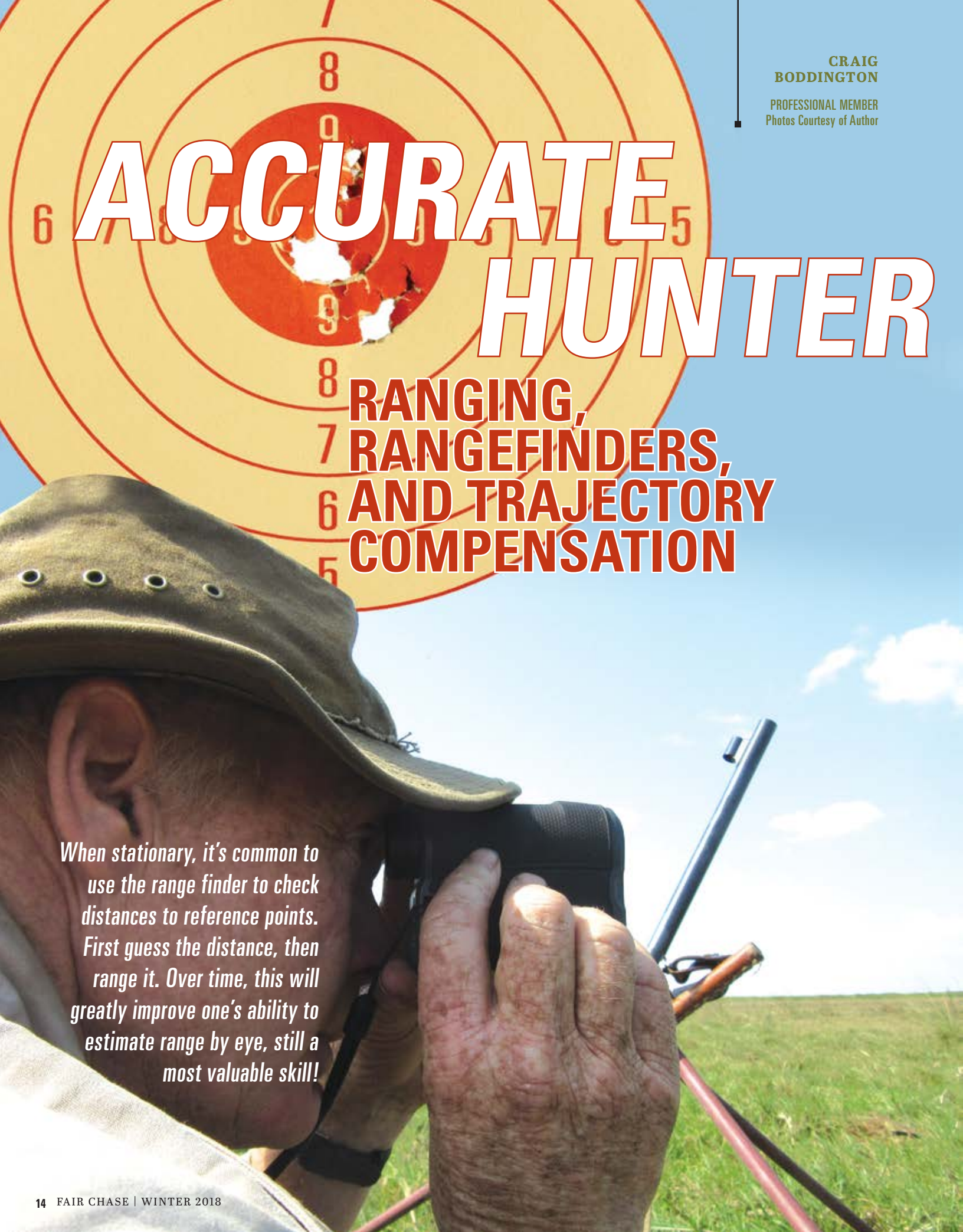
ACCURATE HUNTER

RANGING, RANGEFINDERS, AND TRAJECTORY COMPENSATION



When stationary, it's common to use the range finder to check distances to reference points. First guess the distance, then range it. Over time, this will greatly improve one's ability to estimate range by eye, still a most valuable skill!

Laser range finders are wonderful, but the eye-safe lasers required by law (and safety!) cannot burn through precipitation or fog. On a day like this, you need to know how to estimate range the old-fashioned way—by eye!

Like it or not, hunters are taking game at longer ranges than we used to consider practical and sensible—and some shots are being taken at much longer ranges. Long-range shooting is hardly new. Long-range competition was popular in the 19th century, but field shooting at longer ranges was unusual. The accuracy was there, and optics, though less common, existed. Telescopes, binoculars, and riflescopes saw use in our Civil War, and a few of the bison hunters (including Colonel Richard Dodge) used scoped rifles. But there's a big difference between a target on a surveyed "known distance" range and an animal standing "somewhere out there."

Optics have come a long way in my lifetime! The compact laser range finder didn't even exist until I was nearly 40, and now it's a major category in sport optics. Today's range finders even measure the uphill/downhill angles and yield the horizontal distance. Leupold pioneered this with its TBR (True Ballistic Range), but a number of current range finders offer this feature. The modern laser range finder is accurate, compact, and amazingly inexpensive. Several firms also incorporate range finders into binoculars. It is extremely handy to have both tools in one unit, but good range-finder binoculars are costly, plus they are heavier than binoculars-only. Plus, it's an engineering limitation that incorporating the range finder slightly reduces the brightness and clarity. So, there are tradeoffs, but some type of laser range finder is now standard equipment for serious hunters.

Remembering hunting without a range finder is like a trip back in time. We made the best "guesstimates" we could! Sometimes it worked, but since it was a lot of trouble to pace off shooting distances it was simpler to believe our guesstimates. I suspect many of the "500-yard shots" I read about when I was a kid included some exaggeration.

The laser range finder has essentially removed distance as a variable. There is a caution here: Laser range finders work poorly in any precipitation, so it's good to maintain the dying art of judging range by eye. The range finder is a great tool for this. When I'm set up glassing, or when I get to an unfamiliar deer stand, I range all manner of reference points, committing distances to memory. Instead, play a guessing game: Look at a rock or tree, guess how far it is, and then range it. Over time your guesses will get better—useful when weather or time don't allow ranging.

Most of the time, we don't have to worry about distance like we used to. We must know the trajectory of our cartridge and bullet; armed with that knowledge we can adjust the hold. In this area, there hasn't been much progress. In 1915 the .250 Savage was the first commercial cartridge to reach 3,000 feet per second (fps). A century later 3,000 fps is still considered fast. Better bullet aerodynamics have flattened trajectories slightly, but improvements are incremental.

We "cheat" gravity by zeroing so our bullet slants upward to cross the line of sight at close range, continues to rise a bit, and then gravity takes over and the bullet starts to drop, crossing the line of sight again. This downward curve continues and grows steeper as air resistance reduces velocity. Some of us sight-in "dead on" at 100 yards. Many, as Jack O'Connor advocated, zero a couple inches high at 100 yards; others pick a set distance for that second crossing of the line of sight, whether 200, 250, or (with very fast cartridges), possibly 300 yards. For hunting it's rare to zero farther because the rise of the trajectory is such that you must consciously aim low at shorter ranges to avoid shooting too high.

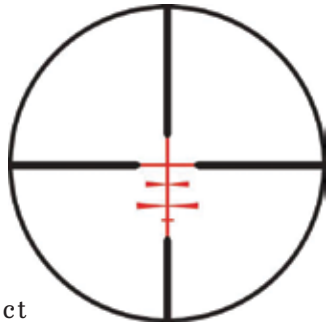
The reality is that, even with our fastest and flattest-shooting cartridges, with any sensible zero you must start to aim high to compensate for trajectory before you get to 350 yards. At whatever distance you must start to aim high, trajectory becomes just a number. As long as you know the range and the bullet drop at that range (the "number"), and ignoring factors such as wind and wobbles, you can make hits.

The guesstimate method for compensating for wind deflection has long been called "Kentucky windage," done by instinct and experience. Looking through a plain scope reticle or through open sights and adjusting for trajectory drop could be called "Kentucky elevation." Let's say, with a 200-yard zero, your 130-grain .270 bullet drops 20 inches at 400 yards. You think the deer in your area are 18 inches from brisket to backbone. You want to hit about a third up on the shoulder so you need to hold eight inches over the backline. Hunters have done this for generations, and it has long worked. Except that you can't run out there and measure the buck before you shoot. In any species some animals are bigger than others, and some are smaller. And, do you really know what eight inches of air looks like through your reticle at 400 yards?

Today we have a myriad of reticles with additional aiming points on the vertical crosshair below the central intersection. There are many systems, and the spacing varies: There can be stadia lines or hashmarks, while Nikon has a reticle with circles. Then there's the "mil dot" reticle with a series of dots on the vertical wire. Although standardized by NATO, "mil" doesn't mean military; it's short for "milliradian," an angular measurement of 1/6400 of a degree. The dots can vary in size, but on a mil-dot reticle, the space between the dots should subtend (cover) 3.6 inches at 100 yards and 36 inches at 1,000 yards. I'll be honest: I commanded snipers but have no sniper training. I never learned mil-dots and have no intention of learning now!

But, whatever system you choose to become familiar with, additional aiming points on the reticle offers a far better way of accurately judging holdover. Exact size of the target no longer matters, and you are using a firm aiming point rather than guessing "x" inches over the backline.

Again, there are many different reticles, and larger optics companies offer multiple options. Some are simple and others complex. I don't like a lot of distracting clutter in the reticle, so I try to keep it simple. As simple as it gets, yet effective and versatile, is Leupold's "Boone and Crockett reticle," with just a few additional stadia lines. I've had good success with it, but I've also done a lot of hunting with Zeiss's Rapid-Z—more complex but workable. It took time to get used to it, but I used it for a number of my Asian sheep and goats, including several shots between 400 and 500 yards. Regardless of system, the exact distances at which the additional aiming point will be valid varies with the cartridge and load. Computer ballistics programs get you close, but there's no substitute for shooting at actual distances to verify your data.



Don't expect round numbers! Right now, I'm working with Zeiss's new ZMOA-2 reticle, with hashmarks on both vertical and horizontal wires (the latter for wind compensation). I input the bullet, velocity, and climatic data, into the Zeiss Hunting App and it yielded me a chart for my .300 Weatherby Magnum loads with 200-grain ELD-X bullet. With a 200-yard zero, the first four stadia lines should be valid at 297, 381, 458, and 530 yards. Since game animals rarely stand on measured yard lines, the random numbers don't really matter. You know the range, so you use the stadia line valid at a distance closest to the actual range, then hold slightly high or low.

The ability to put an aiming point on the animal is much more precise than aiming somewhere in outer space. But you can only have so many aiming points in a reticle, and as distance increases, the values will be farther apart, requiring ever more extrapolation. There is another way of doing it, developed by long-range competitors, proven by our snipers, and generally preferred by today's growing group of extreme-range shooters. This option is, of course, dialing the correction on the scope's elevation turret. Then, with the correction dialed in, you simply hold where you want to hit using the crosshair intersection. This sounds like the most precise system for trajectory compensation, and it probably is—but there are pros and cons. In the next column we'll delve into the question of whether to "dial or hold." ■

TOP: Leupold's "B&C reticle" is simple and uncluttered; in this illuminated version, it offers three stadia lines, plus the top of the bottom "Duplex" post offers a fourth aiming point. Valid yardages for each stadia line vary with your bullet and velocity. MIDDLE: Verifying computer-generated data at Zack Aultman's range in Georgia, with targets to 500 yards. Many shooters have problems getting access to long-range targets. This is a limitation; in order to shoot in the field at longer ranges, data must be verified at actual ranges. BOTTOM: Laser range finders like the Leupold, center, are accurate, compact, and inexpensive. The Leica Geovid, left, was the original range finder-binocular, cumbersome but effective. Newer range finder-binoculars (right) are more compact but still heavier and more costly than stand-alone units.