

# SHOOTING

Jack O'Connor



O'Connor checks rifle from various positions and ranges



Rifle hits high and a bit left, but it's good enough for hunting



Jerry Fisher tests rifle he remodeled for O'Connor

## Know Your Big-Game Rifle

**N**OT LONG before I gathered up my wife and young and fled Arizona's postwar population explosion, I went on a 45-day hunt for Stone sheep and whatnot in northern British Columbia. One of the two rifles I used on the trip was an excellent Springfield .30/06 with a Weaver K2.5 scope. I knocked over everything I shot at with it, and all the bullets went about where I wanted them to go. With that rifle, I also shot the heads off about a dozen plump blue grouse.

As always happens when I have been away from my desk for some time, I was very busy when I got back. Then, toward the end of November, I took the Springfield on a hunt with some friends in Sonora. On the way down I saw a nice juicy coyote, knocked it over, and

to my surprise I found when I paced off the distance that he was 300 yd. away. Not long after we got to camp I rolled two mule deer at about 50 yd. The next day, I missed a shot at a superb whitetail buck at about 200 yd, then stalked and shot a ram at not over 35 yd. On the way back, I missed a standing shot at a coyote from the sitting position at about 100 yd.

My friends had all seen me miss this easy shot at the coyote, and as I drove along with their jeers ringing in my ears the pieces began to fall into place. I had connected on the long shot and the close ones, but I had missed everything in between. The rifle had to be shooting lugh.

I took it out on the range and found that the bullets were landing 5 in. high

at 100 yd., about 7 in. high at 150 and 200. Actually, it was putting the 180-gr. bullet right at point of aim at 300 yd. No wonder I had hit the coyote at 300, missed the one at 100 and the whitetail at 200. When I had sighted in the .30/06 before the long British Columbia trip, it had been putting the 180-gr. bullet 3 in. above line of sight at 100, at point of aim at 225, and about 9 in. low at 300.

I had not shot the rifle on paper before going on the Sonora trip, but I had taken the precaution to see if the scope and guard screws were tight. They were.

How come the rifle shot high? About as good a guess as any is that the wood of the stock dried out and put a bit more pressure on the fore-end to make

it shoot high. I should have checked the shooting on paper before I left.

In 1959, I took a .30/06 and a .375 to Tanganyika. On a previous trip, I had had a sad experience because the constant bouncing and jiggling of the hunting car had loosened the guard screws of a rifle and had changed the point of impact. So every night when I came in, I took my little screwdriver and checked the guard screws. Every morning, I had a gunbearer take a panga and cut a white spot on a tree. Then I'd rest the rifle carefully on a seat cushion over the hood of the hunting car and squeeze off a shot at 100 yd. The bullet always landed 3 in. high.

I got careless and one day I did not fire that single shot at a mark. That afternoon I got a shot at about 60 yd. at a fine leopard lying on an anthill and working up an appetite for a quarter of rotten zebra hanging in a tree. I had all the time in the world. I took a nice rest over a rock, held about one third of the way up the leopard's body, and squeezed the trigger. The leopard let out a startled roar, shot about 10 ft. into the air, landed, and took off like a jet plane. All I had for this wonderful chance was a bunch of long leopard hair. I had missed my handsome spotted cat by about 1/64 in.

So now that it was too late, I had the gunbearers make a mark on the tree 60 yd. away. I fired two shots. Both were about 4 in. low. Syd Downey, my white hunter, fired two shots. They

were right with mine. We backed off to 100 yd. and sighted in again. What caused the miscue? I think that in cleaning the rifle the night before, one of the gunbearers had dropped it. There was a bright mark on the eyepiece of the scope as if the rifle had fallen against something hard.

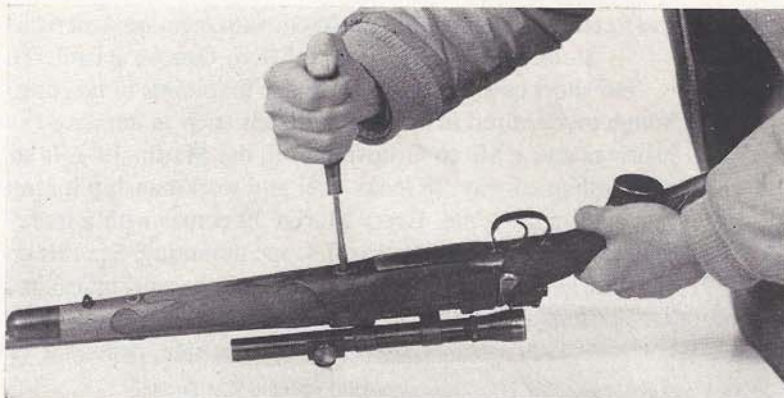
But to show that luck never deserts the dumb, I decided the next day to use my .375, which had always been a lucky rifle. That morning I took a shot with it and all was well. That afternoon, on the same bait that had attracted the leopard I had missed the day before, I shot a beautiful leopard that was larger and handsomer than the one I had missed.

Back in the days when Mexican sheep hunting was relatively legal, a New Yorker made up his mind he wanted to collect a Sonora bighorn. For the occasion, he decided to have a dream .270 made up. He turned the job over to a famous maker and instructed him to sight the rifle in with the 130-gr. Western open-point bullet to be on at 250 yd. After two weeks of hard hunting, he stalked to within 100 yd. of the ram of his dreams. He emptied the magazine without a hit. Back at camp, he and his guide decided to see where the rifle shot. It was just 12 in. high at 100 yd.

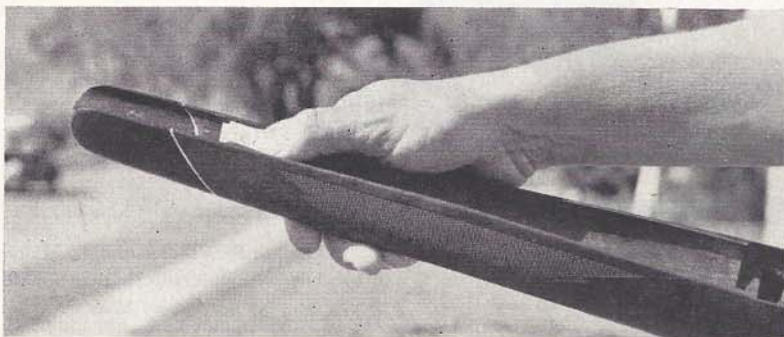
Rifles are sighted in at the factory, but not necessarily with the bullet weight the purchaser will use or at the distance he wants. And they certainly are not sighted in by those who buy



Weatherby gunsmith relieves wood in barrel channel to improve accuracy



The guard screws of all bolt-action rifles should always be kept tight



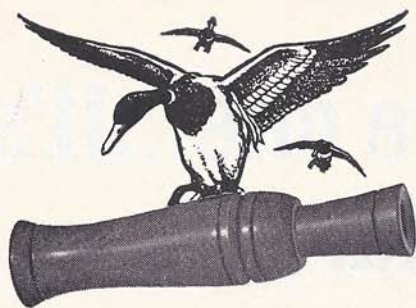
Sometimes paper shim back of fore-end in channel will improve accuracy

them. No two riflemen see their sights (particularly open sights) alike, and no two hold their rifles exactly alike.

Gunsmiths who mount scopes are busy men. Few of them have convenient access to 100-yd. or 200-yd. ranges. Many bore-sight scoped rifles by lining up the aiming point of the scope reticle on an object seen through the center of the bore. Others do the same thing with iron sights. Some use a collimator, an optical gadget by which they align axis of bore and scope reticle. These methods are better than nothing, but neither takes into account the fact that when a high-powered rifle is fired the barrel vibrates like a violin string. Sometimes a rifle with sights carefully adjusted by bore-sighting or by a collimator will be right on the button, but generally the most one can hope for is to have the bullet hitting somewhere on a 100-yd. smallbore target at 100 yd. He can then go from there.

Since I first revealed the astonishing fact about 25 years ago in these columns, it has been generally known that a properly sighted-in big-game rifle equipped with a scope puts the bullet at point of aim at about 25 yd. the first time, then the second time at the distance at which it is said to be sighted in. Depending on the cartridge, this is anywhere from 175 to as much as 300 yd.

To take two commonly used cartridges, a scope-sighted .270 with the



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line of scope sight 1½ in. above the bore, if sighted to hit exactly at point of aim at 25 yd., is about 1 in. high at 50 yd., 3 in. high at 100, 4 in. high at 150 and 200, on the nose at 275, and 2 in. low at 300. Figures for the .30/06 with the 180-gr. bullet are as follows: on at 25, 3 in. high at 100 and 150, 2 in. high at 200, on at 225, 2 in. low at 250, and about 8 in. low at 300.

When I get a scope put on a rifle I simply sit down and fire a few shots at 25 yd. to get the scope lined up approximately. I then very carefully finish the sighting at 100 yd. and carefully adjust the sights so the center of the group is 3 in. high. With this sighting, I have shot the heads off of dozens of blue, Franklin, and ruffed grouse at short range in the Canadian north.

I know of many who have hunted successfully after having shot their rifles at only 25 yd. However, this must be very carefully done, as any error made at 25 yd. is multiplied by 4 at 100 yd., by 8 at 200, and by 12 at 300. It is always best to refine the sighting at 100 yd.

Sighting in is not difficult. Scopes are marked in minutes of angle, and some click in fractions of minutes. Adjustment dials are marked for the direction the dial should be turned for the point of impact to move up or down, left or right.

But, as we have seen in the case of my two .30/06 rifles, the fact that a rifle is right on the button does not mean it will remain so. We have seen that the .30/06 I took into Mexico shot high because the wood of the fore-end had warped and had exerted more pressure against the barrel and that the rifle I missed the leopard with had been dropped.

It pays to know your rifle and its foibles. One of the reasons no two rifles are exactly alike is that no two pieces of stock wood are exactly alike. One piece may be relatively stable and another may never get through warping. Most of us like light rifles, but the lighter the barrel is the more a warping stock can affect it.

About 1953, I got a standard-weight .270 Model 70 Winchester and had a skillful gunsmith cut the barrel off to 22 in., turn it down to lighten it, fit a good 4X scope on a Tilden mount, and stock it with a fine piece of French walnut. I specified that the fore-end screw be retained to act as a bedding device. The rifle shot like a dream, particularly with the 150-gr. Nosler bullet in front of 58.5 gr. of No. 4831. It has shot many groups that ran under an inch, and since the rifle weighs 8 lb. with scope and sling it is a joy to carry in the hills.

I found it shot best with the fore-end screw as tight as I could get it. After I had it for a couple of years and had not fired it for some months, I took it to the range and shot it. To my amazement the best it would do was about a 4-in. group. As an experiment, I backed the fore-end screw out half a turn. The rifle then laid them in as nicely as ever. From that day to this I have not

touched the scope adjustment. It shoots that particular load right in the same place year after year.

Stocks warp because they are made of wood, and, depending on the moisture content of the atmosphere, wood dries out and absorbs moisture, shrinks, and swells. A stock finished with marine spar varnish or one of the new plastic varnishes has less of a tendency to warp than a stock finished with linseed oil or by a combination of varnish and linseed oil, but, in the opinion of many, such finishes look terrible and they are not 100 percent moistureproof. It helps to use a wood sealer on the inside of a stock, then to finish with spar varnish. Some years ago, a process for moistureproofing stocks was worked out by the forest products division of the University of Wisconsin, but the stocks had to be impregnated with some sort of goop after they were shaped and inletted. So far as I know, nothing much has come of the process.

A rifle may show a preference for one particular bullet. I once got a nice rifle on a Mexican Mauser action made up in a popular 6 mm. caliber. I bought 100 cartridges and took the rifle out to try. Groups ran about 3 in. I was about to wrap it up and send it back to the maker when I decided to try another load. I loaded some 90-gr. Speer bullets in front of 48 gr. of No. 4831 and the first group I shot ran less than 1 in.

I have a good many tender memories about the old Winchester Model 70, and I have several in calibers from .220 Swift to .375. I did not have one in .30/06, however, so when the model was replaced by the new one, I picked up an old Featherweight Model 70 and sent it to Jerry Fisher, the Portland, Oregon, gunsmith and stockmaker, along with a piece of French walnut and a Leupold 4X scope. In due time, the rifle showed up and a handsome job it was. Accuracy was certainly satisfactory enough for big-game hunting, but not distinguished—groups of 2 to 2½ in. Then one day I tried it with 50 gr. of No. 4064 behind the 180-gr. Nosler bullet. Groups shrank to about 1½ in. Why this particular rifle prefers this bullet to other bullets that group just as well in other .30 caliber rifles, I cannot say.

Generally, I think that if a rifle is delivering unsatisfactory accuracy the fault lies in poor bedding, poor bullets, or loose sight or guard screws. As a rule, a good bolt-action rifle with a one-piece stock will outshoot a rifle with a two-piece stock, such as those found on most rifles with lever, slide, and automatic actions. Those with two-piece stocks, however, give good enough accuracy for most big-game hunting.

The action of the bolt-action rifle should be bedded squarely and solidly into the stock, with the recoil lug bearing evenly and the magazine square. I have never tried glass-bedding an action, but I am told that many examples of sloppy inletting have been cured by this comparatively easy process.

For years, there has been a mild controversy among rifle nuts about which system of barrel bedding gives the best

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accuracy—the free-floating barrel, the barrel touching the stock the entire length, or the barrel touching the stock only near the fore-end and giving some upward pressure.

If a barrel "floats," it is possible to pass a sheet of paper between barrel and fore-end for the entire length. This method, generally, has the advantage of preventing the fore-end from warping against the barrel and changing the point of impact. However, I have seen fore-ends that clear the barrel so far that twigs, grass, rain, and miscellaneous crud could get into the barrel channel yet manage to warp against the barrel and change the point of impact. A heavy or medium-heavy target barrel gives fine accuracy when free-floated, but I have had the best luck with light sporter barrels if the fore-end presses upward against the barrel about 7½ in. forward of the receiver ring.

Just how much pressure one needs, I can't say. I have found, though, that too much is generally worse than too little. Factory fore-ends sometimes float. If they don't, they often give too much or too little pressure if they do touch near the tip. Many good, custom-made stocks give too much pressure.

I find that I get the best accuracy with light sporter barrels when I can just feel fore-end and barrel come together with the last turn of the forward guard screw—or even the last half turn. Too much pressure of the fore-end against the barrel results in erratic barrel vibration and poor accuracy. A moderate amount apparently tames down the vibration, makes it more uniform, and promotes good accuracy.

I once got a .25/06 made up. Accuracy was only fair, and I found that as I turned out the forward guard screw I could feel the stock bow out behind the screw. Too much pressure. I relieved the barrel channel near the fore-end with sandpaper until I could feel no pressure when I turned in the forward guard screw, either against the screw-driver or with my left hand around barrel and fore-end. Accuracy of the rifle was now considerably improved, but it could have been better. I put a shim made of one thickness of target paper in the fore-end. The result was a slight upward pressure and fine accuracy.

A custom-grade Remington Model 700 in 7 mm. Remington Magnum caliber was so stocked as to give no pressure of the fore-end against the barrel. A bit of upward pressure against the barrel from a paper shim was the difference between pretty good accuracy and outstanding accuracy. To obtain the best accuracy, the experimenter should try different thicknesses of paper shims and he should also vary the location of the shims slightly. It is surprising what a little paper can do.

One of the questions most commonly asked a shooting editor goes about like this: "I have a .30/06 mounted with a 4X scope. It is now sighted to put the 180-gr. Remington Core-Lokt factory-loaded bullet at point of aim at 200 yd. Where will the 150, 220, and 110-gr. bullets strike?"

The poor shooting editor can only gulp down a handful of tranquilizers and reply that his crystal ball has blown a tube and he is unable to answer.

It is up to the shooter to know his rifle, since every rifle is a law unto itself as to the way it will handle bullets of different weight and at different velocity. Sometimes a heavy bullet will land about the same place as a lighter one up to 200 yd. or so, but often it won't. Anyone who shifts from one bullet weight to another without checking the point of impact on paper is taking a grave chance. Bullets of different weights, with different amounts of bearing surface, different jacket hardness, and fired at different velocities generally set up different barrel vibrations.

Some rifles will put bullets of different weight and velocity to more or less the same point of impact. Others will not. Barrel vibration varies not only with the bullet weight and powder charge but with the weight and the contour of the barrel, the way it is bedded, and also, apparently, with the caliber.

I cannot figure out any sensible reason why rifles of certain calibers should often put bullets of different weights into more or less the same group, whereas those in other calibers will not. However, many other shooters have observed and commented on the same phenomenon.

A .270 with a well-bedded barrel will often put bullets of different weights near enough to the same place so there would be no excuse for missing a big-game animal up to well over 200 yd. Either one of my light pair of Model 70 .270's can be used with any full-power factory or handloads with bullets weighing from 120 to 180 gr. with no important difference in point of impact up to 200 yd. or more. Sighted to put the 130-gr. bullet 3 in. high at 100 yd. and on at 275, these rifles put the 150-gr. factory loaded bullets 2 in. high at 100 yd. and on at a bit over 200. Actually, at 200 yd. with either rifle all full-power hand or factory loads will stay in about a 6-in. group.

Some other calibers likewise have this happy faculty. The .375 Magnum is one of them. So are the 7 mm. Remington Magnum, the .280 Remington, the .338 Winchester Magnum, the old .250/3000 Savage.

Sometimes a .30/06 will lay everything into the same group, but, usually, rifles in this caliber will not. It is quite common to find .30/06 rifles that put the 220-gr. factory load 6 in. below the 150 gr. at 100 yd. At that distance, one could hit a moose or an elk with the 220-gr. bullet in a rifle tuned up for the 150-gr., but at 200 yd., where the 220-gr. bullet would strike about 15 in. low, he would just about miss rhino with a hold for the heart. Now and then, a freakishly vibrating barrel will put the 150-gr. factory load lower than it will the 180, but as a rule the higher the velocity the higher the bullet strikes.

The .30/30 is a bad actor for putting bullets of different weights to different



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points of impact, and many an innocent has missed good shots at deer when he shifted from 170 to 150-gr. bullets. What is said about the .30/30 can also be said about many old cartridges such as the .32 Special and the .25/35.

I have a rather vague theory that rifles for cartridges with considerable constriction between body and neck tend most often to disperse different bullet weights less. This may or may not hold water, and why it should be so I have no idea.

It is wise for the man who really wants to know his rifle to do some shooting at different ranges and from different shooting positions. That way, he can not only find out the actual drop with the ammunition he is using but he can also find out his own capabilities.

The loading companies all publish the same velocity and trajectory figures, but sometimes the velocity obtained in hunting rifles is far below the velocity one finds in the handbooks and ballistic tables. Many of these published figures are taken in 26-in. barrels, whereas the ammunition is fired in the field from 20, 22, and 24-in. barrels. Many of the drop figures are not obtained by firing but with a slide rule, and sometimes they are pretty unrealistic. Then again, factory ammunition may sometimes be considerably under specifications. Often, for example, 180-gr. .30/06 loads actually register about 2,550—2,600 f.p.s. instead of 2,700, and the 220-gr. bullet may be turning up about 2,200 instead of 2,400.

Many hunters apparently believe that firing a rifle at anything that can't be eaten is an evil that should be avoided at all costs, but it is far better to fire 10 shots on the target range and one shot in the hunting season, than to skimp on practice and fill the air full of lead when the game season rolls around. Only by shooting can the potentialities of rifleman and rifle be discovered. Ammunition that is supposed to have a drop of 8 in. between 200 and 300 yd. may actually drop 12. A shift from one brand of ammunition to another may give an entirely different point of impact. Old Betsy may have been on the button last season, but she may not be now. There is only one way to find out how a rifle shoots and that is to shoot it.—*Jack O'Connor.*

**COTTONTAIL JUNGLE**

*(continued from page 67)*

none of them came out. This was what had stopped the hunters before us.

Bill Cutts, however, had ideas. He's a cottontail specialist, 46 years old, and has been hunting rabbits in Tennessee since he was 12. The cover never gets too thick and tangly for him. His theory is that after cottontails retire to the thickets following the early season blitz, at least one member of a hunting party must go into the thicket with the beagles and help run the bunnies out.

"They will run a pack of beagles ragged and never leave a jungle," he

told us. "But if a hunter will get in there and help the dogs, the cottontails will start getting jittery and leave the thicket one by one."

The farm, about 75 acres, was surrounded by well-cultivated farms. There were green fields of fall-sown grain and cornfields where mechanical corn pickers had left shattered corn on the ground. One side of the farm was even bordered by an alfalfa patch.

Finally things started happening. George's 12 gauge Remington Model 58 autoloader boomed and Pete stopped bawling right away. Then Frank's 12 gauge Stevens Model 311 double roared twice, but Lady kept on talking. The bunny tried another exit over on Gent's side of the thicket. His autoloading 12 bore sounded off and the beagle stopped bawling. Jane was skimming the edge of the thicket on my side, and I had my eyes glued on a rabbit path which was as slick as a mole's heel. Suddenly there was a cottontail trying to slip out across country, but I cut him down with one quick blast from my 12 gauge Browning autoloader with 26-inch improved-cylinder barrel. Jane came up for a few sniffs of the kill and headed back into the jungle where Pete and Lady were again tracking a cottontail.

The hard-working beagles couldn't make very much time in the jungle. Even with Bill tromping around in there, the bunnies didn't exactly run over each other leaving the place.

But they were getting more and more jittery. One tried to make a getaway, and Frank rolled him over. It was not the one the beagles were after. Gent got a crack at that one, but it scooted back into the thicket, then tried to take off on my side. I was not the crack shot of the party by any means, but I managed to lay that one low with one of my Remington Shur Shot plastic shells with 3¼ drams of powder and 1½ ounces of No. 7½ shot. George and Frank were using the same load. Gent was firing Federal Hi-Power shells and Bill had Winchester Ranger shells, both with 3¼ drams of powder and 1½ ounces of No. 6 shot.

Getting another cottontail started was just a matter of the beagles going back into the jungle proper. Suddenly, George got another chance. His Remington autoloader boomed twice. Gent was where he could see George, and I heard him say, "Blamed if he ain't laying in his winter's meat supply fast. He's scored a double."

"Who invited George along on this hunt anyway," protested Bill from within the jungle.

There's nothing Bill enjoys better than helping his beagles chase cottontails out of thickets so other hunters in his party can get shots at them. However, there has always been a sort of brotherly rivalry between him and George to see who can limit out first.

The beagles were already bawling away again when I saw Bill squirreling up a small locust tree beside the old chicken house. I guess he figured the cottontails were stirred up enough so that the noise of the chases would