A New Bolt Action Rifle

By Horace Kephart

What Careful Testing by OUTING'S Gun Expert Showed About the 1920 Savage .250—3000

THE latest Savage rifle is a fascinating little weapon. Powerful and accurate, but light and lively in the hands, it is just what a man wants for hard trips afoot or as a saddle gun.

The one I have weighs 6 pounds ½ ounce. It balances just right to carry easily, comes up into alignment quickly, and swings like a light shotgun in following a moving object.

When carrying the gun in one hand, with thumb down, the hand touches no metal if it is cupped slightly. There is no protruding magazine in the way, nor any long metal receiver to rust from sweat or to freeze one's fingers in winter. A comfort in the hand, a feather on the shoulder.

The stock dimensions come nearer fitting a man of average build than any other of factory standard that I have seen: length 13½ inches from trigger to middle of butt plate, drop to comb 2⅛ inches, to heel 3¼ inches. The pistol grip is ideal: 4 inches from trigger to front of grip cap, 4¾ inches in circumference, and full curved.

Grip and forearm are checkered, and so are the trigger and the steel butt plate. The safety is of shotgun type, on top of the grip, where it can be operated instantly without shifting the hand.

The action is of the Mauser bolt system, but with bolt handle fitting down into a slot in the receiver bridge instead of the Mauser's rear safety lug. The bolt is removed by simply holding back the trigger while withdrawing, as in the model 1919 Savage .22 N. R. A. It can be dismounted like that of a Springfield. Cleaning the barrel from the breech is easy with any kind of rod.

This action is very strong and sure to function. The shell cannot stretch lengthwise when fired. The extractor never slips off the head of the shell, and the camming action will make it start stubborn shells without difficulty.

Owing to the shortness of the .250-3000 cartridge, compared with those of military type, the bolt throw is short. Quickness in repeating is aided by the light recoil, which is similar to that of a .30-30.

The total length of the rifle is 42¼ inches. The barrel is 22 inches long, tapering to the same wall thickness at the muzzle as the Springfield (.16 inch).

The groove diameter (.257 inch) is the same as the caliber of the bullet. This is as it should be. In black powder days it was all very well for the bullet to be slightly smaller than the rifled bore, because naked lead of proper temper will upset to full caliber as quick as it starts. But a jacketed bullet generally will not do so until it gets up into the rifling, and so there will be gas leakage, erosion, and inaccuracy.

That is why the .32-40 and .38-55, which are very accurate with low-pressure loads and lead bullets, will not shoot straight with high-velocity charges and jacketed bullets. That is why the .30-30 cannot be counted on for better than 7 or 8-inch groups at 200 yards. If you will upset its .305 bullet in a swage to true groove diameter of .308, as I used to do, it will make 5-inch groups.

Then there is the other extreme, oversize bullets, to which the Savage company went with their .303, using a bullet of .311 diameter in a barrel of .308 groove caliber. This shot accurately after the barrel had expanded from continuous firing, but the first few shots would not hold their elevation so well. Again when they brought out the .22 H. P., they made the bullets .228 for a .226 barrel. That was too much jolt at the jump-off for a tiny missile with soft jacket, and the scores showed it.

The .250 bullet, being of true groove diameter, permits little gas leakage at the start, in a gun properly chambered, and, on the other hand, it is not deformed by sudden and violent swaging in the barrel throat. This, I believe, is one reason for the fine accuracy of this high-speed charge in the Savage rifle.

The twist of rifling for the .250-3000 is one turn in 14 inches. This slow twist reduces wear and metal fouling and makes the gun easy to clean. It also permits the use of naked lead bullets with reduced charges, for those who like them. A .25-35, with its 8-inch twist, gives trouble from leading the barrel when such ammunition is tried.

With the regular metal patched bullets (which I prefer for all purposes) one who loads his own shells can get any velocity desired, by regulating the powder, up to a maximum of near 3400 feet a second at the muzzle. Experimenters who understand their business can develop a considerable variety of useful loads for different purposes with this rifle. But it is no weapon for novices to monkey with, in the way of loading their own ammunition.

The model 1920 Savage is not a take-down, I am glad to say. If it were, it would be less accurate and less durable. The barrel and frame of a rifle using such high-pressure ammunition should come as near as practicable to being one solid integral part. This to prevent spring or "give" at the moment of discharge, and to insure that there shall

Top: .22 Savage Hi-Power. Middle: .250-3000 Takedown. .250-3000 Bolt Action Bottom: Model 1920

be no play from wear of breech thread and its connection.

A take-down for the .250-3000 is safe enough, but it cannot be so accurate as a solid frame, especially after it has been in service for some time. The vibration set up by a charge that gives a breech pressure of 50,000 pounds per square inch is violent and racking. Any looseness or unevenness of support in the connection of barrel to frame would tend to cut down accuracy.

As it is, the model 1920 Savage promises to be the most accurate hunting rifle on the market. This in combination with its exceedingly low trajectory is a high merit indeed.

But so far as the shooter is concerned, a rifle is only as accurate as he can aim it. The sights have a great deal to do with the matter.

The rear sight issued with the new Savage is a level bar with U-shaped notch. With this it is easy to keep uniform elevation in aiming. There are no absurd wings to cut off one's view and to make uniform drawing of bead well nigh impossible. Nice adjustment for elevation is provided by a set screw; but there is no wind-gauge like that on the Savage No. 15WG sight, and horizontal adjustment must be made by tapping the sight to one side in its slot—a tedious trial of guesswork, wasteful of ammunition.

The front sight is a thin stem surmounted by a small bead, of German silver or the like. It fits into the slot of a standing stud which is an integral part of the barrel. The inside of the slot and the sides of the sight are serrated. To remove the sight, unscrew the pin and slide the sight out to the rear, instead of trying to pull it out from the top.

This front sight is good for fine shooting under an overcast sky, or in any moderate and uniform shade, but not in bright sunlight, where it glitters, nor in deep shade, where it can hardly be seen at all. An ivory bead front sight would be much better for all-round shooting. The Lyman No. 26 Featherweight sight will not work on this gun, being too low, and having a slot instead of pin hole at the base. A suitable ivory bead front sight will be on the market by the time this article is printed.

For the present I will say nothing about peep sights for this weapon, except that more than one pattern is now being designed for try-out. The problem to be solved is whether it is best to attach the sight to the receiver, or to the bolt head, or to the cocking piece. There is more involved in this matter than would appear on the surface. [See September OUTING.]

But taking the open sights as they are issued: I have had an eye-opener (literally, not in the slang of a bygone age). For several years I have discarded open sights altogether, as my eyes are ageing. Still I had to shoot the gun as it was. The front sight looked like a dark shadow around which a light shadow played hide-and-seek. Smoking the front sight with a match made it stand out clearly at intervals, staying so for about a second.

At 100 yards, rest, to adjust sights, I fired a bit to the left. Tapped rear sight over a trifle. Next four shots in rectangle ⅝ inch wide by 1⅝ inches high, center to center, just under bull. Raised sight one step. Next two shots ⅝ inch apart diagonally, ½ inch horizontally, just above bull, and exactly in line with lower four. The last six shots had extreme horizontal dispersion of ⅝ inch. And the sight blurred, as described, at every shot.

I looked at the target, measured up, and said: "'Tain't so; there ain't no sich animile."

Later trials showed that when I did not smoke the front sight I would get some off shots, owing to defective vision; but when I did smoke it I would get five-shot groups in a 2-inch circle. This at 100 yards, from an extemporized rest, and with no telescope or spotter to let me know where the bullets were going.

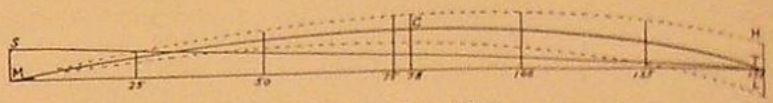
Of course, that is not a sufficient test of accuracy. But a peep sight is on its way to me, and when it comes I can shoot as long as I please without overstraining my eyes or keeping my nerves keyed up to fire on the instant that a front sight stops dancing.

Five years ago, Mr. L. A. Danse tried the .250-3000 cartridge in a model 1899 Savage rifle. In varying weather conditions he fired ten groups of ten shots each, at 200 yards: offhand, sitting, prone, and from rest. They ran from 7 inches, offhand, to 3 15/16 inches, rest. Average diameter of the ten groups, 5 inches. He concluded that the rifle was capable of averaging 4¼ inches at 200 yards from rest.

When the first model 1920 Savage rifle was turned out at the factory, Lieut. Colonel Whelen of the General Staff, U. S. A., tried it with open sights, firing ten groups of ten shots each, at 100 yards, rest. Their average diameter, center to center of shots widest apart, was 3.12 inches. "I should say," he reported, "that with peep sights I would be able to get groups at 100 yards averaging at least 2.50 inches, which is as close as I can get with the model 1903 [Springfield] rifle and the best ammunition."

No other 6-pound hunting rifle has come near such accuracy. And the bullets, bear in mind, of the .250 start from the muzzle at a speed of 3000 feet a second.

The advantage of a high muzzle velocity is apparent nowadays to any rifleman who has opportunities for long shots. Such chances are not always confined to open country. Even in the thickest forest wilderness you may come out on a lake or a river and get a long shot across the water. In the mountains you may have to shoot far across a ravine, having no way to get nearer before the game disappears.



150-YARD TRAJECTORY

M, Muzzle. *T*, Target. *S*, Front sight. *MCT*, Mean trajectory. *C*, Summit of Trajectory. *MH*, Curve of highest shot. *ML*, Curve of lowest shot. *ST*, Line of Sight.
Figures show distance from muzzle, in yards

The higher the velocity of the bullet, the lower its trajectory, and the surer you will be of hitting at a longish unknown distance. The higher the velocity, the less allowance you need make in holding ahead of running game.

But the advantage of high speed is lost if the gun does not shoot accurately. The closer it will group its shots, the less variation there will be in trajectory, from shot to shot. To illustrate this point I have calculated the following table of the trajectory of a .250-3000 Savage rifle, at intervals up to 200 yards, when the rifle is sighted to strike point of aim at 150 yards.

The table shows not only the mean trajectory, but also the extremes, for highest and lowest shots, it being assumed that the rifle can be depended on to keep ten consecutive shots in a 2¼-inch circle at 100 yards, and 4½-inch at 200 yards: a degree of accuracy that I believe the Savage model 1920 can be relied upon to show.

The accompanying diagram shows clearly just what is meant by the terms used in the table.

The front sight of the Savage model 1920 stands eight-tenths of an inch above axis of rifle bore. Consequently the gun shoots eight-tenths of an inch low at the muzzle. Half-way between muzzle and target the sight allowance is half of eight-tenths inch, which is subtracted from the trajectory to get rise of bullet above line of aim, and so, proportionately, for other distances.

The mean curve of trajectory is shown in the diagram by a solid line; the curves of highest and lowest shots, by dotted lines.

Trajectories given below are in inches and decimals.

Now let us suppose that another rifle has the same mean trajectory as this, but that it shoots all over a 10-inch disk at 200 yards, and 5-inch at 100 yards. Its high and low shots, then, would be so much farther apart than those of the .250-3000 that its trajectory for practical purposes would compare very unfavorably with that of the straight-shooting weapon we are here considering.

In a future article I will give further ballistic details of the .250-3000, and will discuss its penetration, shock, and its qualities as an all-round weapon for American hunting.

150-YARD TRAJECTORY
of .250-3000 Savage Rifle, Model 1920, at Sea-Level
A Minus Sign Means Below Line of Sight

Yards	25	50	75	78*	100	125	150	175	200
Trajectory	0.684	1.128	1.308	1.310	1.205	0.780	0	—1.179	—2.775
Sight Al.	.667	.533	.400	.384	.267	.133	0		
Above L.S.	.017	.595	.908	.926	.938	.647	0		
Dispersion	.281	.562	.843		1.125	1.406	1.687	1.969	2.250
High Shot	.298	1.157	1.751		2.063	2.053	1.687	.790	—.525
Low Shot	—.264	.033	.065		—.187	—.759	—1.687	—3.148	—5.025

*The summit of the trajectory is at 77.88 yards.
In shooting at objects beyond the 150-yard point-blank, one should not aim as much above as the drop indicates. (See Bevis & Donovan, Exterior Ballistics, p. 134.) The true amount to hold over at 200 yards is only 2¼ inches, instead of 2¾ inches. At 175 yards no allowance should be made, as the shooter would be apt to overdo it.