

# Clean Bores. *And Certainty.*

*Lead, copper, water and time  
conspire to sabotage accuracy.  
You can save it. But first...*



Colonel J.H. Patterson, left, dispatched the Tsavo man-eating lions after a misfire almost proved fatal.

Henry Starr started stealing early. On the trail in Arkansas after jumping bail, he ran into an ex-deputy named Wilson. Ordered to dismount, Starr complied, but suddenly grabbed his Winchester. Both men fired. Wilson missed; then his rifle jammed. Starr walked up and shot him dead.

As the 19th century wound down in the West, having the law on your side counted for less than a well-aimed shot—and then a functioning rifle.

Accuracy? Odds were kind to lawmen, settlers and hunters who could riddle a milk pail at a few feet in a hurry. Precision was seldom urgent.

Rifle failures beset hunters stateside and abroad—including Col. J.H. Patterson, an engineer on the Tsavo sector of the Uganda Railway. “I was only partially concealed, [so at 15 yards] he caught sight of me...and growled savagely. As I covered his brain with my rifle, I felt that at last I had him...I pulled the trigger, and to my horror heard the dull snap...”

Rail construction had been halted in December 1898 by months-long depredations of two man-eating lions. That misfire—caused by a light strike to a primer—might well have ended Patterson’s cat-killing quest. As luck would have it, the man-eater bounded off.

Reliable function is an elusive mistress. Early on, many failures were laid to flawed rifle design, and to variations in parts and ammunition. Field conditions mattered too. “The chief difficulty in running buffalo,” wrote Francis Parkman in 1849, “is that of loading the gun or pistol at full gallop. Many hunters for convenience’s sake carry three or four



Bores in early cartridge rifles like this Ballard fouled with black powder residue and lead, not copper.

bullets in the mouth; the powder is poured down the muzzle of the piece, the bullet dropped in after it, the stock struck hard upon the pommel of the saddle, and the work is done. [But] should the blow on the pommel fail to send the bullet home, or should the latter, in the act of aiming, start from its place and roll toward the muzzle, the gun would probably burst in discharging... [To seat bullets], some hunters make use of a ramrod, usually hung by a string from the neck, but this materially increases the difficulty of loading.”

The industrial revolution spurred competition among inventors for army contracts. In the 1840s, after Remington acquired the services of William Jenks, ordnance officers disqualified his breech-loading carbine when a nipple failed on the 1,400th shot in a 1,500-round test. Europe was quick to woo Jenks. He later returned state-side, to develop, in 1858, a rifle firing cardboard cartridges coated with beeswax and

tallow. Alas, the next year he fell off a hay wagon and died.

But Remington built on the Jenks design. The Rolling Block rifle of 1866 was simple and sturdy. One 50-caliber Rolling Block digested 40 balls atop 750 grains of powder, the charge filling 36 inches of barrel! All parts held together on firing! With the Sharps rifle of 1874, the Rolling Block would hasten the end of the great bison herds. When buffalo hides sold for \$50, skilled hunters could earn \$10,000 a year. A Rolling Block cost as little as \$8.

Despite their reach, reliability and accuracy, Remington and Sharps single-shots were little used by Indians who might have picked them up after battles. Many of these rifles used proprietary cartridges that were hard to get. Available ammo put a premium on 1873 “trap-door” Springfields in .45-70 and the 1873 Winchester in .44-40.

Caplock rifles and revolvers remained in common use through the 1870s. Pony

Express riders were initially issued two Colt 1851 Navys, then, to reduce weight, just one. The 86-grain bullet pushed by 25 grains of black powder also served ambidextrous James Butler Hickok, who carried two Navys butt-first. He practiced regularly, and to keep fresh powder in the chambers, shot them dry at day’s end. Few outlaws dared face Wild Bill. But on August 2, 1876, as he played cards in a Deadwood saloon, Dakota Territory, Jack McCall slipped up from behind and shot him in the head. The .45’s next round misfired, sparing the bartender. McCall fled but met the law in Wyoming. He returned for his hanging in 1877.

Misfires are uncommon now. Usually, when a rifle fails to do what you want it to, both it and the ammunition are blameless. Many are the triggers I’ve pulled with the safety on. I’ve dropped strikers on empty chambers, short-stroked bolts and otherwise made myself out a fool. Once, on the trail as opening day dawned, I found the

cartridges in my pouch didn’t match the barrel stamp. There’s no fool-proof rifle.

Fools can be slow to redeem themselves. Long ago, after I muffed an easy poke and had to track down the wounded beast, I checked the rifle on a target. My shot centered it. Soon thereafter I hit another animal poorly. A paper check again showed perfect zero. Perplexed, I fired once more. That bullet struck well off the mark! The culprit: a loose windage screw in the scope mount. Recoil was shifting the scope back and forth against those twin screws. Every other shot was on the money!

Tight screws can annoy too. Re-assembling one .30-06 after a thorough cleaning, I found the bolt wouldn’t rotate into battery. A close look at the lower locking lug revealed a scuff from the front guard screw. Perhaps the stock wood had shrunk slightly; or I had snugged the screw tighter than usual. Filed a thread shorter, the screw was no longer a nuisance. Similarly, a

bolt that drags in cycling may be kissing the rear guard screw. A file fix is easier at home than in the field.

Feeding hiccups have cost many hunters a second shot. Faulty magazine followers and damaged feed lips can be at fault. But at the bench, many of us load singly and pick empties from the extractor to keep them clean. A better idea: Fill the magazine, cycle fast between shots and spill the brass. Finger-fed, a long handload will sit dutifully in the mouth of a box that wouldn't accept it farther

down. Also, the top round in a full box may be too tight to move. Recently, a .308 wouldn't feed at all after I'd pressed the final cartridge home. Pushing hard on the bolt barely broke it free. When the bullet nose hit the feed ramp, it stopped cold. Loading the magazine a cartridge shy of capacity solved the problem.

The more you manipulate a rifle, the better you'll like each other.

Dirt and debris in a rifle action can cause it to fail. Lubricant attracts them. Excess oil can congeal in frigid weather, impeding movement of small parts and cushioning strikers. Bore condition once directly affected rifle function too. Black powder and lead residue could so gum rifling as to prevent bullet seating in muzzle-loaders. Modern cartridge rifles aren't decommissioned by fouling. Assuming you don't stick the muzzle in the mud, bore status affects only accuracy.

Barrels on black-powder rifles almost never wore out. That is, the rifling wasn't burned away by high-pressure gases or friction from fast bullets. They died when neglect allowed residue to suck moisture that caused rust. Pitting followed. When smokeless powder supplanted black, misfires increased, because smokeless was harder to ignite. Adding mercury fulminate solved that problem; but mercury ate brass—a chemical reaction exacerbated by the lack of absorbent black powder residue! In 1898 the H-48 primer in .30-40 Krag ammunition replaced mercury fulminate with potassium chlorate. This compound spared the case but deposited corrosive salts. A scrub with boiling water and ammonia, then an oily patch, preserved the bore. At best, this procedure was inconvenient afield.

By 1901 Germany's RWS had a non-corrosive primer. Stateside, Remington chemist J.E. Burns developed "Kleanbore" non-corrosive priming in 1927. Peters "Rustless" and Winchester "Staynless" followed. German chemists Von Herzs and Rathburg came up with non-corrosive, non-mercuric priming. Since

then, bore shadows indicating rough steel surfaces in the throat are more likely caused by erosion, which increases with bullet velocity and powder charges, also rate of fire. Letting a barrel cool between shots is an act of charity.

Dry powder and primer residues from modern cartridges won't harm barrel steel. Both, however, are hygroscopic. Whether or not you've fired on a hunt, you're smart to give the bore a couple of passes each evening with dry patches. Follow with a slightly oily patch to leave a light film of protection. Don't forget the chamber! Sudden warmth causes condensation; so in cold weather, it's a good idea to keep your rifle in a cool corner of the tent, near the floor.

After a range session or a hunt, I clean a rifle by first running a patch soaked in original Hoppe's No. 9 from breech to muzzle. I discard that grungy patch instead of pulling it back through. Next: I give a brass brush soaked in Hoppes four back-and-forth pumps, rotating it after each. As often there are several rifles in the cleaning bay, I complete one procedure on all before starting another,



At the range, load the magazine full, and cycle all cartridges you'll carry afield from the bottom up.



Get in the habit of firing at targets as you would afield, cycling from the shoulder, spilling empties.

leaving solvent time to work. A Tipton or MTM vise holds the rifle without marring it. A newspaper-lined basket snares patches and solvent spray from emerging brushes (as do receptacles like Muzzle Mate, Patch Hog, Splatter Box). Rifles await their turn muzzles down, on or extended over layers of cardboard that catch drips.

Why the old Hoppe's? I like the smell. And it's a mild solvent, with some lubricating qualities.

Dry patches follow until they emerge clean. But metal fouling can lurk in gleaming bores. Copper glomming to steel traps moisture and tears at bullets that follow. Unalloyed copper is softer than gilding metal (95-5 copper-zinc), standard for bullet jackets now. So solid-copper bullets and lead-core bullets with "pure" copper jackets leave more stubborn deposits. Green or blue stains on patches are evidence of copper fouling. If it resists more brushing, ammonia-based bore solvents like Montana X-Treme's Bore Cleaner, Copper Killer 50 BMG solvents and Barnes CR-10 may remove it. Sweet's 7.62 is so stout, it shouldn't remain in the bore more than a few minutes. Bore Tech and Shooter's Choice market solvents that target lead and copper. I also like Witches Brew, from Holland Shooters Supply.

Like their jacketed brethren, cast bullets leave residue. Pure lead melts into rifling at bullet speeds over 1,200 fps or so. Buffalo hunters of the 1870s reportedly bumped that ceiling to 1,500 fps by adding 5 percent tin and 5 percent antimony. Paper patching helped too. Charles Newton later used paper as insulation under metal jackets to nix core-melt. He perforated jackets for both papered and unpapered bullets before installing cores, then fired both

types through white cardboard. Smears of melted lead from the uninsulated bullets were absent around holes punched by those with paper-wrapped cores.

Bore cleaning tools have improved. A one-piece rod—bare steel or polymer-coated—trumps three-piece aluminum rods. Sections of jointed rods don't mate perfectly; junctures and the dirt they collect can cause damage. Wipe alloy and coated rods with an oily cloth before and during use, to snare microscopic grit that can adhere to these "soft" surfaces. The best rods have free-spinning handles, so patch and brush can track the rifling. Buy high-quality rods to fit all your rifles. Three ship about as cheaply as one. Given ordinary use and care, they'll outlast mastodon bones.

Slip a bore guide onto the rod before installing rod tips. This inexpensive tube keeps the rod from flexing against the chamber. An 18mm guide fits most bolt races. Sinclair sells guides for just about every bolt rifle and even has muzzle protectors for autoloaders, pumps and lever-actions you must clean from the front. The slightest muzzle damage can affect accuracy!

Patches should fit snugly but not so tightly that you must jam them through. To save a few cents, grab scissors and old, freshly washed pajamas and T-shirts. Cut and try to get the right size.

Sizing matters more with brushes. Also, before enthusiastically shoving one down the bore, make sure your rod is long enough to push it clear of the muzzle! Brushes aren't made to reverse inside! Stock up on brushes. Discard those with tattered bristles that let the steel core scrape rifling. Remember: copper solvents attack copper brushes! Use nylon brushes for these solvents.



Black powder fouling still impedes bullet seating in muzzleloaders! "Wet" patches soften fouling.



Solutions to copper fouling have followed a trend to "pure" copper bullets like these Honey Badgers.



Pure lead strips at bullet speeds over 1,200 fps. Antimony raises that limit on these "hard" cast bullets.



A polymer bore guide in the bolt race will keep the cleaning rod from flexing and rubbing the bore.

Brownells, Midway and a few other shooter supply houses list individual cleaning items you can pair, in quantity, with a full-length rod. There are also convenient kits. The Otis Elite has 40 components with obstruction-clearing tools. Another option, the Gun Boss Pro by Real Avid, features a hinged, clear-polymer box that opens to hold components—a sturdy jointed brass rod, tips and brushes from .22 to 12-bore—at an easy angle. Real Avid cleaning supplies include a roll-up mat that not only protects kitchen tables and rifles but has a magnetized section to snare small parts.

A pull-through cable coils neatly in a biscuit-size pouch. With a slotted tip, patches, a brush and a small tube of oil, it belongs in your hunting kit. The Otis Ripcord has a 10-inch section with Nomex fibers that “trap

fouling better than nylon.” It won’t free that case you stuck with a hot handload, but it can help clear snow and light debris from the muzzle. It makes field cleaning a snap!

Protecting a clean bore is as easy as finishing with an oily patch. Grease isn’t necessary, save for extended storage in jungle climes. For the chamber, use an extra-large patch or a 28- or 20-bore shotgun swab. Storing rifles muzzle-down prevents oil from blackening the stock tang and keeps recoil pads soft and shapely. Like me, you may have to build your own rack. And yes, unless they’re held securely, it’s easy to tip those rifles accidentally!

Henry Starr? He walked free when his murder conviction was overturned by the U.S. Supreme Court. On March 27, 1915, he and five thugs attempted what the Dalton gang had failed to do 23

years earlier. Simultaneously, three men tapped each of two banks in Stroud, Oklahoma. First National was a pushover, but cashiers at Stroud State resisted. Out of time, the outlaws joined up, pushing hostages into the street. Then 17-year-old Paul Curry, a butcher’s son, grabbed a Winchester used for killing hogs and dropped Starr with a shot to the thigh. His next bullet hit another felon. The rest put spurs to their horses. A recovered Henry Starr found banks too tempting. On February 18, 1921, the 48-year-old crook and his gang targeted People’s National in Harrison, Arkansas. Marched to the vault, Manager William Myers snatched up an old but well-kept Winchester ‘73, and felled Starr with a bullet to the spine. After surgery, uremic poisoning got the best of Henry Starr.

Col. J.H. Patterson fared better. His candid 1907 account of the Tsavo project and its man-eaters left little doubt he led a charmed life! Less blessed were the 28 Indian coolies (or more) killed by the cats—with the “scores of unfortunate African

natives of whom no official record was kept.” His judgment and marksmanship failed Patterson repeatedly. But his pluck and persistence prevailed—with a reliable .303 that kept him “blazing away” after a bullet sent the first lion into a frenzy behind cover. In similar fashion the second beast “made a most determined charge” in response to his shot. “I fired again and knocked him over; but in a second he was up... and coming...A third shot had no apparent effect.” Patterson turned to grab his back-up rifle. Faithful Mahina, however, had taken the Martini with him up a tree. The colonel lost no time clawing his way up, but admitted that had not one of his shots shattered a hind leg, “the brute would most certainly have had me.” More shooting ensued.

Like the bank vault’s Winchester, Patterson’s Martini carried the day with a bullet that flew just a few feet. Blessed is a well-maintained bore. But accuracy can never reassure like a rifle that works when it must. ■



Real Avid sells a suite of standard and ingenious cleaning items. Discard worn or damaged brushes!

*Clean that chamber! Use shotgun swabs or oversize patches, a loose-fitting brush you can reverse.*

