

The
Rifle
Magazine

Number 7
Jan.-Feb. 1970

U.S. & Canada, \$1.00
Foreign, \$1.25



New! Bench Rest Section
Barrel Rejuvenation
Professional Stock Finishing

The **Rifle** Magazine

'Only Accurate Rifles Are Interesting'
- Col. Townsend Whelen

Volume 2, Number 1
January-February 1970

In This Issue

More Fun With Your Gun	Jim Carmichel	14
The Lyman Story	Ken Waters	18
Stock Finishing	Henry L. Woltman	22
First Factory Bench Rifle	Jim Gilmore	26
'Hind-Leg' Shooting	Al Miller	28
Nothing New	John Wootters	32
Barrel Rejuvenation	Maj. George C. Nonte	34
Tests	Roy Dunlap	38
Those Amazing .28's	Maj. George C. Nonte	40
Home-Built Bullet Tester	Earl Etter	44
Something New In Rifles	Roy Dunlap	60

Departments

Loading For Bear	5
Editorial	6
Muzzle Flashes	7
Dear Editor	8
Aiming For Answers	11
Product Proofing	62
Bench Report	65
Just Jim	74

Cover

The bench rest scene on the cover of this issue, though planned a year ago, is particularly appropriate since RIFLE is now the official publication of the National Bench Rest Shooters Association. The rifle is Remington's new 40XB-BR, the first major factory rifle designed to meet NBRSA specifications, with Remington's 20XBR scope, a Bausch & Lomb zoom spotting scope on the Freeland bipod stand, and Beecher fore-end rest and bags.

Adopted in August 1969 as Official Publication
For National Bench Rest Shooters Association



The RIFLE Magazine is published bi-monthly by Dave Wolfe Publishing Co., Rt. 4, Box 3482 (1406 Hendryx Place), Peoria, Illinois 61614. Telephone (309) 691-2169. Second Class Postage paid at Peoria, Illinois, and additional mailing offices. Single copy price of current issues -- \$1.00. Subscription price: six issues \$5.00; 12 issues \$9.00; 18 issues \$12.50 (Outside U.S. possessions and Canada -- \$6.00, \$11.00 and \$15.50). Recommended foreign single copy price \$1.25. Advertising rates furnished on request. All rights reserved.

Publisher of The RIFLE is not responsible for mishaps of any nature which might occur from use of published data, or from recommendations by any member of The Staff. No part of this publication may be reproduced without written permission from the editor. Manuscripts from free-lance writers must be accompanied by stamped self-addressed envelope and the publisher cannot accept responsibility for lost or mutilated manuscripts.

Change of address: Please give one month's notice. Send both old and new address, plus mailing label if possible, to Circulation Dept., The RIFLE Magazine, Rt. 4 -- Box 3482 (1406 Hendryx Place), Peoria, Illinois 61614.

The Staff

Dave Wolfe, *Publisher* -- Neal Knox, *Editor*

Jim Carmichel, <i>Associate Editor</i>	Norm Lammers, <i>Tech. Adviser</i>
John Wootters, <i>Associate Editor</i>	Maj. George C. Nonte, <i>Military</i>
R. T. Wolfe, Ph.D., <i>Associate Editor</i>	Ken Waters, <i>General Assignment</i>
Parker O. Ackley, <i>Wildcats</i>	Edward M. Yard, <i>Ballistics</i>
John Buhmiller, <i>African Rifles</i>	Don Zutz, <i>General Assignment</i>
Harvey Donaldson, <i>Historical</i>	Rod Guthrie, <i>Staff Artist</i>
Roy Dunlap, <i>Gunsmithing</i>	Barbara Hansen, <i>Data Processing</i>
Edward C. Ezell, Ph.D., <i>Technology</i>	Judith MacDonald, <i>Ed. Assistant</i>
Jim Gilmore, <i>Bench Report Editor</i>	Barbara Killough, <i>Ad. Director</i>
Bob Hagel, <i>Hunting</i>	June Skillestad, <i>Circulation Manager</i>

new FORMULA



**PERMA BLUE
PASTE
GUN BLUE**



**FOR
TOUCH-UP
OR
COMPLETE
REBLUEING**

\$1.50

BIRCHWOOD CASEY COMPANY, EDEN PRAIRIE, MINN. 55343

PERMA BLUE PASTE GUN BLUE OUTPERFORMS ALL OTHERS

... in durability

Three coats of new formula PERMA BLUE PASTE GUN BLUE outlasted 8,000 cycles of laboratory abrasion tests. Three coats of competitive products failed at 1,000 cycles.

... in ease of use

Gel-like PERMA BLUE PASTE has controlled action that really works. Spreads evenly direct from tube, blends perfectly for touch-up. Apply, wipe off in 30 seconds, buff lightly with steel wool. No heating or rinsing needed.

... in beauty of finish

PERMA BLUE PASTE produces deep, lustrous blue-black color coat after coat because the acid content is adjusted so that each successive coat does not remove the blue previously laid down.

No wonder PERMA BLUE PASTE GUN BLUE is preferred by men who know guns best. No better product ... no better price.



BIRCHWOOD CASEY

7900 FULLER ROAD
EDEN PRAIRIE,
MINNESOTA 55343
DIVISION OF
FULLER LABORATORIES, INC.

Dear Editor

Gold Mine

Since Volume 1, Number 1 of *The Rifle*, I have been an avid fan of your unique magazine. As such I cannot possibly pass up this opportunity to enlist in the ranks for another three years.

As a relative newcomer to the field of amateur guntinkerers (I don't botch up anybody's guns but my own...it's much safer that way, I don't make enemies), I am indebted to you for offering such a gold mine of useful theoretical and practical information.

In the future, I would like to see more theoretical articles concerning interior and exterior ballistics and general gunsmithing. I would like eventually to become a qualified gunsmith. How about an article on the ins and outs of acquiring a Federal Firearms License—at present it's all rather confusing to me.

George H. Franklin
Gulfport, Mississippi

Heavy Bullet Fan

In regard to Mr. James Wyatt's query on heavy bullets in the .308 I have been working on just this, but will first assure him that the .358 Win. IS a better short-range stopper. Use the 200-grain RN Power Points for deer, 250-grain Silvertips for big stuff.

In the .308 the necessary deep seating and restricted powder space can be countered by using a powder that is denser than the common Du Pont types. I find Norma 204 quite superior for heavy bullets in .308 Winchester—in my 77 Ruger, 49.5 grain of N204 gives the 200-grain Silvertip 2,495 fps and 48 grains of N204 gives the 220-grain Core-Lokt 2,280 fps. These loads are six per cent below the point where head expansion begins with Remington cases; you could go a grain or two hotter in Winchester cases.

The 200-grain will stay in two inches at 100 yards, but the 220 will not stay

in a three inch group; it is stabilized however and would probably be accurate from a 1 in 10 inch twist. These loads are slightly compressed, but in a Mauser magazine you could seat bullets out to avoid this.

As for Mr. Jack O'Connor's letter, apparently Mr. O'Connor has not associated with common, run of the mill hunters since he reached his exalted position. It is true enough that any caliber will kill well if the shot is placed exactly right BUT, in our camp (Circle W Outfitters) our hunters fire maybe five shots for every one that hits the game. If they cannot hit the whole critter how the heck can they place their shots? And yes, they shoot at excessive ranges, poor angles, etc., and no amount of writing or persuasion will change that. Heck, they'll do it while I'm guiding them, unless I get a hammer-lock on them!

So I favor big bore rifles. No, they will not kill with poorly placed shots, nobody said they would. The idea is to disable and stop the game, or at least leave a blood trail so you can find and finish the critter. Mr. O'Connor's favorite .270 often fails to leave a blood trail; the .375 or .458 seldom fail, if you need one. Last time I hit an elk too far back with the .375 he went 30 yards and lay down, and I've seen an elk stopped dead with a shot between the hams from the rear—with 500-grain .45-70 bullets. A .270 would not have stopped either one; it will kill with well placed shots but has little stopping power otherwise. A slight increase in power won't do it, Mr. O'Connor is right there. But using the .458 on elk, or the .300 Weatherby on gazelle, will make up for a lot of 'shooter error.'

True enough, rifles of the same class—.270 to 7mm Mag, for example—show little difference in power. But guns that are not "reasonable" for the game are a different matter. For example I will point out that Mr. O'Connor got the gazelle that he hit with the .300 Weatherby. If he had shot it through the

The RIFLE Magazine

guts with a .222 he would likely never have found it—and that's the difference I'm trying to point out.

Will Hafler, Wierpe, Idaho

BAR Tip

I have followed Bob Hagel's tests of the Browning Auto rifle with interest, and after getting one in .270 Winchester have found the reports of excellent accuracy to be true.

I have a little tip to pass on to you that may be of interest. To keep your cases from hitting the ground, lay a rag across the scope, covering the ejection port. The case will fall on the bench under the rifle. It works every time for me. Needless to say this is good only at the bench rest, but that's where 90 percent of my shooting is.

E. R. Gousset, Jr.
Natchez, Mississippi

Direct Line

Keep up the good work on both *The Rifle* and *Handloader* Magazines. I certainly enjoy reading and learning from people who experience the same problems I do. It's as if I have a direct line to 50 states.

If I am in doubt or troubled about some problem I look in an index that I make after reading each magazine so I may refer back for the information.

Noel R. Drummond
Oberon, North Dakota

Double Builder

The item that really interested me in *Rifle* No. 4 was Al Miller's article on double rifles. I don't know how many of these guns Mr. Miller has worked with, but obviously more than one. My experience has been limited largely to one double rifle, a .45-70, which I built myself. But building that rifle taught me more about rifles than I would have learned in years by the normal route.

I am in general agreement with most of the statements made by Mr. Miller though one or two did shake me up rather severely. During the course of building my rifle I developed an equation which seems capable of analyzing the reaction of double rifles. The problem Mr. Miller points out of developing a load which is accurate

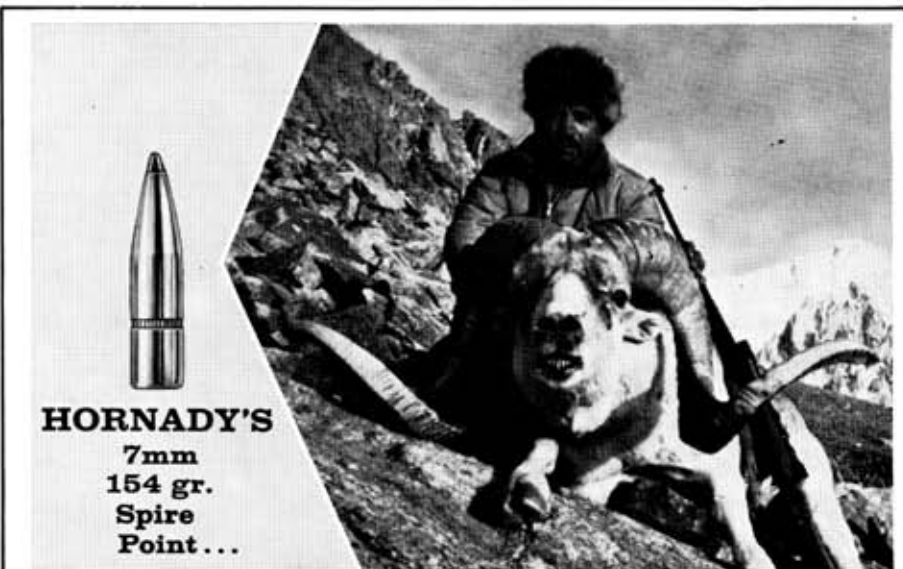
from the individual barrels had been my main bug-a-boo so far. Since the barrels of a side-by-side double lie off the centerline of the rifle, recoil causes a rotational torque which throws the gun to the side of the barrel fired. The barrels of doubles are therefore made to converge to offset the effect of this torque. Theoretically there are four factors affecting the recoil: weight of bullet, weight of powder, weight of rifle, and the center-of-gravity or balance point of the rifle. The greater the bullet weight and/or powder weight, the less the gun weight or the shorter the distance between the butt and the balance point, the farther out the gun will throw. Slight changes in any of these factors can sometimes result in extreme changes in the way the rifle shoots.

Again, theoretically, the type of powder, type of bullet, or velocity of the bullet should not affect the way the gun shoots to a point, except as they may affect the accuracy from the individual barrels. However, there are definite indications that these factors do have some effect, though I have not

been able to determine the exact nature of the cause and effect.

It was when Mr. Miller got to his procedure of regulating the load to his gun that I really got shook-up. He states that at the starting load the left barrel will shoot to the *left* of the right barrel (i.e. parallel or divergent fire) and as the load is increased the points of impact would move together and then separate again (i.e. crossfire ???). This *must* be an error. Every bit of evidence available indicates that light loads will crossfire and increasingly heavier loads will decrease the amount of crossfire until parallel and finally divergent fire is reached. Mr. Miller also shows a heavier charge of 3031 for the heavier bullet than for the lighter bullet, which I cannot quite believe. I would like to know what his final loads were when he got both bullets to shoot to the same point.

While it seems inconceivable that anyone acquiring a fine old double rifle would want to alter it, I have heard of a number of such rifles which were virtually ruined because of such modifications. Most common of course



HORNADY'S
7mm
154 gr.
Spire
Point ...

King of the Mountain!

This remarkable trophy was taken by Chris Klineburger of Seattle, Wash., and earned him membership in a small but elite group—Americans who have successfully hunted one of the world's rarest and most majestic animals—the Marco Polo Sheep.

Klineburger chose Hornadys for his Marco Polo hunt because he trusted them...even in Afghanistan at 16,000 feet.

Hornadys are as accurate, deadly and dependable for North American game as they are for Marco Polo in Afghanistan. The Hornady line for reloaders includes 75 bullets, from the 17 cal. Varmint Special to a 500 gr. Full Metal Jacketed 45 cal. bullet for African game. You can trust Hornadys for your most important shooting needs...anywhere in the world.

FFL 47-404

75 Bullets for
Handloading. Send
for complete brochure



Hornady Bullets

HORNADY MANUFACTURING COMPANY
Dept. R, Grand Island, Nebraska 68801

is the simple installation of a recoil pad, which will change the degree of fixity at the butt. Shortening or lengthening the butt stock is another common error, while restocking to a different length or cast is less common. Even the addition of a scope, which alters the weight and weight distribution, can be a problem. Some of these changes will so greatly change the shooting characteristics that no amount of handloading tricks can correct it. In such cases, and with really stubborn doubles, the answer may be to install double sights.

George A. Barrow
Missoula, Mont.

Why anybody who has the courage—to say nothing of the ability—to make his own double rifle would expect me to give him any answers on the subject of doubles beats me. However, I'll do my best.

To the best of my knowledge, double barrels are set to converge beyond normal shooting ranges. I don't have any idea if ALL doubles are made this way or if they have always been made this way. Even so, the convergence must be very slight indeed. I've never suffered from crossfire when building up a load. Perhaps because my starting loads are not low enough. It's quite possible that very mild loads might result in a crossfire but I've just never had it happen.

In the .500 for example, 45 grains of 3031 and the 435-grain bullet places the shots from individual barrels about 3 inches apart at 50 yards; 48 grains brought the spacing to 1-3/4; 51 grains put them slightly over an inch apart and at 52 grains they were separated by exactly one inch. While 53 grains made no measurable change, 54 grains began their separation and 55 grains put them about 1 1/2 inch apart and the primers began showing a slight cratering. For that particular rifle, I settled on 52 grains for a final load.

The 250-grain bullet gave its best accuracy with 50 grains of 3031. I don't see why this

should surprise you. Although I don't have a chronograph, I suspect that velocity of both loads is very close. Naturally, it takes a bit more powder to get that heavier bullet moving at the same speed. With both bullets leaving the muzzles at approximately the same speed, they should shoot to the same point, give or take a little—and they do.

I don't pretend to know much about ballistical theory but I was surprised to see that, according to your letter, recoil is affected only by the bullet weight, powder weight, rifle weight and location of the balance point. Perhaps I'm confusing apparent with real recoil but I can't understand why the burning rate of the powder doesn't have some effect.

In my .458 Winchester, 68 grains of 3031 and a 405-grain cast bullet, although a healthy load, is easy enough on the shoulder. I can shoot it offhand, kneeling or sitting. I tried 55 grains of 4198 once though, and when I touched it off I thought for a moment that someone had belted me when I wasn't looking! That was the most abrupt, vicious and punishing load I've ever fired in my life. Now, if only the weight of the charge is involved, how come the lighter charge packed such a horrendous punch?

I like letters like yours. You'd be surprised how much I've learned this way.

Al Miller

For Veterans, Too

Just a note to thank you for the fine review that you gave *Safari*—Keith in the No. 3 issue of *The Rifle*. Of all the write-ups we have received to date, I consider this the best and most well thought out.

There's only one point that you mentioned that I would not possibly agree with, and that is that the book "isn't for the veteran African Hunter." My reason for taking exception to this is

that there are three "veteran African Hunters" (two killed outright by lion, and one, severely mauled) that very possibly would be alive and kicking today, had they had the opportunity to profit by the advice given concerning the complete inadequacy of the .375 H&H bolt action for lion.

Those guys came to trouble not years ago, but within the last few years. All were "veteran African Hunters." When their story was put in the book, I had a few qualms as to whether we were overdoing it a bit, as most people think the .375 perfectly capable of handling lion under any circumstance, which, of course, would not appear to be true if one were to judge the circumstance by those three incidents. Funny thing, I have heard of no American hunters that have fallen prey to the other members of the big five in recent years.

I notice that my friend Jack O'Connor had to get the last word in on "Potence" ("Potence is a good 7mm"). To claim in so many words that the difference in killing power between a 7mm and a .470 is largely in the imagination of the user (he gives the example of the PWH that gets along so nicely using a 7mm for *all the big five*) is really going overboard. I think the "potence" argument is fascinating, and I am especially intrigued by the various "arm chair experts," who have hunted very little, but are living dynamite with their slide rules. I refer to the nut that equates the bullet blow and damage from the front end with the blow delivered by the recoil. These gents should go to Africa and shoot a bull elephant in the side of the head with a fast-moving .300 mag. solid 150-grain bullet and see what happens (nothing) then smack him in the same place with a .470, and observe the results.

I think your new magazine is really great, and darn refreshing for a change to see writers that aren't writing down to a bunch of morons or to be more polite "beginners."

Truman R. Fowler
Publisher, *Safari*
LaJolla, Calif.

HANDLOADERS

Stop using a
hand crank to start
your automobile!



Also, stop wearing out your barrel by producing high pressures with the wrong powders. Find out the correct powder, know the velocity and pressure with the Powley Computer-Slide Rules that make it easy. Modern cartridges only.

Powley Computer for Handloaders . . . \$4.50
Powley psi Calculator \$2.00
Both in one Package for \$6.00

Note: The new pressure calculator cannot be operated without the Powley Computer for Handloaders.

The more sophisticated handloader will need:

Powley's High Velocity Trajectory Chart \$22.00

Powley PMAX Pressure Gauge for large rifles \$49.00

100 Pellets for above \$16.50

HUTTON RIFLE RANCH

Dept. HL

1043 Greenleaf Canyon Road
Topanga, California 90290

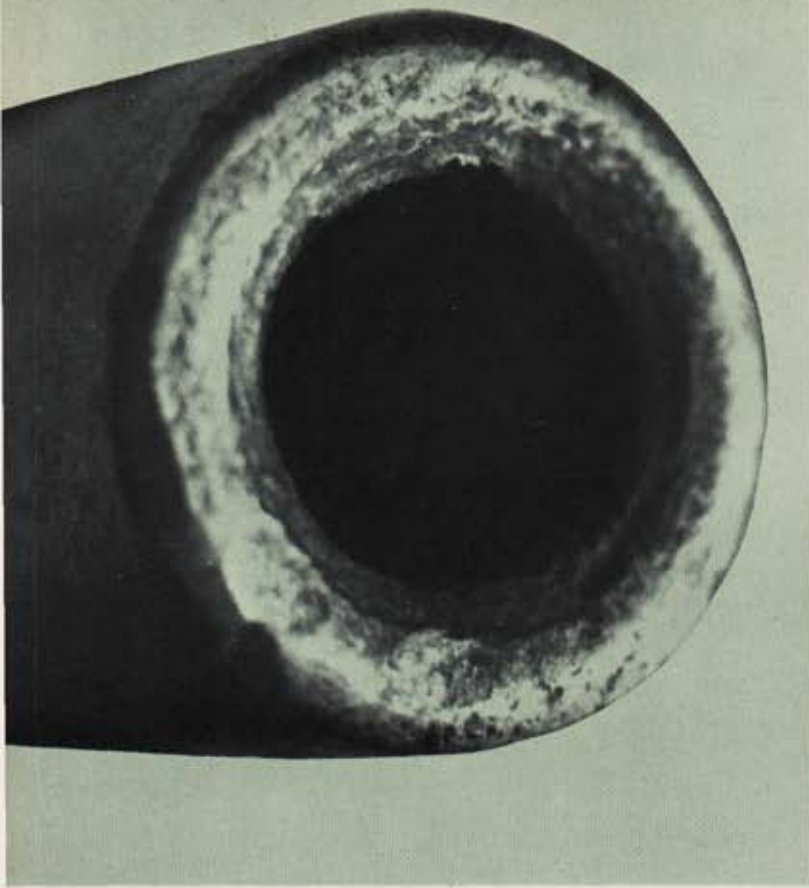
Gunsmith Tools

Send for 1969 Catalog

B-SQUARE,

Box 11281, Ft. Worth,
Texas 76110

BARREL



This M-98 Mauser muzzle, shown at left has been badly battered. On the left is a gouge and on the right a burr turned into the bore. Either or both will spoil accuracy and are easily removed by re-crowning or amputating the muzzle.

SOMETIMES WONDER how many hundreds of thousands of guns sit idle in closets and attics, even barns, because the interior of their barrels has been shot out or ruined by neglect. An amazing number of guns are simply set aside and forgotten when they no longer shoot close to where they look. Often these are older models, and the owners simply can't see spending the money a new barrel will cost. Then, too, new barrels frequently aren't available except from custom makers—and that kicks the price up and adds to the difficulty of getting the job done. Trading such a gun in on a new model is often difficult unless the fellow has his mind made up to take whatever the local gun shop offers. Consequently, when "Ole Betsy" won't hit her mark anymore, she's just laid aside and forgotten.

No matter how bad the barrel looks, there are few circumstances under which it cannot be restored sufficiently to produce at least acceptable performance in its original or another caliber. There are several basic gunsmithing operations which can be performed to place these barrels back in service. Some are so simple and easy they can be accomplished with hand

tools by any reasonably dexterous shooter; others cost little at your neighborhood gunsmithy; and a few are relatively costly—but still more economical than fitting a complete new barrel.

Let's take a look at a few of the simpler jobs first. Out West I've encountered a number of rifles that were in perfect (apparently) condition inside, but had become badly battered externally from being constantly carried in the back of a pickup truck or the trunk of a car bouncing over open range and dirt roads. Occasionally owners have asked me why such a gun that had

Gunsmith supply houses sell mounted brass balls for crowning muzzles, but a large-size, round-head brass screw will work just as well for an occasional job. Don't use a power drill. Chuck the screws or ball in a hand drill and rotate slowly, first in one direction, then the other, rocking the drill simultaneously. Use fine valve-grinding compound and oil between screw head and muzzle.

performed satisfactorily for years suddenly developed an aversion to the target. Aside from sight damage, the most common cause turned out to be muzzle damage and, in one instance, a barrel bent by having a heavy snatch block tossed on it. No help for that one, but those with battered muzzles shot as well as ever after re-crowning.

REJUVENATION

By MAJ. GEORGE NONTE


In each case, impact with some hard, sharp object had carved a deep nick in the mouth of the muzzle or had turned a burr into the bore. These defects then deflected the bullet as it exited and spoiled accuracy. Most gunsmithing supply houses offer brass muzzle-crowning balls which are coated with valve-grinding compound and oil and rotated against the muzzle at low speed in a hand or electric drill. A ball can't take more metal off one side than another. In a pinch, a round-head brass wood screw of large size will serve for the job. In any event, it seldom takes more than 20 or 30 minutes to restore a muzzle to newness and accuracy. If the damage extends more than 1/32-inch into the barrel, time can be saved by sawing off an appropriate portion, filing the fresh muzzle square, then crowning it anew.

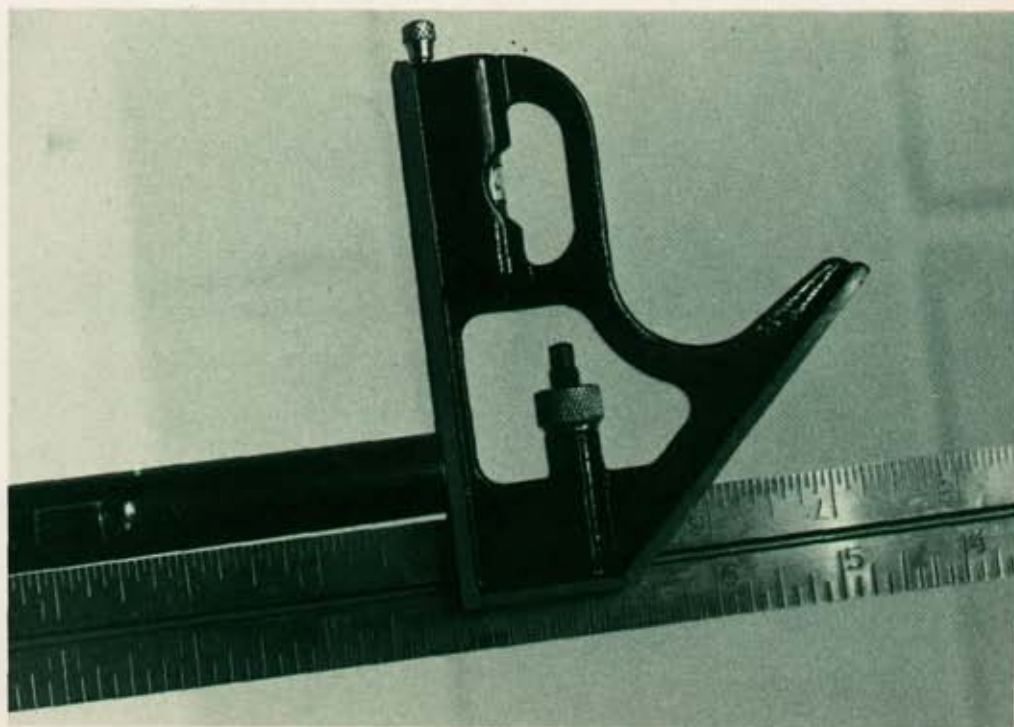
A gun whose owner is addicted to excessive and careless cleaning from the muzzle—usually with a bent and battered springy rod—may develop a belled muzzle which is ruinous to accuracy. This occurs most often with lever and pump-action guns which must be cleaned from the muzzle; and with older models whose barrels are made of relatively soft steel. This condition can usually be seen readily by examining the interior of the bore closely under good light right at the muzzle. Since this damage seldom extends more than an inch or two into the muzzle, amputation and re-crowning restores accuracy. The barrel should be carefully sawed off as squarely as possible, then filed exactly square, and properly crowned. Again, this is something you can do yourself in no more than an hour or two some idle evening. Hacksaw, file, and some means of crowning are all the tools you need. Where iron sights are

involved, this normally requires re-fitting the front sight, but that's no great chore.

Amputation is also the answer for some other forms of damage. To digress from rifles for a few moments, shotguns in particular are prone to burst muzzles. It's so very simple to unknowingly dip the muzzle of your scattergun in snow or mud, then take a fast shot with the obstruction still in place. At the very least, this will produce a bad bulge or split at the muzzle and can mean chunks of barrel wall blown completely clear. In a single-barrel gun, simply sawing off the damaged portion and fitting any of the adjustable or interchangeable choke devices on the market restores performance. In the case of a double, even though only one barrel is damaged, both must be cut off at the same point. This generally removes all or nearly all of the choke, which can be restored only by careful reaming and/or polishing by someone competent in this work. Though less likely, this type of muzzle damage can occur to



Lapping a rough barrel isn't as difficult as you might believe. Cast a lead lap in the bore around the end of a cleaning rod, then pass it part way out the muzzle to apply fine abrasive and oil. During lapping, don't let it protrude farther than this from the muzzle. 



Squaring a cut-off muzzle can be a chore. Keep checking with a common adjustable square in this fashion until the same gap exists between the muzzle and the arm of the square from opposite sides. Lower end of the arm must touch the tapered barrel several inches behind the muzzle.

rifles—especially those of large caliber. Corrective action is the same but must include crowning as mentioned earlier.

Occasionally a bulge may be produced almost anywhere along the length of the barrel. In shotguns this is usually due to a wad left in the bore by a “blooper” shot. In rifles, a stuck bullet, stripped bullet jacket, lost cleaning patch, or any other obstruction is likely to be the cause. Often barrels will continue to deliver normal accuracy even when a readily visible bulge exists

if it's back a way from the muzzle. In that case, there's no actual necessity for removing or reducing the bulge. A not-too-large bulge on a relatively thick rifle barrel can be draw-filed flush with the adjacent surfaces to restore original contours. This doesn't help the inside but, if the gun is delivering satisfactory accuracy, is an acceptable cosmetic repair. Shotgun tubes cannot be given this treatment because of their thin walls—however, shotgun specialists such as Simmons Gun Company, (500-510 East 18th Street, Kansas City, Missouri), can reduce such bulges and can also raise dents by means of their special tools. The cost is far less than replacing the barrel.

When the bulge occurs near the muzzle, the most practical solution is to cut off that section of the barrel and re-crown or, in the case of a shotgun, fit a choke device. In doing this, one must keep in mind that the minimum barrel length for rifles is 16 inches; 18 for shotguns. There is no minimum length for pistols and revolvers, so any amount of reduction necessary to remove the bulge can be tolerated. However, in the

case of automatic pistols whose slide surrounds the barrel, shortening is not possible. As a matter of fact, a barrel bulge in this type of gun will probably jam the slide tightly to the barrel.

Amputation also works at the breech end of the barrel. High-intensity cartridges working at tremendous heat and pressures of 50,000 psi and more will eventually erode the rifling completely away directly ahead of the chamber, even though the remainder of the barrel is in near-perfect condition. Of course, with anything except ultra-hot wildcat cartridges, it takes many thousands of rounds to produce erosion extensive enough to spoil the accuracy of hunting rifles. Eventually, though, erosion will reach the point where in passing through this roughened and enlarged portion of the bore the bullet is so damaged that it will not deliver satisfactory accuracy.

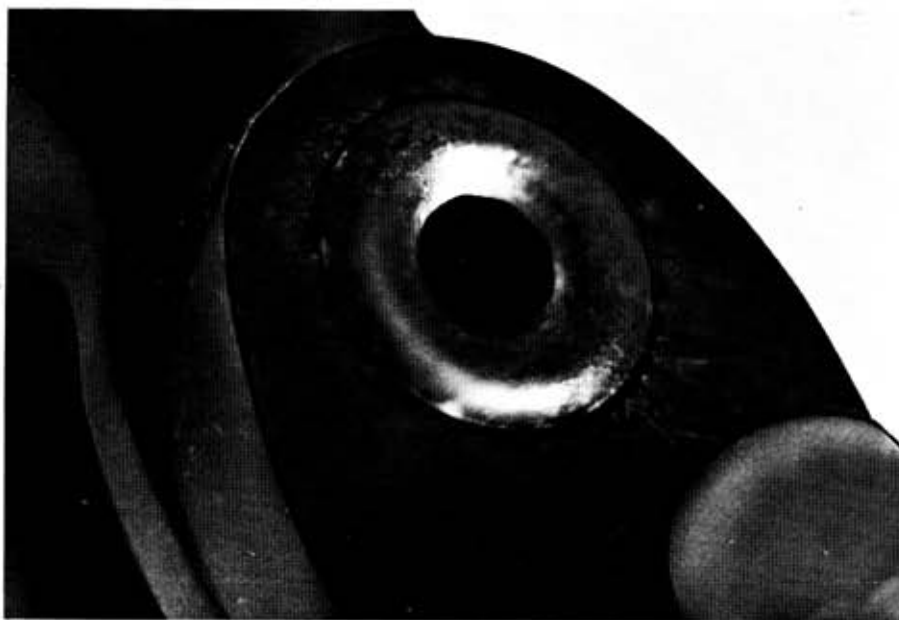
When that state is reached, the barrel may be removed from the action, shortened from the breech an amount equal to the length of the worst-eroded portion, then rethreaded and rechambered and fitted back to the action. Some bench rest and varmint shooters who fire unusually large amounts of ammunition often deliberately start with barrels two or three inches longer than necessary in order to have room for subsequent shortening as erosion develops. This is, of course, a gunsmithing operation and may cost upwards of \$20. But, that is still significantly less than the cost of a new barrel—especially in a bench rest gun fitted with a \$100 tube.

In some instances it is possible to eliminate some of the effects of erosion

British WWI vintage S.M.L.E. rifle was factory relined to .22 rimfire caliber, fitted with new bolt head, firing pin and extractor. Many thousands of training rifles were produced in this manner under several designations. Rifle pictured is “No. 2, Mark IV” and is currently available from Century Arms, St. Albans, Vermont -- the only relined-barrel gun that can be purchased across the counter at this time.



This S&W M1917 .45 revolver barrel is bulged just behind the front sight, probably caused by being fired with a bullet stuck in the bore. It is easily restored by cutting it off behind the bulge, truing up the muzzle, then fitting a new front sight.



This Lee-Enfield barrel has been factory relined to .22 rimfire caliber for use as a training rifle. The joint between barrel and liner is scarcely visible without magnification.



by simply rechambering. For example, rechambering for a longer cartridge will sometimes clean up the worst of the erosion. A 7mm Mauser barrel can be rechambered to the .280 Remington or 7mm Remington Magnum. A .243 Winchester may be rechambered to any one of the 6mm wildcats based on the blown-out full-length .30-06 case.

An old artillery sergeant once brought me a virtually new 7mm Mauser sporter he had acquired in Europe. The gun would have cost several hundred dollars to duplicate in this country. In spite of its appearance, the gun was ruined by deep rust pitting in the chamber. The pits were so deep that fired cases could not be extracted normally. The problem could have been solved by shortening the barrel about 1/2 to 3/4-inch at the breech and refitting and rechambering it. However, this would have spoiled the wood-to-metal fit in the fore-end. Not wanting to do this, we looked about for a larger diameter 7mm cartridge and found it in the .284 Winchester.

A .284 finish reamer removed sufficient metal to entirely eliminate the pits. This left the new chamber with a neck and throat slightly longer than standard for the .284, but the rifle shot quite well. Since the owner was a handloader, he compensated for the long throat by seating bullets out to the same length as the original 7mm Mauser caliber. Rechambering for any one of the belted 7mm Magnums would have cleaned the chamber up completely, but this individual didn't want a belted magnum.

Even a bore that appears badly rusted and pitted can frequently be salvaged in one way or another. Many times it will not be as bad as it looks. A thorough scrubbing with solvent and

Many older guns such as this Winchester M1886 .40-65 are often found with ruined bores or cannot be used because ammunition hasn't been produced for decades. In either case, reboring the barrel to handle readily available .45-70 cartridges restores the gun to service.

steel wool packed tightly around a brass bore brush will remove all rust and accumulated fouling of the years and will also provide some smoothing action on the roughened rifling.

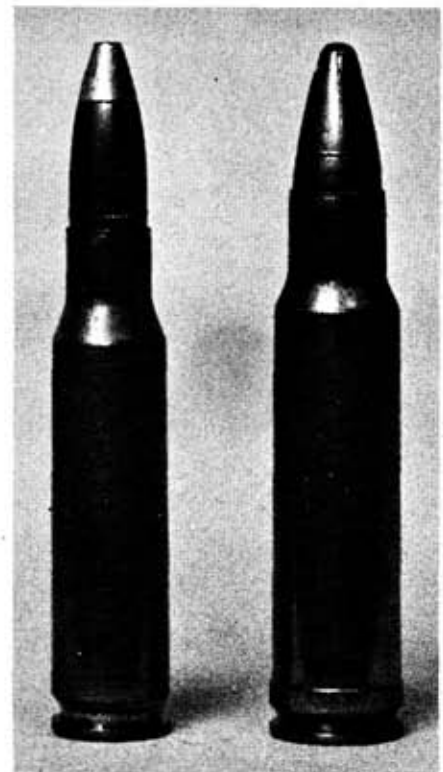
This operation should *always* be conducted from the breech, even if the barrel must be removed from the receiver to do so. In addition, some sort of stop should be attached to the rod to prevent the wad of steel wool from passing through the muzzle. This will prevent bellling of the muzzle, and will also result in a slight amount of choke which often seems to improve accuracy. The steel wool should be replaced after each few strokes because it loses its cutting ability rather quickly. This treatment should not be extended past the point necessary to produce acceptable performance. If kept up too long, it can virtually destroy rifling. The best procedure is to fire a few test groups as soon as all rust and fouling has been scrubbed out. Once cleaned out and smoothed up a bit and perhaps recrowned, barrels that look rough inside will produce surprisingly good hunting accuracy.

Essentially the same thing can be accomplished far more precisely by lapping a rough bore. This is done by casting a pure lead lap about 3 inches long on the end of a cleaning rod inserted into the bore. The rod is inserted from the breech, and the lap cast in the muzzle. When cooled, the lap is passed part way out of the muzzle and coated with oil and very fine flour emery abrasive powder. It is then worked back and forth full length in the barrel, fresh emery and oil being applied as necessary. Here, too, the lap should not be allowed to protrude from the muzzle except for application of abrasive. As polishing progresses, a new lap should be cast. Even a badly pitted bore can be completely smoothed by lapping and still retain reasonably clear rifling. However, this can result in so much enlargement of the bore that standard diameter bullets will not shoot well in it. Lapping should not be carried

past the stage where a reasonable degree of accuracy is produced.

A bore so badly ruined that it cannot be salvaged by lapping or scouring may still be restored, through not in its original caliber. Reboring is the answer. This consists of drilling and/or reaming to completely remove the rifling and all roughness. The smooth hole thus produced is then reamed and rifled in the conventional manner in a larger caliber. The barrel is then rechambered and refitted to the action. This is, of course, a special job that can be accomplished only by those shops tooled up for it. Fortunately, a good many such shops exist, even though most of them are considerably behind in their work. Depending upon the particular gun and the caliber, a typical reboring and rechambering job may cost

(Continued on Page 46)



Typical of reboring jobs possible is opening up a ruined .308 Winchester (left) barrel and chamber to handle the .350 Remington Magnum.

