"Only accurate rifles are interesting"
- Col. Townsend Whelen

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This Month's Cover

Terry Elder, the varmint shooter on this month's cover, is equipped with a heavy-barreled Sako M-74 22-250 wearing a Redfield 3-9X variable in Redfield mounts. Although the scenery resembles prime rockchuck country, try prairie dogs. In recent years, prairie dogs have expanded their range into 7,000-foot-plus elevations in some regions. Transparency by Rick Jamison.

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In reloading for the hunting field, everything begins with the bullet. For the hunter-rifleman, perhaps the single most significant advantage to reloading is the ability to select the one precisely correct bullet for the game and conditions.

Hundreds, perhaps thousands, of different ideas have been conceived for making hunting bullets penetrate and/or expand properly, and dozens of these have found their way into commercial manufacture. Some have been so complicated as to become uneconomical, or at least non-competitive. Bullet cores have been wrapped in just about anything you could name from sheet steel to banknote paper, and then coated with an equally extensive list of exotic substances, from Teflon up to and (maybe) including horse manure.

Hunters were experimenting with game bullet designs and materials in the 1840's and they haven't slowed down even today.

The basic game bullet today is made up of an alloyed lead core in a gilding-metal (mostly copper with about 5 percent zinc) envelope. Expansion is controlled by various treatments of the jacket at the nose — hollow-pointing, thinning or scoring the jacket to provide fracture lines, nose shapes, etc. This bullet works reasonably well at modern velocities and is reasonably economical to produce.

There is endless discussion in this and other gun magazines, around the gunshop hot stoves, and in advertising material about the penetration and expansion characteristics of various manufacturers' versions of this basic bullet, as well as a lot of chit-chat about accuracy.

It seems to me, however, that there is one characteristic of game bullets which is largely overlooked, and that is the overall strength of the bullet. Strength, as I'm using the term, is a bit hard to define, but may be said to be the ability of the projectile to resist deformation by the forces of firing and impact, except to the degree that an expanding bullet is intended to deform. I concede that this definition leaves something to be desired, but I hope to clarify it below.

Bending and slugging are the two species of deformation which can give the most trouble. Bending is best illustrated by so-called "solid" or full-metal-jacketed bullets used against very large and dangerous game. When attempting the brain shot on an African elephant, for example, the hunter must drive his bullet through a great deal of bone. A bullet which bends upon impact may offer plenty of penetration, but is quite likely to veer enough to miss the relatively small target. In other words, it'll penetrate far enough, but not in a straight line.

The famous elephant hunter W.D.M. Bell was obsessed with bullets for his small-caliber rifles (mostly .256 Mannlicher-Schoenauer and 7x57mm Mauser) which would not bend, and he postulated that a .308 slug made of solid steel might make the then-new .308 WCF cartridge "the elephant hunter's dream"! This matter of bullet strength was that important to a man who slew 1,011 African elephants in his lifetime.

But you don't shoot many elephants,
you say, so what has bullet bending to do with your own hunting? More than we have previously thought, I suspect. When a soft-nose strikes a deer or an elk, its performance depends upon its progress through the target nose-first. If it tumbles, none of the carefully calculated devices for uniform expansion can function. And typical, pointed soft-points do tumble more often than most hunters may realize. I have several in my collection of recovered slugs which show this clearly, and I suspect that the tumbling was caused by the bullet’s bending upon initial impact. The result is usually a shearing off of the front of the slug, often at the cannelure or just in front of the partition in a Nosler. There is a marked loss of weight, reducing penetration, and quite likely a wild, unpredictable veering off-course.

I’ve observed the phenomenon most often in the smaller calibers, from .24 through .28, which would be expected if my theory that insufficient strength to resist bending, especially on angling shots, is the cause. Bullet length, obviously, must also have an effect, which means that the heavier bullets in a given caliber should be more subject to this type of deformation than the lighter ones. This, too, fits my experience.

Even in some types of varmint shooting, bullet strength may play a largely unsuspected role. Experimenters with super-high-velocity .22 caliber centerfires such as the .22-243 and .22-284 have occasionally reported markedly better success with handloaded bullets which could be expected to be relatively strong, such as the Nosler solid-based models.

Cast-bullet shooters have realized for decades that the strength of a lead-alloy, unjacketed bullet is a major factor perhaps the major factor — in obtaining good results. In general, the higher the velocity, the harder/stronger the bullet must be. On a different order of magnitude, why shouldn’t the same factor affect performance in jacketed bullets?

Is there a type of game bullet which supports my theory by resisting bending and slugging through sheer structural strength? Well, I have yet to recover a bullet from the body of a game animal which was of the so-called copper-tube construction which showed signs of bending, tumbling, or core extrusion to the rear. This type of bullet is an old one. Cores are usually pure or nearly pure lead, and jackets are made of thick copper tubing. The old Western Tool and Copper bullets were famous for reliability in all calibers. Among today’s custom bullet makers, as far as I know only Colorado Custom Bullets (formerly Barnes) and Bitterroot Bullets make hunting bullets along these lines...and I’ve shot quite a few from both makers of all sorts of game with nary a hint of bending or slugging, even on Cape buffalo.

At the same time, I’ve had even a “solid” with a thick steel jacket come out of a buffalo in roughly the shape of a banana. My collection also includes a steel-jacketed .505 Gibbs slug which was dug out of an elephant’s skull with the rear badly flattened and bent and part of the core extruded.

All of which means that I don’t have any super-secret techniques for overcoming the deformation problem in game bullets, but only some evidence that it may be a bigger problem than we have generally supposed. Unfortunately, the expansion of a softpoint commonly masks the evidence of bending so much that it may not be noticed unless the hunter is looking for it.

Still, it’s an interesting theory in the ongoing search for the perfect game bullet, and one that may someday be recognized as being as critical as expansion and penetration.

What you see here is a rifle that’ll rip through some of the heaviest cover in North America.

What you see here is the Marlin 1895. The rebirth of one of the most powerful sporting arms ever to rule the old west.

The big .45/70 cartridge breezes through thick brush with knockdown power that’s nothing short of phenomenal.

And because its 22” barrel is specially grooved to prevent bullet distortion, its accuracy is just as spectacular.

The 1895 comes with all kinds of high-quality standard features. Like a genuine American black walnut stock. Six machine heat-treated solid steel forgings. 4-shot tubular magazine. And solid top receiver, for low, centered scope mounting.

The Marlin 1895, starting at about $185.00. Also be sure to see our other big bore models, 1894 and 444. All are unexcelled for knockdown power, and provide the handloader with a variety of load options.

See them at leading gun shops everywhere. Ask your dealer for our free color catalog. Or write Marlin Firearms Co., North Haven, Conn. 06437.
Open Letter
to a ‘Gun Bug’ Husband

from KATHLEEN DEITER

Note: This may be a pseudonym

Hi there, Buddy.

Remember me...W.I.F.E?

[Sorry, all you other guys, but this is the only way I can get through to my husband. He’s a gun bug — one who eats, sleeps and lives for guns. Whenever he’s not building, buying or bartering guns, he has his nose buried in a gun magazine. Since I haven’t been able to talk to him for the last seven years, I figured this was my last resort.]

First of all, Honey, thought you’d like to know that the last one was another boy. That makes a set of three in case you’ve lost track. No, he’s not old enough yet to even pick up a gun, much less learn to shoot. But don’t worry about the way I’m raising him. I keep a guard on his trigger finger so it won’t get hurt. And you’ll be happy to hear that it looks like he’s going to have keen eyes for shooting, just like you.

Now, don’t get mad and cancel your subscription, because I’m not doing this to complain. There’s just a few other things on my mind. I promise not to take more than a few minutes away from guns, that third member of our little love triangle.

It’s just that some of the family has been asking me when you’ll be back from your hunting trip. I think they’re talking about the one in 1957 as it was right around then that you last saw any of the relatives. Guess they don’t understand about the different seasons in different states. I told them you’ve stopped by here many times to get a change of clothes. And that between seasons you’re busy keeping in shape with skeet shooting, pistol and rifle range, and those gunsmithing classes.

Speaking of gunsmithing, I want to tell you that last muzzleloader you made is an excellent piece of craftsmanship! I saw it in your workshop the other day and especially admired the stock. It’s hard to believe anyone could bore and shape such beauty out of a hunk of wood. Of course, it made me feel bad to think that I’d spent six days hand-sanding my desk because you never told me about buying those new tools. Is that what happened to the money we were saving for a new washing machine?

Thought I’d better warn you that your sons found the key to your gun cabinet, so you’d better change the lock.

I’m not nagging but it was rather upsetting to find them planning to make mud pies with your black powder. Just don’t want to lose any of them before they get a chance to meet their father.

Sorry I missed you the other night. Know you were here though, as I found the check stub for the $56.29 order for gun books you sent to the NRA. That’s okay with me if you’re not interested in having clean clothes. The washer’s not going to last much longer, you know.

Hey, remember the fun we had last fall between small game and deer season? Well, the consequence is due in July. Now that you know early enough, maybe you can plan on being around to take me to the hospital for a change. I hate to bother you but I think the ambulance squad is beginning to wonder. Last time, I heard one of them mutter that it was some kind of record to miss three births in a row.

Hey! The washer just made some grinding noises and fell over. I think it finally expired. Well, that’s it fell. You’ll be hearing from my lawyer in a few days. A gun bug can live with. But I never could stand dirty clothes.

Your loving,

Kathy
THE RESEARCH and development branch of rifle accuracy is competition bench rest shooting, which has been the testing ground of many of most-significant contributions during the past couple of decades. While most of the competition bench rest developments have been adaptable — and many have been adapted — to other forms of competition rifles as well as hunting rifles, some aren't compatible, such as ultra-wide fore-ends and ultra-light three-lever triggers. In the past few years, the most radical development in bench competition has been barrels and actions “glued” into the stock; these have given excellent results, but this method of bedding has not, so far as I know, spread into other accuracy sports.

The purpose of both systems is to eliminate bedding problems, and to improve grouping ability by permanently affixing the barreled action to the stock with a vibration-free, theoretically unchanging bond of epoxy. As any accuracy competitor knows, bedding will change due to the effects of humidity upon the stock, which can bend the surface of conventional epoxy bedding, or it can change due to excessive or uneven torquing of action screws. No one knows precisely why bedding that misses a perfect fit by a couple of thousandths of an inch will so seriously affect accuracy, but it will. About four or five years ago, rifles with barrels glued to the stock, and the actions “floating,” began showing up at NBRSA and IBS bench matches — and they won more than their share, due at least in part to the fact that they were being shot by extremely skilled competitors.

The most obvious disadvantage was that “barrel-bedded” guns had to be “unglued,” usually through the application of heat or cold; before they could be re-barreled (glued-in actions were developed primarily to allow simple barrel changing). A second disadvantage, removing the trigger for cleaning or repair, was solved by providing trigger pin access holes through the stock, and an enlarged trigger slot to allow it to be removed through the bottom of the stock. A major advantage, in theory at least, was that any flimsy action could be used, since it didn't have to be bedded to support itself, barrel and scope. While the Hot Stove League might argue forever about the merits of “glued-in jobs,” there is one thing unarguable — those rifles shoot; while they are still a minority on the competition circuit, they have won titles and set records completely out of proportion to their numbers.

The question was: Would a barrel-bedded rifle for a magnum caliber stay glued together? And would it provide the accuracy advantages for 1,000-yard bench or prone shooting that the system has shown for 100 to 200-yard bench competition?

The occasion for the venture was the availability of a cheap used Remington Model 721 action fitted with a Hart barrel in 7mm Remington Magnum. The 28-inch tube was 1 1/4-inch in diameter, and the twist was one turn in nine inches. I had planned to stiffen the action, and provide additional bedding surface, by installing a sleeve (another development of bench competitors which has been adopted successfully for other games). But then I began looking at a Sporter Class bench gun which had been barrel-bedded by Remington’s Jim Stekl, the originator, or at least one of the early practitioners, of the system. Jim had removed the recoil lug and excess wood around the action, then glued the barrel to the stock with a six-inch pad of epoxy just forward of the receiver. Would the same method work with the 1,000-yard gun?

A quick phone call to Jim brought plenty of information and lots of encouragement. Jim said that he had never tried this method with a magnum but the .308 Winchester offered no problems so he saw no reason why a magnum would not stay in the stock if the metal were adequately clean and the bedding compound mixed and applied.
properly. Jim had used Devcon for his work with good success but I felt that other materials might work as well. With that in mind several were tested; Bisonite was finally chosen primarily due to personal experience. Also, a letter from Bisonite indicated that more problems would be encountered in removing the barrel at a future date than would be anticipated by its shooting loose from recoil forces.

The usual procedure for removing a barrel-bedded barrel is to heat the barrel to about 350 to 400 degrees, at which time the epoxy bond will release and the barrel can be removed. The only time removal is necessary is when the barrel wears out or, if access through the stock is not provided, when the trigger fails. To install a new barrel, simply rough up the old bedding, clean the barrel and epoxy it back in place. This is simplicity at its finest and, to date, a rather successful method.

Wally Hart of R.W. Hart & Son, Nescopeck, Pa., provided an excellent heavy bench stock machine-inletted to my specifications, allowing clearance around both the barrel and action. All that had to be inletted was the rear of the action where the milling cutter didn't remove quite enough wood. It is better to stop a bit short than it is to have to try to add wood later. The stock was left unfinished for all of the work prior to the final bedding.

With all materials on hand the process began in earnest. The first job was to obtain shims or spacers to keep the barrel and action free, and equally spaced, above the stock wood. Chipboard was used for it was handy and about the desired thickness. The chipboard spacers were placed at each end of the action, at the forward end of the bedding area and at the fore-end tip.

After shimming, the trigger area was examined to be certain that it did not touch the stock. It was then discovered that the bolt stop would not function. Sufficient wood was removed from the stock to allow it to operate freely.

The area to be bedded was marked and the shims were given a coating of release agent to keep them from sticking to the bedding. It should be pointed out that I had planned to pre-bed this barrel by applying release agent to the barrel so it could be removed from the stock and the stock finished before the barrel was finally “glued in.” Had I planned on doing a one-step job, the approach would have varied in that all operations would have been final — with no release agents on the barrel. Since this was my first attempt, I wanted to take it slow and allow room to correct an error if it appeared. Fortunately it did not and a few steps could have been eliminated had the stock been finished prior to the bedding.

To keep things neat, a layer of masking tape was applied to the stock in all areas adjacent to the bedding. After the bedding became stiff, but not hard, the tape would allow the excess bedding to be removed neatly.

The bottom of the barrel was then coated with release agent so that the barrel could be removed for a check on progress when the bedding became hard. At this point the barrel had not been roughened in the bedding area.

Mixing the Bisonite according to instructions took little time and the solution was given about ten minutes to firm up a bit. Bisonite offers one distinct advantage in that the operator has about forty-five minutes of working time before the stuff becomes unworkable. It also has a thicker consistency — about like cold syrup — than a lot of other products, but it's “runnier” than paste-like Devcon.

Bisonite was poured into the bedding area, with the shims serving as dams. The barreled action was placed into the stock and held in position by a C-clamp placed above the center of the bedding area. When fastening the clamp, attention was directed to the trigger to see that it was centered in the trigger opening. This squaring up of the action assured the scope bases would be level. Once this check was made, the clamp was tightened enough to hold the barrel firmly against the spacers. When the bedding compound hardened to a leathery-like toughness, the excess along the sides of the barrel was trimmed with a knife and the tape on the stock removed.

The next morning the barreled action was removed from the stock and the work inspected. The shims were removed, the stock was finished and a trigger guard was made from aluminum. The final gluing-in was to come shortly.

Prior to the final bedding the stock was taped to protect the finish and new shims were inserted at the forward end of the stock and at the rear of the action. These new shims were thicker than the originals by one strip of masking tape. This was to allow for a thin coat of bedding between the old bedding and the barrel so a better bond might result.

Attention was then given to the barrel bedding area. It was taped at each end and at each side of the bedding surface so that only a 180-degree area, six inches long would be exposed for roughing prior to final bedding. A file was used to make cross-channel marks and 50 grit paper was used to further rough-up the steel. This same grit paper was then used to rough-up the Bisonite in the stock. Making sure the release agent was completely removed was important.

With all preparations made for the

Prior to bedding, the area around the action must be relieved to prevent touching, and allow all parts to function, fully. The Hart stock was machine-inletted to allow clearance around the 1 1/4-inch barrel and the 721 action in anticipation of barrel bedding, center. Shims to support the barreled action and confine the Bisonite were taped in place and coated with release agent prior to the preliminary bedding.

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Bisonite is poured into the area to be bedded; the shims also act as dams to contain the liquid Bisonite. A coat of Bisonite was also applied to the underside of the barrel.

The stock was taped to prevent Bisonite adhering to the surrounding wood. The barrel and action support shims are shown in place.

bedding, with the exception of final cleaning, the Bisonite was mixed and allowed to stand and become a bit more firm. During this waiting time the barrel and bedding were cleaned. Carbon tetrachloride was used although Trichloroethylene would have done a bit better job according to several sources, but I was unable to locate any in my area.

The Bisonite was applied to the stock bedding area. The barrel was wiped clean several times, just to be safe, and a small amount of Bisonite was wiped over the barrel area with a Q-tip. Some contend that a thin film of oxidation forms over steel in a few minutes, which might be detrimental to a good bond, so I cleaned and coated within a matter of a minute or so.

The barreled action then was lowered into the bedding area. A check was made to see if the trigger was located on center and just enough pressure was applied with the clamp to hold the parts together. Avoid excess pressure for it is possible to induce stress into this type of bedding. Remember that this is a bedding process which can be done improperly just as easily as any other bedding method. As soon as the bedding compound became firm, the excess was removed with a razor blade. I found that a light wipe with white gas smoothed the rough edges of the Bisonite yet had no effect on it. Lacquer thinner and similar solvents will dissolve the bedding material and should be avoided. The clamp was left in place overnight. The next morning there was a finished "barrel bedded" rifle on the bench with no screws to tighten and, hopefully, no tensions to worry about.

Any process must be judged by the success of the finished project, but the judgment day for this rifle had to wait for a week as the bolt handle had to be lengthened. While Wally Hart did this job I paced the floor in anticipation of the big day.

When that day arrived I loaded cases with 65 grains of IMR-4831 behind the Hornady 162-grain rebated boattail bullets and CCI BR-2 primers. The cases were Winchester. A box of cases with the same combination except for 64.5 grains of Norma-205 was also prepared.

Would it hold together? Some shooters using this type of bedding system place a non-bearing screw into either the guard screw or tang holes. This screw, which doesn't touch the stock, merely acts as a safety to hold the action to the stock in case the bond breaks loose. I didn't install the safety screw since I had confidence that if the rifle held for the first few shots there should be no problem. However, since this was a first-time thing for me the rifle was tested for togetherness by securely wrapping the barrel to the stock with furniture rubber bands. The scope was removed as a further precaution. I had no doubts as to the outcome but was taking no chances. A dozen shots later convinced me that all was well and the bands came off. Many additional shots have failed to break the bond.

Accuracy of the rifle at 100 yards is better than it is with either of my other 1,000-yard rifles. The first three groups at 100 yards printed in the .400-inch range which is almost bench rest accuracy. The 65 grains of IMR-4831 load showed a slight edge in grouping ability.

Release agent was applied to the barrel for the preliminary bedding. The shims were then removed and the barrel cleaned and roughed for the final bedding.
After the preliminary bedding hardens, it is roughened with 50-grit paper. The surface is then cleaned with carbon tetrachloride or trichlorethylene prior to final bedding.

The next step was to check the rifle at 1,000 yards. The first job was to zero the rifle after the 100-yard readings were recorded. Usually 120 clicks of elevation on a Redfield 3200 scope will achieve the proper elevation. Today was different for the rear base was too low. Fortunately the impact was close enough to the target that a group could be located on paper by holding on a clump of brown earth peeking through the snow about five feet above the target center. It was with this aiming point that the initial testing was finished.

Starting with Winchester cases which had been once fired and neck turned, Federal 215 Magnum primers, Hornady 162-grain rebated-boattail bullets and 66 grains of IMR-4831, a ten-shot group was fired which measured 10.250 inches. The rifle was cleaned and allowed to cool while the target was pasted and prepared for the next group.

A second loading of new Winchester cases, Federal 215 primers, the same bullet as before and 64.5 grains of Norma-205 was tried. The conditions were getting worse with a wind blowing over the hill from the 1 o'clock position. This tends to push the impact down on the target. Care was taken to shoot when the flag appeared to be in the same position but this did not prove to indicate identical conditions as the target revealed two groups. One, a six-shot beauty which measured 7.937, revealed only 3.5-inch of vertical dispersion while the other, a few inches lower, measured 7.125 for four shots. The 10-shot group ran 15.625 which is respectable for many rifles in much better conditions at 1,000 yards. This load is so lacking in vertical problems that it will be tried again in better times.

A box of new cases with 65 grains of IMR-4831 was also fired in zeroing the rifle and plinking at various clumps of brown in the snow-covered backstop to gain a feel of the rifle. Though not fired on paper, the impact on the bank appeared to indicate that this load should be checked further.

Since that first trial the barrel-bedded rifle has performed well, considering the blustery conditions that prevailed, but it's too early to know whether this bedding system is an improvement over conventional methods. However, it's clear that if a rifle is assembled properly, the six-inch pad of epoxy is more than ample to hold things together at 7 magnum recoil levels. Tugging on the barrel shows no sign of separation. With heavier-recoiling guns, a non-bearing safety screw in the action might be advisable, but the strength of a proper bond is well above the recoil force of normal rifles.

In theory, the heavier-recoiling rifles used in 1,000-yard competition should benefit more from a vibration-free, "permanently" wedged barreled action and stock than the light-recoiling guns used in standard bench competition. I'm hoping that the theory will prove correct in this rifle. But from the results to date it appears that barrel-bedding has a lot to offer the shooter who hangs a long, heavy barrel on a relatively thin action, tries to hold it in a creepy stock with a pair of 1/4x28 screws, and expects miracles.

C. Reed Moon

This 7mm Remington Magnum, which weighs about 30 pounds, is the first known barrel-bedded magnum-caliber rifle. It wears a 16X Redfield 3200 scope.