The Cast Bullet Articles Of

Glen E. Fryxell

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High Capacity Hollow Point Bullet Moulds

(Inset bar conversion HP Molds by Erik Ohlen)

By: Glen E. Fryxell

One of the drawbacks to cast hollow points (HPs) is that they traditionally have come from single-cavity moulds and the production rate is kind of slow. That's never really bothered me as I just use the corresponding solids (from multi-cavity moulds) for practice, and save the HPs for when I'm hunting. This situation was improved upon by the Cramer style HP moulds, which are compatible with multi-cavity HP moulds and increase production rate significantly over the traditional single-cavity HP moulds. We are lucky in that there are now multiple places we can turn to now to get Cramer-style HP moulds (Erik Ohlen at http://www.hollowpointmold.com/, and Miha Prevac at http://www.mp-molds.com/).

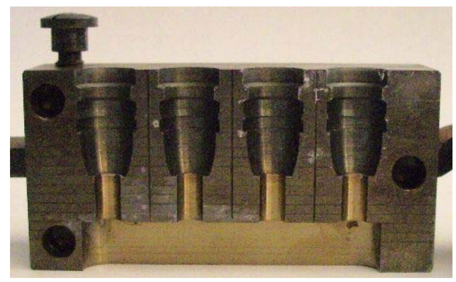
Now we have another option, and one that I have grown to like very much, the "inset bar HP conversion" option offered by Erik Ohlen over at Hollow Point Bullet Mold Service (email Erik, erik@hollowpointmold.com, or (541) 738-2479).

In this conversion, Erik mills out the bottom of the mould to accept a piece of bar stock that has all of the HP pins imbedded in it -- very compact and highly compatible with multi-cavity moulds. The bar stock is then mounted onto two transverse pins (much like the individual HP pins of the Cramer style HP moulds), which then pass through one of the mould blocks. Overall, this design is a very rugged one and I expect it will stand up to many years, no, *generations* of casting. This is a really well thought-out design, and solidly executed.

Erik calls this the "inset bar conversion", and while that description is accurate, it's kind of a mouthful and I just think of it as the "Ohlen HP" mould design. I sent Erik a Lyman 4-cavity 429421 mould, one of the older style with the "square-cut" grease grooves and the full size forward driving band, and asked him for a 4-cavity HP conversion, with .150" cavities, 7 degree taper, rounded tips, penetrating down to the crimp groove (similar to the original). A little while later the mould arrived in the mail, modified just as I had requested. In a word, Erik's machine work is excellent. The HP pins are perfectly centered in the mould cavities and the inset bar slides in and out of the mould block easily and freely. The HP pins are polished smooth so the bullets can drop free from their own weight. The mould blocks close easily and tightly (i.e. no gaps between the mould blocks). A subtle design feature is that the milled out portion of the base of the mould is ever so slightly bigger than the inset bar, leaving a gap of about .003" or .004" between the long edges of the inset block and mould blocks. This is an important feature, and provides positive clearance between the inset block too make sure the mould closes all the way, and also allows air to vent out the bottom of the mould during filling. This is a very good feature on a HP mould as it helps to increase bullet quality and lower reject rate by minimizing voids in and around the HP cavity due to trapped air pockets.

For the first casting session with the 4-cavity 429421 Ohlen HP, I fired up the lead pot with about 6 lbs of range scrap and then lubed the transverse pins with Dry-Slide and set the mould on the back edge of the lead pot to pre-heat. After everything was warmed up I started casting, and not surprisingly, the first several casts were highly wrinkled rejects due to the vapors coming off from the cutting fluids/oils from the machine work burning out of the metal's pores. After everything got burned out and the mould started producing "keepers", I recycled the rejects and the sprue's and started casting in earnest. I was recycling my sprue's as I went along, and 17 minutes later, the lead pot ran dry. That's 6 lbs of HPs in 17 minutes! For bullets that weigh 240 grains each, that amounts to about 175 bullets in 17 minutes, or about 10 HPs a minute (later on I would sort and count the bullets to find 154 keepers and 15 rejects)! Try THAT with a traditional single-cavity HP mould!

The 429421 HP needs no introduction, having served sixgunners since the early 1930' it is the HP version of the Keith SWC, and it is an outstanding hunting bullet for deer-sized game. These bullets were cast with recovered range scrap with a little added tin, and had a measured BHN of ~8.5, specifically for use in the .44 Special at 1000-1200 fps. These bullets dropped from the blocks at 242 grains, and were .432" in diameter. They will be sized .430" and loaded up in .44 Special cases over 10.0 grains of HS-6 (1000 fps) or 17.5 grains of 2400 (1200 fps) -- two of my favorite hunting loads, the first for vermin, and the second for deer and hogs.



The next day a second casting session was carried out with 10 lbs of range scrap. It took exactly 30 minutes from the first pour to the last dribble from the lead pot to produce almost 300 Keith HPs, once again at a rate of almost 10 HPs a minute!

A similar casting session with 6 lbs of range scrap and 2 lbs of linotype (a blend that has a measured BHN of 12, formulated for the .44 Magnum). 21 minutes later the lead pot was empty. The bullets came out weighing 239 grains and were .432" in diameter. 8 lbs of 239 grain bullets in 21 minutes comes to just over 11 HPs a minute. My Ruger Flat-Top .44 Mag is going to be well fed with these cast HPs loaded to 1400+ fps.

Test loads were assembled next. For the softer bullets, I sized them .430", and lubed them with my home-made Moly lube. These bullets were loaded over 10.0 grains of HS-6, sparked with a CCI 300 primer, in .44 Special cases. The test gun in this case was a 7 ½" Ruger Old Model Blackhawk that I converted to .44 Special a number of years ago. Accuracy was good and velocities averaged 1022 fps. There was zero leading.

The harder bullets were also sized .430" and lubed with Moly lube. In this case, they were loaded into .44 Magnum cases over 23.5 grains of H110, with CCI 350 primers. This time, the test gun was an old Ruger Flat-Top .44 Magnum (circa 1960) that I picked up earlier this spring. Earlier tests with this gun revealed that even with the rear sight bottomed out, any bullets heavier than 240 grains would still shoot well above point of aim. The 429421 HP (weighing 235-240 grains, depending on alloy) is one of the few bullets I've tried in this gun that will shoot to point of aim. These test loads (along with most of the previous testing with this gun), revealed mediocre accuracy (2 ½ to 3" at 25 yards).Velocity of the test loads averaged an impressive 1466 fps. These results spurred me to sit down and take some measurements, and learn more about this particular sixgun. It turns out the throats on this revolver run .432", or just a tad over. By sizing the bullets .430", I was making them .002" undersized for the throats on this particular gun, which is not usually a good recipe for success.

So, I chose to split the difference and size a batch .431" -- .001" over nominal groove diameter of the barrel, and .001" under the throat diameter. This is an approach that I have used with recalcitrant revolvers in the past and had good success with. So I took a batch and sized them .431", and lubed them with my home-made Moly lube. I reduced the powder charge to 23.0 grains of H110 since the first load had more velocity than I needed. On a beautiful, sunny day up in the mountains, I test-fired them to find that group size shrank by almost half, and velocities averaged 1405 fps. Just what I was looking for! This mould produces excellent bullets, and when they fit the revolver properly, they shoot very well indeed.

This 4-cavity mould conversion may be a little spendy for the individual bullet caster who is just casting for their own consumption (unless, of course, you really like cast HPs like I do, in which case it's money well-spent), but this type of mould legitimately makes commercial production of cast HPs a viable proposition. With two bottom-pour lead pots (one melting while the other is casting), a continuous production rate of ~600 cast HPs an hour is realistic. For the home-caster, this is serious production; for the commercial bullet caster, this capability offers the first real opportunity to offer cast HPs as a commercial product.

Bottom-line -- the Ohlen 4-cavity HP mould rocks!

- Glen E. Fryxell

A New Source for Hollow Point Bullet Moulds

By: Glen E. Fryxell

We handgun hunters have it really, really good these days. Not only do we have more choices in terms of guns available today, and more cartridges tailored for handgun hunting, but also the excellent selection of commercially available bullets out there, more than ever tailored for the handgun hunter. More commercial cast bullets are out there for those who want to shoot cast bullets, but don't cast their own. All of these commercial cast bullets are solids designed for deep penetration, nobody is marketing commercial cast hollow point (HP) bullets that I am aware of.

For the handgun hunter who does cast their own bullets, there is an excellent selection of mould designs available from Lyman, RCBS, Lee, Rapine, NEI, LBT, Cast Performance, Hoch, and more. These mould-makers have a multitude of styles that can cater to virtually any application, need or personal taste.

If, however, you can't scratch your particular itch with the offerings from those mould-makers, and you want/need to design your own mould, you can go to Mountain Molds website and play with Dan's online spreadsheet design tool, and chances are you'll be able to use his tools to draw up something that will tickle your fancy (as long as it's not a HP mould, Dan doesn't do HP moulds).

If you're specifically looking for a HP mould, then you can either shop around at gun shows and try to find what you're looking for (good luck!), or shop the online auction houses, where HP moulds tend to command premium prices lately. A faster (and commonly less expensive) way is to buy the standard mould and then have it converted to drop HP bullets. Several machinists offer this service. One that I have had very good experience with has been Erik Ohlen over at Hollow Point Bullet Mold Service or email erik@hollowpointmold.com, (541) 738-2479). If you can find the base mould to work from, Erik can probably make what you want (within reason). Erik offers not only the traditional HP pin design (i.e. a single cavity mould with a removable HP pin), but also the much faster casting Cramer-style multi-cavity HP design. My experience has been that I can generally cast 5 or 6 HPs a minute with a Cramer-style 2-cavity mould. I really like this mould design.

But is anybody making HP moulds from scratch? Very few people that I am aware of. In fact, I know of only two. One is Bruce Brandt at BRP LLC, or email babrandt@sbcglobal.net, (616) 667-2427). Bruce has a 4-page list of bullet designs he makes, and most of these are available in HP form. Bruce made me a single cavity 358627 HP mould for my Ruger .357 Maximum, that I really like.

The other person currently making HP moulds from the ground up will be the focus of the rest of this article for the simple reason that the mould he sent me is, quite simply, the most beautiful mould I have ever had the pleasure of casting with.

I have never met Miha Prevec (MP Molds) in person. The fact that he lives in Slovenia, and I live in the Pacific Northwest of the US probably has something to do with that. I originally became aware of him, and his work, through the "Cast Boolits" online discussion board (just for the record, I generally don't care for the affectation of intentional "cutsie-pie" misspellings -- I don't dot my i's with little hearts or flowers, and I don't replace syllables with numbers -- but in this case I tolerate it for two simple reasons, 1) it helps to identify a unique place online, and 2) there is a large and very knowledgeable community gathered there, and the knowledge is worth putting up with a little "cutsie-pie" crap). Miha is a machinist, and one of the participants on the CB discussion board. He started making a few moulds for people, and his customers started posting a few comments on the quality of his work. He followed that up by doing Group Buys for the guys on the CB board, especially of Cramer-style HP moulds. The reviews that came back were invariably glowing. And on top of this, Miha makes his moulds out of brass! (I have a fondness for brass for three reasons -- 1) it tends to machine very smoothly, so the surface is smooth and tends to release the bullets very easily, 2) it heats up readily and holds its heat very well, leading to a high fraction of "keepers", and 3) brass moulds are just plain beautiful!).

Perusing Miha's website, I found that he offered a Cramer-style HP mould for a copy of the design that Dave Scovill drew up for the .45 Colt -- the RCBS 45-270-SAA. I've worked with the Scovill bullet a fair amount over the years, in a number of different guns, and I have developed a great deal of respect for the design. I have said a number of times (and in print) that I feel that this is one of the best all-round designs *ever* for the .45 Colt. I still feel that way. My fondness for cast HPs is no secret, nor is my fondness for the .45 Colt. Miha's 45-270-SAA HP intrigued me, and the more I thought about it, the more I thought that this would make an excellent hunting bullet for deer, hogs and black bear sized game. Miha's prices were very reasonable, and the reviews I had read of his work were very good, so I placed an order.

A little while later, a box showed up in my mailbox with a Slovenia return address. Like a little kid on Christmas morning, I gleefully opened the box and out came a pretty shiny brass mould. As I inspected it closely, it became apparent to me that this mould was made with real attention to detail. Things that should be tight were tight; things that should be hard were hard; things that should be smooth were smooth; things that should move freely moved freely; things that shouldn't move didn't move. In short, everything about this mould was *right*.

But how did it cast? This mould didn't fit on my handles from Lyman or RCBS, but it snugged up very nicely on Saeco handles. I started off with about 6 lbs of 25-to-1 (lead to tin) alloy (6 lbs of pure lead and half a pound of 50/50 alloy). This is a fairly soft alloy (BHN of about 7.5) that is very well suited for moderate velocity cast HP loads (generally about 950-1200 fps). These bullets dropped from the blocks right at 280 grains and miked .454". All the .45 Colt revolvers that I currently own take bullets sized .452", but having these bullets drop .454" pleased me since if I ever need .454" bullets I can generate them with this mould. In any event, I sized them .452" and lubed them with my homemade Moly lube, and loaded them over 18.5 grains of 2400 with a CCI 300 Large Pistol Primer. This is a variation on Elmer Keith's load for the .45 Colt, and probably generates somewhere around 25,000 psi peak pressure and should not be used in older, weaker guns, but it's a dandy in strong modern guns like the large frame Ruger Blackhawk. The test gun was a 7 ½" Ruger Super Blackhawk that I converted to .45 Colt several years ago, with a proven track record for accuracy (.480" chambers, .452" throats, and .4515" groove diameter). This load generated 1235 fps, and (as usual) delivered good accuracy, with zero leading.

Back when I was working up loads with the 284 grain Scovill bullet (the RCBS 45-270-SAA SWC), the best load I found in my guns was 13.0 grains of HS-6, which gave 1050-1150 fps, depending on barrel length, and excellent accuracy. According to the pressure data in the Hodgdon manual, this load generates roughly 22,000 CUP (again, not suitable for older, or weaker sixguns). So, naturally, I tried that load with the 280 grain (25-1 alloy) Miha Prevec HP. Once again, I got very good accuracy and velocities averaged 1162 fps. I like HS-6, it is a very useful revolver powder.

For many years, my "go to" load for .45 Colt SWC's in the 250-280 grain range was 14.0 grains of HS-7. Sadly, HS-7 is no longer available, so I needed something to replace this load. I have had very good results using 13.0 grains of Accurate Arms #7 underneath 300 grain cast bullets in the .45 Colt, so I decided to try this powder out with Miha's HP. 14.0 grains of Acc. Arms #7 delivered very good accuracy, no leading and 1102 fps. According to the pressure data in the Accurate Arms loading manual, this combination should generate roughly 19,000 CUP. This would make an excellent hunting load.

OK, so now that I knew that Miha's HP shot accurately in the 1100-1200 fps range, I wanted to find out how this bullet expanded. I prepared a bed of water-soaked newsprint and shot 5 of these bullets into it point-blank at ~1150 fps. This expansion testing revealed an average of 9-10" of penetration in the wet newsprint (suggesting about 18-20" in ballistic gelatin) and positive expansion. The expansion indicated that this impact velocity is right at the upper limit for this bullet cast with this alloy. All bullets expanded extremely well, some mushrooming up to .87" diameter and weighing 250-260 grains, and some went beyond this, losing "petals" off of the expanded mushroom late in the wound channel. I expect that part of the problem was that I was shooting them point blank into the wet newsprint, and that if this had been a mulie buck at 50 yards that mushrooming would be near perfect.

Even so, I wanted to try some that were a little bit harder so I loaded up the lead pot with 10 lbs range scrap, and started casting. 45 minutes later the pot ran dry. That amounts to a little over 250 cast HPs in 45 minutes, or almost 6 HPs a minute! Try THAT with a traditional single cavity HP mould! These bullets weighed about 275 grains and had a BHN of about 9 -- just what I was looking for. Sizing them .452” and lubing them with my home-made Moly lube, I once again loaded them over 13.0 grains of HS-6 with a CCI 300 primer. Accuracy once again was very good and velocities averaged 1154 fps. Expansion was just what I was looking for. This would make an excellent hunting load for animals up to about 400 lbs in size.

This mould is a joy to cast with, and is beautifully made. Production rate with this mould is excellent. It is an accurate bullet that both shoots and expands well. Handgun hunters truly do have things better than ever right now. And even better news is on the horizon! Miha says on his website that he intends to start making some 3 and 4 cavity Cramer-style HP moulds as well!

- Glen E. Fryxell

Web Master note: In the article Glen made the following statement, to realize what a powerful statement this is consider that it came from a man that owns over 450 molds . . .

The mould he sent me is, quite simply, the most beautiful mould I have ever had the pleasure of casting with!

- Glen E. Fryxell

Expansion Properties of Cast Hollow Points

By: Glen E. Fryxell

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If a little is good, more is not necessarily better. The Golden Age of Cast Hollow Points was arguably in the 1890s, when they were embraced by the hunting community and established themselves as killers of the first order. The world of ballistics was a rapidly changing pace at that time, and jacketed bullets and ever-higher velocities eventually took over. The end result was that while the attributes of the cast HP were appreciated by a few seasoned hunter-casters, most of the hunting community moved on to whatever the latest whiz-bang that was being promoted by the manufacturers. While that's perfectly understandable, it is also a pity because cast HP's can be some of the best hunting bullets out there, and they offer the additional advantages of being very affordable and easily made. What's more, once you have the mould you never need to worry about a manufacturer dropping (or changing) your favorite bullet design, and they offer the satisfaction of making your own premium hunting bullets, to your own specifications, with your own two hands. To gain these advantages, one simply needs to understand the cast HP. Let's go back to when it all got started and see what these bullets have to offer...

In the 4th Edition of the Ideal Handbook (published in 1890) there was a short section dedicated to "Express bullets" highlighting the .45 caliber 330 grain Gould bullet (which would later be known as the Ideal 456122 when they started assigning cherry numbers in 1897). This bullet was designed by John Barlow (founder of Ideal) for A. C. Gould (editor of *Shooting and Fishing* magazine), an avid bullet caster and hunter (also shown was a picture of the .50 Express bullet, although no details were given). The Express Moulds cost $2.50, and came with polished cocobolo handles (all single cavity Ideal moulds had integral handles at this point). The excellent killing properties of the Gould bullet were spelled out in vivid detail. Thus was the beginning of the Golden Age....

By 1897 the following HP moulds were cataloged by Ideal in the 9th Edition of their Handbook (I have included some of the original ad copy to give some insight as to how Ideal thought of each of these bullets):

- 22638 -- a 60 grain PB-HP for the .22-15-60 Stevens rifle, "It is astonishing how much more deadly this bullet is with a hollow point." (other weights also available)
- 25727 - a nominal 75 grain (other weights also available) HP for the .25-20 and .25-35 Winchester.
- 31133 -- a 100 grain HP for the .32-20 Winchester, "They increase the killing powers of .32-20 rifles greatly."
- 31945 -- a 150 grain HP for the .32-40, "They increase the killing power of the rifle greatly for deer, bear, etc."
- 31953 -- designed by Col. Pickett ("the well-known grizzly bear killer"), a 205 grain paper-patched HP for the .32-40.

- 37577 -- a 235 grain HP for the .38-55, "The .38-55 rifle with express bullets are sure killers of deer and elk."
- 40090 -- a 165 grain HP for the .38-40 Winchester, "Those who have .38-40 rifles can increase their killing power by 50% by using express bullets."
- 40393 -- about 330 grain HP for the .40-65, .40-70 and .40-82 Winchesters, "Every person owning one of these rifles should have an express mould as they greatly increase the killing power for larger game."
- 42499 -- 195 grain HP for the .44-40 "Hunters will find that the killing qualities of their .44-40 rifles are increased 50% by use of this bullet."
- 446110 -- a 315 grain HP for the .44-77, .44-90 or .44-100 Sharp's cartridges.
- 45115 -- a 325 grain paper-patched HP designed by Col. Pickett.
- 45117 -- a 335 grain HP designed for the .45-70 (this bullet sounds seriously undersized for use in a .45-70 to me...)
- 456122 -- the Gould bullet, designed by John Barlow for A. C. Gould, the editor of *Shooting and Fishing*; a 330 grain HP for the .45-70, "It has a great reputation as a killer of large game."
- 512139 -- a 300 grain HP with a gaping cavity "This is the standard .50 Winchester Express bullet."

Note that John Barlow designed these bullets for rifle cartridges, specifically *black powder rifle cartridges*, and therein lies the secret to the soul of the cast HP. Generally speaking, these cartridges were loaded with BP to muzzle velocities of 1100-1600 fps (most commonly in the range of 1200-1400 fps), and this is why the cast HP’s worked so well and were so well received by the hunters of the day (men like Col. Pickett and A. C. Gould) -- the guns that they were initially developed for did not over-stress them. Thus, the cast HP delivered excellent expansion and deadly performance on deer, black bear and elk.

This is also why cast HP’s are such a good fit for the handgun hunter -- many handguns also operate in the velocity regime of 1100-1600 fps, especially around 1200-1400 fps. Modern handgun hunters can learn much from the old black powder rifle hunters because of this common ground.

Elmer Keith used some of these early HP’s in some of his revolver loads and he recognized early on the value of cast HP’s in sixguns. Shortly after he designed his landmark SWC bullets in 1928-1931 (the 429421, 452423, 454424, and 358429), he came back and had Ideal make HP versions of these same bullets. These SWC’s and HP’s were his favorite hunting bullets for the next 50 years. Phil Sharpe did much the same thing in the mid-1930s with the bullets he used in the development of the .357 Magnum (the H&G #51, aka the 160 grain Sharpe solid and 146 grain Sharpe HP). It is worth noting that Elmer typically loaded his cast HP loads initially between 1100-1200 fps, and then later with the introduction of the .44 Magnum at 1400 fps, and he reported excellent expansion on game animals like mule deer and elk. Sharpe loaded his HP’s to 1500-1600 fps in the .357 Magnum, where they expanded violently and delivered devastating blows to bobcat-sized game.

Do you notice a trend here? First with the black powder riflemen, and then later with the sixgun experiments of Elmer Keith and Phil Sharpe, we find knowledgeable hunters using cast HP’s at 1100-1600 fps (mostly 1200-1400 fps) and obtaining outstanding hunting performance … hold that thought.

Generally speaking, the early casters were working with binary lead-tin alloys, typically something around 20 part lead to 1 part tin (Elmer Keith's favorite was 16-1). These alloys have a Brinell Hardness number (BHN) of around 9-10, and are very malleable (meaning they expand smoothly and don't tend to fragment). The performance of 1-20 Keith HP's at around 1200 fps has to be seen to be believed -- recovered bullets are typically the most perfect little leaden mushrooms you've ever seen, and with very little weight loss. Black powder shooters sometimes used 30-1 alloy to cast their HP’s for lower velocity BP loads (e.g. 1100 fps).

Alloys used by bullet casters today (for example, wheel-weight alloy) commonly have antimony in them. Does this cause problems? Well, antimony is far more efficient at hardening a lead alloy than is tin, so only a little bit is needed. While lead-tin alloys tend to be very malleable, lead-antimony alloys tend to be more brittle, meaning they fragment more readily. Three component lead-tin-antimony alloys (like WW alloy and linotype) are intermediate between these two binary alloys. The bottom line is if you're using one of these tertiary alloys, blended to a suitable hardness for HP applications (i.e. BHN of somewhere in the range of 8-14, depending on velocity), then you'll most likely get good performance out of your HP’s. In my experience, WW alloy (BHN about 12) works just fine for cast HP’s at magnum revolver velocities (ca. 1400 fps), and WW cut with a equal portion of lead (BHN about 9) works very well for cast HP’s at 1000-1200 fps.

For example, several years ago I shot a large mule deer doe over on the Snake River outside of Pullman, Washington using a .41 Magnum revolver (S&W 657 Classic Hunter) loaded with the Lyman 410459 HP at about 1400 fps. It was a 50-60 yard shot, with her quartering slightly away from me. The cast HP entered behind the left shoulder, about halfway up, and exited low in the point of the right shoulder. There was extensive lung damage, and the heart was center-punched. She ran less than 20 yards and piled up. The exit wound was about the size of a quarter. She came to rest facing downhill and was essentially bled out when I got down to her. The cast HP (BHN about 12) at 1400 fps had expanded beautifully, and punched right on through.

Another mulie doe I shot in that same canyon the year before fell to a cast HP in a .44 Magnum revolver. This time I was using the Devastator HP that Lyman still offers (the 429640 HP). This bullet weighs about 268 grains when it drops from my mould cast with WW alloy. I was shooting it at about 1350 fps from my 6" S&W 629 Classic Hunter. This deer fell to a neck-shot, and the cast HP expanded well and took out significant chunk of spine and exited (she collapsed on the spot, obviously).

A friend of mine reported that he shot an adult cow buffalo with the Lyman .44 Devastator HP and got complete penetration on a broadside ribcage shot. In this case the bullet was launched at about 1200 fps from a short-barreled Ruger SBH, at fairly close range. Damage to the lungs was extensive and the buffalo went down very quickly (after about 20 feet, as I recall). What I find remarkable about this report is the fact that it exited from an animal of this size.

Another example of how cast HP’s at moderate velocity can provide both controlled

expansion *and* deep penetration is found in a 700 pound boar that I "collaborated" on. A friend of mine had wounded a huge old boar, but was having difficulty following-up due to some very thick brush. I came in above the brush and shot twice with a .44 Special loaded with the 429251 HP at 1200 fps (the HP version of the classic RN design; these bullets were cast to a BHN about 8). Both shots were broadside, in the ribs, at point blank range. The boar went down seconds later. One shot exited and the other was found under the hide on the far side. Based on the wound channels, both bullets had expanded beautifully. The recovered bullet was approximately 60 caliber and weighed 194 grains (it started out at about 240 grains). John Taffin had a very similar experience with his Texas Longhorn Arms .44 Special on a couple of big ol' hogs using some 429421 HP’s that I cast up for him out of 20-1 alloy. For the details, I suggest you read about it in his excellent book "Single-Action Sixguns".

OK, so we've seen that cast HP's provide good expansion and penetration at typical revolver velocities, but much higher velocities are possible out of the various single-shot handguns (like the Contender), how do cast HP's behave at higher velocities? Remember the cast HP started off as a rifle bullet, launched at BP velocities. Years of hunting experience back in the early days have already shown that they can work very well indeed at 1600 fps. It's just part of human nature to try for "more, better, faster", and more is always better, right? Not so fast, my friend...

Cast HP’s certainly *can* be launched at faster speeds, and with very good accuracy. I have gotten some excellent groups with certain cast HP’s at speeds well in excess of 2100 fps, but would these make good hunting loads? I wanted to learn more about how cast HP’s behave at these velocities so I would have a better idea about the best way to structure my hunting loads. So I did a little testing (actually, a *lot* of testing...).

My standard test for bullet expansion is to fill a 2L pop bottle with water and lay it on its side so I can shoot through it lengthwise. I back this with a tightly bound "bale" of newspapers (about 6-8" thick) that are leaning against the cap of the 2L pop bottle such that the bullet will cause the bale to fall away on impact. I bind up the bale with duct tape, and arrange things such that the bullet will have to pass through the duct tape upon entering the bale. This allows me to see what size the bullet was after expanding in the water bath, but before it breaks apart in the newspaper (dry newsprint is very hard on a bullet). Now some people say that using water to test bullet expansion is not a valid test method because water is "hard" on a bullet. The reason they say this is because water is an incompressible fluid, and if you shoot into a large body of water (like a lake or a swimming pool) there is nowhere for the water to go as the bullet passes through, so the bullet experiences greater resistance and may expand more under those conditions than if it were passing through, say, a whitetail buck. This is all well and good. However, shooting through a 6" cylinder of water held together with a thin, stretchy layer of polyethylene means that the water can, and does, get pushed out of the bullet's way. While the water itself is no more compressible under these conditions than it is in the swimming pool, it provides far less resistance to the bullet's passing due to the fact that it gets pushed aside. The bottom line is this test has proven to be a reliable (and reproducible) method for evaluating bullet expansion, and I've learned a lot about cast HP's using this test.

For example, recently I've been playing around with a HP version of the 358315, the 200 grain GC-RN made for the .35 Remington. I did a little lathe work to convert the mould to drop HP bullets, and in the process gave it a .200" flat meplat, ideal for tubular magazines. I played around with various HP cavity configurations, and ultimately settled on a cavity that was .085" diameter, and about .375" deep (with a 5 degree taper). The 358315 HP has proven to be a very accurate bullet. Performing the expansion tests described above and varying the muzzle velocity from 1500 fps to 2100 fps revealed a great deal (generally these bullets have been cast to a BHN of 13, a little harder than average WW alloy). At 1500-1600, this bullet expanded smoothly. At 1800 fps it expanded very nicely, but started to show some hints that it might be on the verge of fragmenting. At 2000-2100 fps, the 358315 HP fragmented violently, peppering the duct tape with dozens of bullet fragments. It is interesting to note that even when it fragmented violently the recovered bullet bases still retained about 100 grains of bullet metal. Based on these tests, I am inclined to work up hunting loads with this bullet in the 1600-1800 fps range.

Loaded .38 Special round with a 358477 HP cast to a BHN of about 8, and a recovered bullet after being fired into water at about 1000 fps

But do these test results jive with those on living, breathing, flesh and blood? Well, for the 358315 HP I can't say for sure because I haven't shot anything with that bullet yet (that should change this winter). However, for the other cast HP's that I've used on game, yes those trends do seem to hold true. For example, a couple of years ago I shot a 250 lb hog with a 238 grain .338 cast HP (Lyman 33889 HP) at 1600 fps. It expanded beautifully, stayed together and punched right on through. The hole in the far-side ribcage was almost as big as a 50 cent piece. The pig died quickly. Last year I saw a huge old boar shot with the 330 grain Gould HP (Lyman 457122) at about 1500 fps, and that bullet performed superbly -- it expanded nicely and punched through a substantial pile of pork and very thick pigskin, and kept right on going. What happens if they're pushed faster? Well, a while back I gave a friend of mine some 311041 HP's for his trusty .30-30. He worked up a very accurate load at about 1950 fps and took it hunting. He found a whitetail doe, quartering towards him, and shot her in the chest. The base of the bullet did exit the far-side ribcage, but Jim said the entire chest was bloodshot and the entrance wound was the size of a quarter, indicating early and violent expansion. I suspect that if this bullet had been going a little slower, there would have been less bloodshot meat (but this load sure does make a dynamite varmint load!).

So, to summarize, the expansion properties of a cast HP depend largely on two factors -- the impact velocity and the alloy that they are cast out of. When the anticipated impact velocity is on the order of 1000-1200 fps, then one can expect to get controlled mushrooming. Alloys that work best in this velocity range are those with a BHN of 8-10 (like 20-1 lead/tin, or 1:1 WW and lead). When the anticipated impact velocity is in the range of 1200-1600 fps, then you can expect cast HP's to hit hard and expand beautifully. These loads are best served by alloys in the 10-13 BHN range (and WW alloy works just fine). Once we get above 1600 fps, things start to get a little touchy. For impact velocities of 1600-1800 fps it is useful to break things down a little bit. Some bullets with larger cavities (say greater than about .125" in diameter) will fragment at 1800 fps, while others with smaller cavities (generally less than about .100") generally don't fragment as readily at 1800 fps. So for the bullets with the larger cavities, it may be desirable to hold the velocities down closer to 1600-1700 fps for optimum bullet performance, while the bullets with smaller cavities might stand up to a little more speed. The velocity range of 1600-1800 fps is best served by alloys with a BHN of 12-14. Once you get the impact velocities up above 2000 fps, they all pretty much explode. At these speeds just about all cast HP's all become violently fragmenting hand-grenades, and while this is clearly less than ideal for big-game hunting, they can make some spectacular varmint loads!

So, the bottom line is that with a few cents worth of scrap metal and a little bit of your time you can make premium quality handgun hunting bullets that will deliver excellent performance on thin-skinned, non-dangerous game, all for the purchase of a bullet mould. In the case of cast HP's, the old adage of "Moderation in all things." has a great deal of merit. Moderate velocity, coupled with moderate bullet hardness, results in first-rate terminal performance. The old-timers were on to a good thing!

Glen E. Fryxell

Cast Hollow Points and the .45 ACP

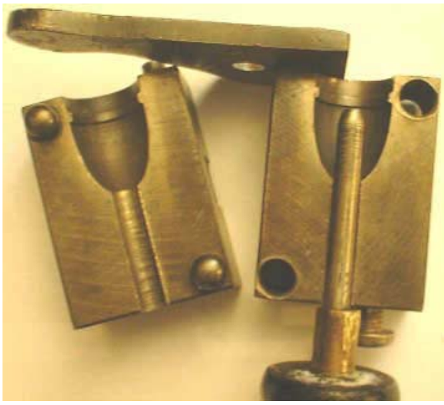
By: Glen E. Fryxell

Affectionately dedicated to the memory of Reo R. Rake -- the former Marine who many moons ago taught me the art of bullet casting and the value of cast hollow-points, and who firmly believed in the righteousness of the 1911 and .45 ACP.

John Moses Browning is widely heralded as one of the preeminent firearms geniuses of all time, and the Model 1911 .45 ACP occupies an affectionate place in many shooters' hearts as one of his finest creations. The conventional wisdom of the day was that in order to get reliable function out of a semi-automatic pistol that round-nosed (RN) bullets must be used. We now know some of the subtle refinements that can be made to the pistol so that other profiles can also be used reliably (e.g. truncated cone, SWCs, etc.), and to very good effect, but those refinements weren't known in pre-WWI America. The .45 ACP is very well-suited to cast bullets, and Ideal was in a major period of growth at that point, and adding new bullet designs almost every week to their line of bullet moulds, so it's no surprise that the Ideal 452374 was quickly drawn up and produced for the .45 ACP, first cataloged in Ideal Handbook #24 published in 1914. The Ideal (and later Lyman) 452374 RN has been a perennial favorite cast bullet for the .45 ACP for almost a century now. The classic RN design is absolutely reliable in terms of feeding, and usually gives good accuracy out of the 1911, but the RN ogive tends to generate poor wound channels. Clearly, something could be done to improve the terminal performance of the fine old warhorse.

Back in the good-old days when customer service still meant something, Ideal (and later Lyman) used to allow the customer to special order any non-hollow-based mould in HP form. Unfortunately, the days of customer service (washed windshields, free delivery of furniture/appliances, and car dealerships that worked to keep customers for *generations*) seem to have gone the way of the do-do bird. Now I understand that business needs to heed the bottom-line, a business is in business to make money after all, but there is value in customer service and the *customer* recognizes that, why can't business? The bottom-line is that we, as a society, have reduced ourselves because of this automaton "quick sale" mentality. If the service has value, charge as fair price for the service, that's just good business sense, but don't ignore your customers' needs just because you're focused on the next sale, instead of the last one. One of the casualties of this "progress" is that Lyman has dropped their custom hollow-point mould service. Oh well, such is "progress".

Fortunately, at some point in the distant past, some unknown bullet-caster put together a mould that would ultimately prove interesting to me. In this case, it started off as a single-cavity Ideal 452374 mould, which someone converted to drop HP bullets, in the same style as the traditional Lyman factory HP’s. This mould has a .140" straight cylinder HP cavity, and weighs around 208 grains when cast with WW alloy. Between the RN ogive and the straight cylinder HP cavity, this mould casts a fair percentage of cosmetic defects because of the delicate "edge" around the HP mouth. This bullet feeds with absolute reliability, but with the modest velocities of the .45 ACP, the relatively small diameter of the straight-cylinder cavity and round-nose ogive mean that it must be cast very soft and pushed hard to give the desired level of expansion. So cast and loaded, this is a fine bullet for the .45 ACP (in the event that you happen to get lucky and happen to stumble across one of these old moulds).



(Above) The old converted Ideal 452374 HP

Lyman 452374 Devastator fired straight down into 3 feet of water with 6.5 Gr unique at 850 fps, alloy is clip-on WW plus 3% added tin. Even at this modest velocity some of the bullets noses broke off with the 2-3% antimony alloy.

Lyman recognized this limitation of the original 452374 HP design, and when they introduced their line of Devastator HP bullet mould they came out with a radical departure from the traditional HP concept. The .45 Devastator has a gaping .250" diameter mouth for rapid and violent expansion (reminiscent of the "flying ashtray" which expands beautifully, although it generates feeding problems in some guns). The conical HP cavity of the .45 Devastator has a flat-based cavity, which can lead to stress risers during the expansion process, and promote fragmentation. This bullet weighs about 185 grains when cast with WW alloy and expands rapidly and violently at .45 ACP speeds. Accuracy was very good in my guns with 7.5 grains of Unique (1100 fps). I was rather surprised that there were no feeding problems with this bullet in my guns, but it fed without a bobble (your mileage may vary). When cast of a nice malleable alloy like 20 to 1 (lead to tin), this bullet consistently forms beautiful little lead mushrooms when fired into a water trough at 1100 fps, but with the more brittle antimony- containing alloys, the thinner walls and sharp-cornered cavity bottom this bullet may fragment if pushed too hard. The bottom-line is that this is a good bullet that expands reliably, but there are some design features that aren't quite optimum for what I had in mind (i.e. the mouth is too big, the sidewalls too thin, and the bullet too light).

At this point, I feel that it is important to emphasize that bullet expansion is a journey and not a destination. What matters is what the bullet looks like *in transit*, not necessarily what it looks like when it stops. Mass retention is all well and good, but the bottom-line is that the wound channel generated is more important than how pretty the bullet looks when it's all said and done. Yes, if a bullet loses mass *early*, that can be a bad thing as that robs the bullet of momentum, but if mass is lost later in the wound channel, that is still acceptable if the wound channel is good (and good wound channels come from a combination of adequate mass retention, frontal surface area, and velocity, and mass lost late in the wound channel when the bullet is traveling relatively slowly has very little impact on overall performance). It is important to remind ourselves that the focus here needs to be on the *outcome*, not obsessing compulsively on one single performance metric.

I have always been fond of the .45 ACP and the use of cast HP's in same. In my experience, the Lyman 452460 200 grain SWC has consistently proven itself to be one of the most accurate cast bullet in the .45 ACP. As a result, several years ago I took a 452460 single-cavity mould and did a little lathe-work and converted it to drop HP bullets. This bullet was built around a .165" cavity mouth, that extends down about .350" down

SS Colt 1911 and Lyman 452374 Devastator HP and expanded bullets

into the bullets (taper is approximately 5 degrees). This bullet weighs about 185 grains when cast with WW alloy and has proven to be VERY accurate. When loaded over 7.5 grains of Unique it generates right at 1100 fps and expands beautifully. This is an excellent bullet and has fed well in the pair of 1911s that I've shot it in, but some people reportedly have problems with the SWC profile feeding poorly in their guns (I never have, but I've heard this from enough other shooters to believe that it's a real problem). The 452460 HP has shown itself to be an excellent varmint bullet for the .45 ACP. I like it very much, but in the final analysis, it's a little lighter than what I was looking for as a general purpose .45 ACP HP.

Lyman 452460 HP and expanded bullets (fragmentation due to alloy used in test bullets).

OK, so I wanted to combine the expansion properties of this 452460 HP bullet, with the absolute reliability and extra bullet weight of the old 452374 RN. The old Ideal 452374 HP was a good first step, but didn't quite hit the mark. The newer Lyman Devastator HP improved things considerably, but in some ways overshot the mark (and removed too much bullet metal for what I was looking for). I wanted a moderately large, conical HP cavity, with a rounded bottom, and a well-defined flat meplat, and I wanted to preserve most of the round-nose ogive for feeding reliability. The design criteria that I eventually settled on for this bullet were: .250" meplat (a flat meplat surrounding the HP cavity makes it easier to cast "keepers"), a .180" cavity mouth, a significantly tapered cavity (7 degrees) that goes .300" down from the meplat (i.e. halfway through the bullet for optimum mass retention at the moderate velocities of the .45 ACP), a rounded HP cavity bottom, and maintain most of the RN ogive for absolutely reliable feeding.

Erik Ohlen is the proprietor of Hollow Point Bullet Mold Service, email at: modify@hollowpointmold.com, (541) 738-2479). I have had Erik modify a number of moulds for me over the past several months and in each case he has done a superb job. Erik not only offers the service of converting a mould to the traditional style of HP mould (i.e. a separate HP pin and keeper system), but he also will convert moulds to the Cramer-style of HP, with captive HP pins, compatible with multi-cavity HP mould casting, and capable of casting HP's VERY fast. Erik has repaired factory Cramer moulds for me and he has converted other moulds to the Cramer-style of HP; he understands this system and he executes the concept beautifully. I found a used 2-cavity Ideal 452374 mould and sent it to Erik with the instructions to convert it to a

2-cavity Cramer-style HP mould with the specifications summarized above. My mould was returned a short while later, modified exactly as requested.

Mounting the mould on handles, I waited as the lead pot heated up and pre-heated the mould on the back edge of the pot. I had ten pounds of range scrap in the pot. After the alloy melted, and I started casting, the mould was cantankerous for the first several pours, requiring pliers to remove a couple of the bullets off of the HP pins, in spite of the fact that Erik had obviously flamed these pins to oxidize them. After about 5 or 6 pours,


The Cramer-style HP conversion on the Ideal 452374 2-cavity mould.

this tendency towards stickiness disappeared and the mould started casting superbly (I don't know why it was sticky initially, but the problem vanished after a few pours). For the next 10 pounds of alloy that mould didn't drop a single defective bullet, and I was casting quickly and smoothly. And oh by the way, it took me *less than an hour* to cast those 10 pounds of bullets (that's about 350 bullets, or almost 6 HP's a minute) -- try THAT with a traditional single-cavity HP mould! The HP cavities were perfectly centered and the bullets dropped easily from the pins after everything got heated up. After they cooled down, the bullets were found to weigh about 203 grains. This was just what I was looking for, now it was time to get shooting and see if the design lived up to the vision.

Test loads were assembled using Federal brass, CCI 300 primers and Winchester 231, Unique, and HS-6. Ammo was loaded to an OAL of 1.265" and a moderate taper crimp was applied. Initial test-firing was performed indoors at 50 feet with a Kimber 1911. It quickly became apparent that 1.265" was just a touch too long and would bind slightly inside the magazine. The parent RN bullet can be loaded to an OAL of 1.272" per the Lyman loading data, and I had guessed that anything shorter than the original OAL would be OK. In hindsight, I had forgotten to take into account the fact that I had shortened this bullet about .040", so by shortening the OAL only .007", I was in essence moving the ogive OUT by about .033", and that was enough to bind things up. Subsequent batches of test loads were loaded up to an OAL of 1.240" and they functioned perfectly.

A very useful combination of velocity and accuracy was delivered with 7.2 grains of Unique (965 fps). Expansion tests with this load indicated modest, but somewhat erratic expansion. Basically, these bullets had a tendency to open up to full wadcutter profile, but would lose a couple of chunks out of the mouth (recovered bullets weighed 180-185 grains). The range scrap alloy was acting uncharacteristically hard and brittle, so I went back and measured bullet hardness and found that these bullets had a BHN of 11-12. Previously this range scrap had been consistently running around BHN of 7.5 to 8, and HP's cast of this alloy would expand beautifully, so clearly as I got down towards the bottom of my ingot bucket I had gotten into some harder, more brittle alloy (always a risk when using recycled bullet metal of unknown composition).

For the next batch I melted up a little over 6 lbs of pure lead sheathing and added 1/2 lb of 50/50 solder to make 25-1 alloy. This sort of binary lead/tin alloy tends to be far more malleable, and less brittle than the tertiary alloys containing antimony, and 25-1 alloy should have a BHN of about 8.5-9.0. 45 minutes later, this casting session ended with the prettiest little pile of shiny, perfectly formed HP’s you ever saw! They weighed 210 grains when cast of 25-1 alloy. Soft, heavy and malleable -- a fine recipe for cast HP’s at moderate velocity. Test loads were once again assembled with 7.2 grains of Unique, and they grouped just fine at 50 feet. Expansion testing in wet newsprint revealed superb performance. All 5 shots expanded beautifully to greater than .80 caliber. All 5 recovered bullets weighed 209-210 grains, for essentially 100% weight retention. Penetration averaged about 6 1/2" into the expansion medium (previous experience has shown that penetration in ballistic gelatin is about twice that observed in wet newsprint, suggesting that this load would give 13-14" of penetration in ballistic gelatin). "Wound channels" in the wet newsprint were on the order of 1" to 1¼” in diameter. This was exactly the sort of performance I was looking for. The project was deemed a success.


Expanded 452374 HP's with the Kimber 1911

Yes, John Moses Browning was a genius; and the 1911 .45 ACP is one of the finest defensive sidearms ever built, but the traditional RN bullet is not the most effective projectile for the 1911 platform. Cast HP’s can significantly improve the terminal performance of the .45 ACP over the traditional RN. The Lyman 452374 Devastator HP is an excellent bullet, but its huge HP cavity (intentionally put in place so the bullet would expand when cast with WW alloy) makes it lighter than desired, and potentially prone to fragmentation. The conversion performed by Erik Ohlen on this Ideal 452374 2-cavity mould to produce a Cramer-style 2-cavity HP mould resulted in a mould that is capable of turning out 210 grain cast HP’s that are ideally suited for the .45 ACP, and allows the caster to crank out a bunch of HP’s in a hurry -- the perfect way to complete the story of the 1911 .45 ACP!

- Glen E. Fryxell

Cast Hollow Points

By: Glen E. Fryxell

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Cast bullets are widely recognized as being more economical than their jacketed counterparts, equally accurate, faster at lower pressures and gentler to rifled bores. In articles about reloading handgun ammunition intended for the hunting fields, there is an interesting trend to be noted: the value of cast bullets for hunting is widely espoused, but they are almost always promoted as non-expanding, deeply penetrating solids.

To be sure, this is a role they fill in superb fashion; whether you're talking about the SSK truncated cone designs, the LBT wide flat-nosed slugs, or Elmer Keith's time-honored semi-wadcutters, they all drive deep and cut a big leaky hole. This is especially true given the current popularity of casting bullets extremely hard, using alloys of high antimony content (6-15%). Occasionally, one will read about some intrepid caster who has thrown some Keith SWC's out of 30:1 (lead: tin) alloy so as to make them soft enough to expand on whitetail when fired from a .44 Magnum, but that's unusual anymore. The bottom line for handgun hunters these days seems to be, "If you want bullet expansion, use a jacketed hollow-point, if you want a deeply penetrating solid, use a heavy hard-cast flat point."

There is unquestionably a great deal of truth to this line of thinking, but it also overlooks some very fertile territory. One area that is virtually ignored today is the casting of hollow-pointed bullets and hunting with same. Elmer Keith was a major proponent of cast hollow-points, but interest in this area has waned in recent years. This is really unfortunate because some really fine hunting bullets can be made, and in fact, the hunter can tailor the final expansion characteristics to his (or her) specific desires and needs.

I feel that cast HP's are better bullets than their commercial jacketed counterparts. Undoubtedly, the personal pride of creating the cast HP's factors into this bias, but I feel that there is a solid, structural basis for this conclusion as well. Commercial JHP's, as good as some of them are, have a significant structural "flaw" stemming from the fact that they are made from dissimilar materials -- a hard (sometimes brittle) jacket and a soft, malleable core. Once the jacket opens up and exposes the soft core, the unsupported core can erode away, the jacket can fragment and the two distinct pieces can separate. The core must have the support from the jacket to withstand all the forces crushing it during the expansion and stoppage of a bullet. Therefore, the basic composition of a strong jacket/weak core requires a careful balancing act on the part of the manufacturer to get the jacket thickness and ductility to properly offset the core hardness, as well as cavity size, shape and depth. Obviously, these decisions require a certain amount of compromise, and the manufacturer's final choices may or may not suit your particular needs.

The cast HP, on the other hand, is made of a homogenous alloy of moderate strength, that undergoes uniform and predictable deformation. The caster can easily dictate the degree of expansion to suit a particular application by varying the alloy composition and hardness.

Concerning the casting of hollow-pointed bullets, there are a few key points to keep in mind. On the choice of alloys, make sure to keep the antimony content low (around 3% or less) to keep the alloy soft enough (and not brittle) to expand smoothly at typical revolver velocities, and a small amount of tin is a must (1-2%). I like to use 9 lbs. of wheel-weights, with 1 lb. of lead and a couple of ounces of tin. This gives an alloy which is roughly 95% lead, 3% antimony and 2% tin, and makes excellent bullet metal.

Elmer Keith's favorite alloy for casting HP's was 16:1 lead to tin, with no antimony (roughly 94% lead, 6% tin). The tin serves to lower the surface tension and viscosity of the molten alloy, allowing it to fill out the convoluted shape of the HP mould more readily. Without the added tin, it can be very difficult to get fully filled out cast HP's. When casting HP's, make sure to keep the alloy hot and cast as fast as possible. This is important because the spud cools quickly once removed from the mould blocks and you only have one cavity's worth of molten alloy going into the mould blocks per cast. Casting quickly with a hotter than normal alloy helps keep the mould blocks and HP spud up to temperature.

Some HP moulds are readily available (for example, Midway carries an assortment), others are old designs that haven't been made in years, and others yet may exist only in your imagination. Is this a problem? Not if you know (or are) a good machinist. A single-cavity base-pour mould in good shape can be converted to cast HP bullets by any machinist worth his cutting oil (index off of the internal faces and cavity, the external faces of the mould blocks may or may not be square to the internal faces). With the 4- and 6-hole gang moulds that are all the rage these days, single cavity moulds can often be found at gun shows for very reasonable prices, making experimentation affordable.

Where does the cast HP fit in, in terms of hunting? Obviously, these expanding bullets are not well-suited for dangerous game, or other situations requiring extremely deep penetration. However, they handle vermin, small game and medium game beautifully, and after all, these are what many handgun hunters spend most of their time in pursuit of. The smaller cast HP's are typically heavier than the light JHP's chosen for varmint hunting, so the cast HP has better long-range stability, accuracy and thump, as well as a flatter trajectory. And trust me, expansion is every bit as dramatic as with their jacketed counterparts! For the larger calibers, the combination of weight and controlled expansion makes them ideally suited for the taking of deer-sized game. In Sixguns, Elmer Keith recounted tale after tale of favorable results, obtained over many years, with cast HP's on chucks, jack rabbits, coyotes, bobcats, mule deer and black bear. That qualifies as a solid endorsement in my book.

The following are some of my favorite hunting loads that take advantage of home-grown cast HP's. In .32 caliber, an old Ideal 3118 single cavity mould was modified to reproduce the original factory hollow-pointed version (which I've spent years searching in vain for). Bullets drop from the blocks at 112 grains, when cast with my pet alloy.

Sized .312" and loaded into .32 H&R cases over 6.5 grains of Acc. Arms # 7, these bullets leave my 6" S&W Model 16 at 1100 fps and group into delightfully small clusters (this gun just loves cast bullets!).

This makes a flat-shooting, hard-hitting varmint load, delivering dramatic expansion on rodents. Even after a busy day of varmint shooting, this sweet little load leaves the bore spotless.

The .38 Special is one of my favorite varmint/small game calibers, and a cherished 5-screw K-38 Masterpiece is one of my favorite .38 Specials. The Lyman factory used to offer, as an example of old-world customer service, hollow-pointed versions of any of their standard line of moulds (sadly, this is no longer true). These moulds are identified by the standard mould number, followed by the "HP" designation. An example of this is found in my Lyman 358480 HP mould, which drops a 128 grain SWC-HP, and makes a delightful varmint bullet when loaded in the above mentioned K-38 Masterpiece. Stoked with 4.6 grains of Bullseye, this little pill gets motivated to 1030 fps and delivers exquisite accuracy.

Searching for accurate .38 +P loads can be a little more challenging. HS-7 is a powder that has provided consistent and repeated success in this area. There are two very similar cast HP's that I prefer for .38 +P loads: the Lyman 358429 HP (a customer ordered hollow-pointed mould, as described above) and an old Ideal 358439 (an unusual example where the HP mould was numbered as a separate design, distinct from the "parent" SWC), both of which are based on the classic Keith 173 grain SWC. These two moulds have very similar external profiles, but differ in terms of their cavity depth and diameter. The Ideal 358439 drops bullets that weigh in a 154 grains, while the Lyman 358429 HP makes a product weighing 162 grains. In my tests to date, the lighter version seems to be slightly more accurate.

Interestingly, in spite of the difference in weight, velocities of the two bullets are identical when launched with the same powder charge. 8.5 grains of HS-7 sparked with a magnum primer, gives about 1060 fps and very good accuracy. Expansion with both bullets is positive on rodents and other vermin. This is as good as it gets with the timeless .38 Special.

When the Ideal 358439 is stuffed into a .357 Magnum case over 14.0 grains of H110, a new realm of handgun varminting is experienced. This combination delivers 1350+ fps out of most .357 revolvers, and its impact behavior puts it into the .22-250 class out to well past 50-60 yards.

"Explosive" is an over-used cliché in the shooting industry, but it's really the only word that fits here. Envision a suicide-bomber prairie dog, with an M80 strapped to his chest, and you'll get the idea. Again, accuracy is good and leading is not a problem.

The Lyman 429421 HP (the 235 grain HP version of the classic SWC, and a "standard" mould for many years) was one of Elmer Keith's favorite hunting bullets. In Sixguns, he included some beautiful pictures of cast HP's, one of which was of a perfectly mushroomed 429421 HP, recovered from a mule deer that he shot with his famous .44 Special load. This picture was the genesis of my fascination with casting hollow-pointed bullets. In my experience, this bullet only expands modestly at an impact velocity of about 1000 fps, unless cast quite soft. The reason for this minimal expansion is that the spud is the same diameter as in its .357 little brother (the Ideal 358439), leaving much thicker walls in the .44 HP than in the .357 HP. Elmer Keith designed this bullet for 1200+ fps, and it shines indeed when launched with his .44 Special load using 17.0 grains of 2400. For hunting deer-sized game, this load delivers all that a handgun hunter really needs.

When the 429421 HP is loaded into a .44 Magnum case over 23.5 grains of Winchester 296, velocities jump up to the 1350-1400 fps range. Expansion of the 429421 HP is smooth and positive at this velocity. This combination makes a great jack rabbit load, unless, of course, you're trying to make hasenpfeffer (it's just too destructive for edible small game). For larger game in the deer/antelope class, this flat-shooting, hard-hitting load delivers the goods, and is hunter-friendly on all counts. The Lyman 429244 HP provides more of the same for those who prefer gas-checked bullets.

After searching for years, I was finally able to track down and purchase a Lyman 454424 HP, the 245 grain HP version of the traditional Keith SWC for the .45 Colt. This particular mould is one of the finest HP moulds I've ever run across. The cavity is so round, and the spud so concentric with the cavity, the spud must be "popped" before the sprue is struck. If the sprue is struck first, the bullet simply spins in the cavity as there is insufficient resistance to "pop" the spud free at that point. The cavity on the 454424 HP is somewhat larger than for the .429" family, but the resulting wall thickness is quite similar. The 454424 HP was found to quite accurate with several favorite "recipes" for the .45 Colt (e.g. 8.0 grains of Winchester 231, 9.0 grains of Universal Clays, or 14.0 grains of HS-7), but once again expansion was found to be marginal in the 950-1050 fps ballpark (but I'm sure they'd expand just fine if cast of a softer alloy). Now keep in mind when I say that expansion is marginal for the .44 and .45 HP's at 1000 fps, that means they perform just like their SWC brethren, which to say the least, is none too shabby. Not surprisingly, when driven to 1200 fps (from a 7 1/2" barrel) with 20.0 grains of 2400 (this accurate load is for Ruger Blackhawk's and other strong, modern revolvers only) expansion is smooth and positive. The most accurate load with this bullet (from my 7 1/2" Ruger Blackhawk, anyway) was found to be 23.0 grains of Winchester 296 (again, Blackhawk's only) which delivers just over 1300 fps and prints ragged, one-hole groups at 25 yards.

I haven't shot any critters with this load yet, but that's only because one particular 200 lb. whitetail doe got very lucky last month. I was hiding in some waist-deep bunchgrass when she stepped out, broadside, 45 yards away. The front sight blade nestled in tight behind her shoulder, the hold was solid and the trigger broke cleanly ... unfortunately, the bullet encountered some of that bunchgrass that I was hiding in and was deflected off into parts unknown. She was untouched. Sigh, maybe next time...

Expansion is not solely the realm of the commercial jacketed bullet. You can make your own, and you can make them perform however you want a handgun bullet to perform. The cast hollow point can be one of the handgun hunter's deadliest allies.

- Glen E. Fryxell

Cast Hollow Points: The Next Generation

By: Glen E. Fryxell

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Back in the days of the black powder express cartridges, bullets were hollow-pointed not to enhance expansion, but rather to make a lighter, faster bullet. The hollow point accomplished this without changing the bullet length, thereby allowing the same twist rate to be used to stabilize the lighter bullet. In the last quarter of the 19th century, most of the bullets that were loaded into these express cartridges were made of very soft alloy (30:1 lead/tin was popular). As a result even blunt, solid-nosed cast bullets expanded upon impact with muscle and bone, and when the projectile weighed 400-500 grains (or even more), a devastating wound channel was left in its wake. The express cartridge cast HP was no different when launched at black powder rifle velocities, so perhaps it's easy to see why the added velocity, and not the expansion properties of the HP, were the focal point of early hot-stove discussions.

Later, experimentation revealed that the impact behavior of moderate velocity handgun bullets could be dramatically enhanced by incorporating a hollow point. Industrious handgunners experimented by filling these cavities with all manner of stuff (wax, garlic, primers, explosives, etc.) to make these bullets more devastating, but the simple fact remained, the hollow point bullet was the key feature responsible for the increased killing effect of these exotic concoctions. In fact, it can be argued that the hollow point bullet is one of the most important advances in the development of modern handgun ammunition. Elmer Keith recognized this early on, and around 1930 incorporated hollow points into his pet SWC designs (358439, 429421 HP and 454424 HP). His detailed reports of their accuracy, expansion and deadly performance on small and medium game highlighted the shooting literature for decades. Ray Thompson followed suit in the 50's with his gas-checked SWC-HP's (358156 HP and 429244 HP). These cast HP's are all excellent hunting bullets.

It is important to recognize that all of these mould designs were drawn up in a day and age when the prevailing practice was to cast revolver bullets of a binary alloy composed of only lead and tin (usually somewhere in the range of 15:1 to 20:1 lead/tin). These lead/tin alloys are not only soft enough to expand smoothly at handgun velocities, but they are also malleable enough to hold together and avoid fracturing and fragmentation upon impact, leading to excellent weight retention and penetration. A large diameter cavity was not necessary to induce expansion in these soft alloys, and since the binary lead/tin alloys are not prone to fragmentation, the cavity could be made to go rather deep into the heart of the bullet. Thus, Elmer Keith designed his HP's to have a cavity that was approximately 1/8" in diameter, roughly straight-walled (with a slight taper at the bottom of the cavity), that ran about half the length of the bullet. He preferred his bullets cast of a 16:1 alloy (8 lbs lead + 8 ounces tin) for use at 1200 fps or so. His was a recipe that worked; these cast HP's were deadly.

In the 40's and 50's, others like Gordon Boser and John Zlatich also experimented with these (and other similar) cast HP's, and varied the alloy composition and cavity design. Their careful and systematic experimentation can be summarized as follows: these traditional HP's expand beautifully at 1200 fps when cast of 10:1 alloy, but are reluctant to do so at slower speeds; a 20:1 alloy expands very nicely from about 900-1200 fps, and a 40:1 alloy does well from about 800-1000 fps, fragmenting badly at 1200 fps. At 1500 fps, all alloys tested fragmented. Type metal HP's did not expand at all at 800 fps and shattered at higher velocities. (I'd like to thank Taffin for sharing these articles from the 40s and 50s with me).

In short, the Keith and Thompson HP's were designed around the concept of binary alloys, specifically lead/tin alloys in the range of 15:1 to 20:1 and this is where they perform their best.

In more recent years, virtually all revolver bullets are cast from more complex alloys (most commonly scrap wheel-weights), that contain antimony, arsenic and other metals. Antimony has the benefit of hardening bullet metal much more efficiently (and cheaply) than does tin, but it does so at the expense of increased brittleness. There have been contradictory reports published about the expansion properties (or lack thereof) of the Keith and Thompson HP designs in recent years as a result of people using these harder, more brittle, antimony-containing alloys. In a nutshell, experience has shown that the thin-walled 358439 cast of WW alloy (3-4% antimony and about 0.7% tin) will expand reliably at 1000 fps. However, the .44 and .45 caliber HP's, with their thicker walls surrounding the HP cavity, need considerably more velocity to expand when cast of WW alloy. Unfortunately, coupling the higher antimony content with the higher velocities can result in bullet fragmentation if pushed too far. With the deep cavities found on these traditional designs, that can result in substantial weight loss. To get the best performance from these larger caliber HP's, it is best to keep the antimony content low and make sure the tin content is adequate. This is because the antimony-induced brittleness can be offset somewhat by adding a small amount of tin. Tin binds to the antimony, forming an intermetallic compound that is soluble in the molten lead alloy and has less tendency (than antimony) to phase separate upon cooling. Thus, the resultant bullet metal is less brittle and more malleable than the starting WW alloy. Antimony is soluble in lead to the tune of about 1.5%, so by adding 2% tin (which in turn binds and solubilizes 2% of the antimony) the phase separation problem (and hence brittleness) of WW alloy is significantly attenuated. This alloy is even better for cast HP's if it's diluted with 10-20% pure lead, which serves to both soften the alloy slightly and dilute the remaining unbound antimony, insuring that it is below the 1.5% solubility limit (and hence, doesn't phase segregate).

Pure tin is expensive and we don't run across it today as readily as the old-timers did, so the binary alloys are less commonly used today and almost everybody uses WW alloy to cast their bullets. In addition, the Keith and Thompson HP moulds are getting harder to find. Does this mean that the concept of cast HP's is past it's prime and all we can do is cast a nostalgic eye back upon the pages of history (and *Sixguns*) and dream of better, by-gone days? Nope. We can revisit the concept of the cast HP and redesign it to better fit the alloys that we *do* have available today.


Lyman 429640 HP

This is precisely what Lyman has done with their line of Devastator HP's in 9mm, .40 and .45 caliber for semi-auto cartridges, along with a GC design for the .44 Magnum. The .44 design (#429640 HP) is clearly a hunting bullet, designed with deer, black bear and elk in mind (the short, light semi-auto designs are better suited for vermin). The 429640 HP has a large diameter, conical cavity, designed to induce expansion even when cast of a harder alloy like WW. The cavity only extends down about 1/3 the length of the bullet, so even if the forward "petals" of the mushroomed bullet break off as it passes through the vitals, there is still a 200+ grain solid wadcutter to punch on through the other side of the animal. If this performance strategy reminds you of the H-mantle and partition bullets, then you get a gold star and can move to the front of the class. This is clearly a design concept that works.

When casting any HP bullet, it is important to remember to turn the pot temperature up a little bit (30-40 degrees, or so) and cast quickly to keep the HP "spud" in the hot mould as much as possible (and therefore up to temperature), or else you'll have a very high reject rate. Also, the addition of a small amount of tin helps to lower the surface tension of the molten alloy, insuring that the bullets fill out properly around the HP cavity. The 429640 HP's drop from my mould at 260 grains when cast with WW alloy + 2% tin (checked and lubed they weigh 268 grains). The gaping mouth of the monstrous HP cavity is over ¼" wide! 22.5 grains of W296 underneath the 429640 HP, sparked with a CCI 350 primer, provided exceptional accuracy from a 7 ½" Liberty Model Super Blackhawk (1410 fps). Good accuracy was also obtained with this combination from a 6" S&W 629 Classic Hunter (1304 fps). This is a very sleek, streamlined bullet that shoots very flat and hits very hard.

A late season doe tag was chosen as a suitable opportunity to try out the 429640 HP in the field. The basalt-encrusted canyons of the Snake River can be an inhospitable place in mid-November, but not this year. Temperatures stayed in the low-40s and the skies were clear and sunny, with little wind (that's a first!). The first day out we found that the deer weren't in all of their usual brushy canyon hangouts. Instead, we found that water was in limited supply and they were primarily in those canyons with permanent water supplies. That afternoon we found the deer (I stopped counting at 50), but there were no shot opportunities inside of 125 yards (except for that goofy little forkhorn that walked within 10 yards of me). The next morning, deep in the heart of that same canyon, Ed made a textbook perfect heart shot from over 200 yards with his 7-30 Waters Contender, and the 140 grain Nosler Ballistic Tip turned in its usual outstanding performance. As Terry moved into position to help Ed out with his packing chores, he pushed a group of deer up-canyon and right into my lap. A yearling came running up to within 15 yards of me, and stopped behind the only brush on the entire slope (for those of you who haven't been here, the Snake River is wide open country). The second deer on the scene was a nice sized mulie doe, moving from my right to left. She stopped at about 30 yards and the 629's black on black sights came to bear on her left shoulder. The metallic click of the hammer being cocked spooked her, turning her back to my right. My outline was pretty well broken up by a basalt outcrop, so she had a hard time picking out exactly where the sound had come from, and stopped after taking only two steps. As the sights swung back across her, I over swept the heart/lung area and came to a stop on the neck. It wasn't so much of a conscious decision to take a neck shot as much as it was a go/no-go decision based on acceptable sight picture and the need to shoot quickly (both animals were skittish and likely to leave quickly). The bullet impact was clearly audible even at this close range, and she collapsed at the shot, tumbling downhill through the brambles and basalt skree, to the bottom of the draw 100 yards below, scattering the other 7-8 deer in the group (including 3 nice bucks). Being a direct hit on the spine, a .38 target wadcutter would have been just as lethal, but a post-mortem examination of the wound channel made it clear that this bullet had expanded very effectively, induced massive soft-tissue damage, shattered the spine and exited to fly off towards the far side of the canyon. In short, it lived up to its "Devastator" label. One bullet and one animal don't prove much, but I suspect that the 429640 HP could get to be very popular in handgun hunting circles. Now that I've had the chance to work up some loads and hunt with the 429640 HP, I, for one, am favorably impressed.

The HP is one of the most significant advances made in the on-going evolution of handgun ammunition. The classic designs put forward by Elmer Keith have proven themselves for decades in the hunting fields. These moulds are hard to come by today and are perhaps best served by binary lead/tin alloys that are used less and less often these days due to the cost and availability of tin. The new line of Devastator HP's from Lyman is very well-suited for today's most common bullet metal, scrap wheel-weights. I believe that this bullet will prove every bit as deadly as Elmer Keith's HP's. Now if they would just make one for the .45 Colt, about 290 grains, plain-based, with a Keith-style grease groove....

- Glen E. Fryxell

The Lyman Devastator Hollow Point Bullets

By: Glen E. Fryxell

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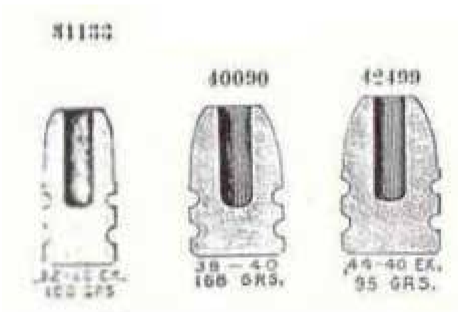
The concept of using a hollow point (HP) to enhance a rifle bullet's terminal performance came about in the late 1880s and was summarized by John Barlow in Ideal Handbook #4, published in 1890. Interestingly, the primary motivation behind the HP design was to reduce the bullet's weight, and hence increase it's velocity, without changing the bullet's length, thereby allowing the same rifling pitch to be used. This was the golden age of Express Loads; lighter bullets driven to the highest velocities attainable with black powder. These HP bullets were listed as "Express Bullets" in the Ideal Handbook #9 (1897) and were promoted as being able to "increase the killing power of these rifles by50%".



The first cast hollow point bullet designs suitable for use in handguns: the Ideal 31133 (for the .32-20), the Ideal 40090 (for the .38-40) and the Ideal 42499 (for the .44-40).

However, due to the common practice of the day to chamber both revolvers and lever-guns in the same cartridges for frontier expediency, it became possible to load and shoot cast HP ammo in revolvers as well. As a result, cast HP's made their handgun debut in sixguns chambered for the .32-20, .38-40 and .44-40 Winchester cartridges by using bullets cast from the Ideal 31133, 40090 and 42499 moulds respectively. It is important to recognize that these moulds were all designed and promoted for use in rifles. However, when cast fairly soft (typically 20-to-1, lead to tin), these bullets were also found to perform exceptionally well from revolvers.

Reviewing subsequent Ideal Handbooks, no other HP mould designs appeared that could be used in handguns until Elmer Keith brought his mould designs to Ideal. After his SWC designs had proven so successful, he went back in the early 1930s (1931-2?) and added HP's to his SWC's. The Ideal Handbook #32 (1936) listed the Keith HP designs for the .38 Special and .357 Magnum (Ideal 358439), and the .44 Special (Ideal 429421 HP). These were the first two cast HP's designed explicitly for use in handguns, and they are two of the finest hunting bullets ever devised. Keith would later add HP versions of the 454424 (for the .45 Colt) and the 452423 (for the .45 ACP and .45 Auto-Rim). During roughly the same timeframe (mid-1930s) George Hensley was making moulds (both HP and otherwise) for Phil Sharpe in his development of the .357 Magnum (Hensley would later partner up with James Gibbs in 1937). Cramer was also making moulds for HP handgun bullets in the late 1930s, particularly for the sensational new .357 Magnum. In the early 1950s, Ray Thompson would add his GC designs to the list of available Lyman HP mould designs (358156 HP, 429215 HP, 429244HP and 452490 HP). Again, all of these bullets perform their best when cast fairly soft (typically about 20-to-1 lead to tin for standard velocities, a little harder for full-throttle magnum stuff).

The binary lead-tin alloys used by Keith, Sharpe and Thompson were soft, malleable, and not prone to fragmentation. These properties were reflected in their HP mould designs -- cavities were narrow (ranging from .100" to 170", typically about .140" in diameter), straight-walled (or only slightly tapered), and extended halfway (or more) through the length of the bullet. This marriage of bullet design and alloy is truly exceptional, and expansion of these bullets with 20-to-1 has to be seen to be believed!

The popularity of casting HP bullets has waned since the 1950s, although in recent years bullet casting in general appears to be enjoying something of a comeback. Today, the most common alloy used by the home bullet caster is wheel-weight alloy. Because this alloy contains a moderate amount of antimony (about 3-4%), it is somewhat harder, and somewhat more brittle, than the binary lead-tin alloys used back in the days of Keith, Sharpe and Thompson. As a result, lower velocity expansion of some of the earlier HP designs can be hampered by using the harder wheel-weight alloy because of the narrow HP cavity and the relatively thick walls surrounding it. Higher velocities can lead to fragmentation and significant weight loss as the HP expands due to the somewhat more brittle alloy combined with the deep cavities of these HP's. Lyman has addressed these issues by redefining the basic cast HP concept. Basically, they made the cavity shallower (limiting possible weight loss during expansion) and the cavity is now much wider and more conical (making expansion easier when cast of harder alloy, with thicker walls at the base of the cavity to strengthen the "mushroom"). In fact, the mouths of these new cavities are as much as a 1/4" across! They chose to call this new class of HP's the Devastators. But how do they shoot? And how do they expand?

First let's take a closer look at the Devastator line-up. Lyman simply took 4 proven bullet designs from their line-up and added large, conical HP spuds to the mould blocks to create the Devastator line of HP moulds. The 9mm/.38 Lyman #356637 HP is nominally a 124 grain HP version of their excellent 147 grain RNFP for the 9mm Parabellum. Their 10mm Devastator (Lyman #401638 HP) has a listed weight of 155 grains, and is a HP version of their very accurate 175 grain TC design. The .44 Magnum 429640 HP is derived from their outstanding (but unfortunately no longer available) 429640 GC-FP, and weighs 260 grains as it drops from the blocks. And the .45 ACP Devastator is derived from the classic 452374 RN and is listed at 180 grains. All four of these HP's have cavernous cavities in their noses, that range from .215" to over .250" in diameter! As a result, these mould have a lot of metal in their HP "spuds". In order to cast high quality HP's with any HP mould, it is important to keep the spud hot (you will never get good HP's from a cool spud), so it's important to pre-heat the mould thoroughly, turn the pot temperature up to about 775-800°F, and cast quickly, to make sure that that fat spud stays up to temperature. Also, it's important to "sweeten" the WW alloy with about 2% tin to make sure that the mould fills out properly around the spud. The cavities on all of these bullets run roughly .300" deep, so the 3 lighter bullets (.565" to .580" in length) are far more frangible than is the .44 Magnum (.800" in length).

Since the point of this exercise was to determine the expansion behavior of these bullets at typical handgun velocities, and not to systematically evaluate every possible combination to find which loads were most accurate in my guns, I "cut to the chase" and chose powder charges for each bullet that have proven their mettle with similar weight cast bullets. All of these loads gave very satisfying accuracy, but there may well be room for refinement. Bullets were cast with WW alloy sweetened with 2% added tin, and lubed with homemade Moly lube (equal parts by weight of Moly grease and beeswax). No leading problems were encountered with any of these loads.


The Devastator family; the 9mm/.38 356637 HP, the 10mm 401638 HP, the .44 Magnum 429640 HP, and the .45 ACP 452374 HP.

Starting with the smallest Devastator, the 356637 HP is the only bevel-based member of the Devastator family and it fell from the blocks at 127 grains. The mouth of the cavity mics about .215". It was sized .356" and loaded over 6.5 grains of HS-6, and test fired in a Browning Hi-Power fitted with a Bar-Sto Match barrel (.356" groove diameter and 1 in 16" twist). Settling on an OAL that would both feed reliably and chamber cleanly took a little fine-tuning. The 356637 HP has a fair amount of bearing surface that has to be taken into consideration when deciding on a seating depth, depending on how the throat of your gun is cut. Just loading them to a favorite OAL will not guarantee that loaded rounds will chamber, load a dummy round first and make sure that your OAL will both feed and chamber in your gun (I used an OAL of 1.010" and this fed pretty reliably, but not quite 100%) This load delivered 1257 fps, along with respectable accuracy.

Expansion testing was carried out using 2L plastic bottle filled with water, laid on their sides and penetrated lengthwise. This light, fragile bullet fragmented at this velocity and didn't even exit the bottle! Expansion was rapid and violent. This light fragile bullet is ideally suited for shooting varmints, and far too fragile for pretty much anything else. Given the "duck-n-dodge" zig-zagging nature of a departing jack rabbit, it seems to me that an accurate, double-stack 9mm (like the Browning Hi-Power), loaded with these cast HP's is just about perfect for perforating such long-eared prey. Bring lotsa ammo; expansion won't be a problem, but hitting that sprinting jack rabbit likely will be...


356637 HP loaded into the 9mm Parabellum, and the Browning Hi-Power.

Lyman also promotes this bullet as being a good choice for the .38 Special. Since it drops from the mould at a little over .357", this makes them essentially unsized when run through a .358" sizer, and very well suited for revolver work. Loaded into .38 Special brass to a depth that allows a light roll-crimp to be applied over the ogive (OAL = 1.390"), over a charge of 4.5 grains of Bullseye, this dainty little HP zipped from the 6" barrel of an old and trusted 5-screw K-38 Masterpiece at 1016 fps and grouped very nicely indeed. Expansion at this velocity is positive, but not explosive. This is an excellent load for ground squirrels, prairie dogs and jack rabbits.

Next in line is the 10mm Lyman 401638 HP. My favorite powders for cast bullets in the 10mm are Accurate Arms #7 and HS-7. The mouth of this HP runs right at .220". When loaded on top of 11.5 grains of HS-7, this 152 grain cast HP attained 1304 fps from the new 4" S&W 610. Expansion in either 2L water bottles or ground squirrels was rapid and explosive. Attempts to recover expanded bullets from the water bottles resulted only in the recovery of fragments. This is a flat-shooting load that hits hard and would be well-suited for coyote and badger-sized critters. I would not expect this bullet to exit on a broadside ribcage shot on an antelope. Tests of these loads in other barrel lengths revealed velocities of 1220 fps for 3" and 1374 fps for 6 1/2". Expansion was consistently explosive in all 3 guns. At the more moderate velocities of the .40 S&W (ca. 1100 fps), expansion should be positive.

356637 HP loaded into the .38 Special, and S&W K-38 Masterpiece.

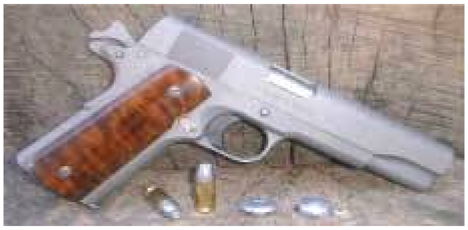
401638 HP loaded into 10mm Auto cartridges, along with a 4" S&W 610.

429640 HP loaded into the .44 Magnum, along with a Ruger Super Blackhawk, a fine hunting combination.

The big game hunter of the Devastator family is the Lyman 429640 HP for the .44 Magnum, which has a mouth of .260" and weighs 268 grains checked and lubed (this is the only member of the Devastator line-up that wears a GC). Loaded over 22.5 grains of W296 and sparked with a CCI 350 primer, this bullet delivered 1410 fps from a 7 1/2" Ruger Super Blackhawk with excellent accuracy (this load runs 1320 fps from a 6"). Expansion testing in water-filled 2L bottles revealed dramatic expansion. Attempts to recover expanded bullets were not successful due to over-penetration. This bullet was used to take a mule deer doe from about 30-35 yards; she never took a step and was dead before she hit the ground. The 429640 HP expanded well and exited (neck shot). This bullet seems to provide an excellent combination of expansion and penetration, making it an excellent hunting bullet for everything up through deer and black bear sized game.

The Devastator line-up is rounded out by the 452374 HP for the .45 ACP. This plain-based 186 grain HP has a .250" mouth, and believe it or not, even with this gaping maw up front it feeds just fine in my stock 1911s. When loaded on top of 7.5 grains of Unique and fired from a full-size Government Model 1911, this combination generates right at 1100 fps with good accuracy. Expansion and weight retention at this velocity are superb (see recovered bullets in Figure 7). In working with this bullet, I was reminded of the pioneering work developing high velocity hunting loads for the 1911 by George Nonte, Lee Jurras and others. Recently while hunting ground squirrels, as a result of these men and their writings, my mind kept wandering to the deserts of Arizona and the pursuit of Javelina whenever I stuffed these cast HP's into a 1911 magazine. I have to go back to Arizona again. Soon. This is a good bullet.

I would like to see Lyman extend the Devastator line of HP's to include HP versions of the Lyman 429649 and Lyman452651 (both of these bullets are gas



452374 HP loaded into the .45 ACP, along with 2 recovered bullets, and a Colt 1911.

checked 325 grain RNFP's). Each of these Devastators would weigh approximately 300 grains, providing the handgun hunter with an excellent combination of expansion and heavyweight penetration, and would be ideally suited for hunting elk-sized game. Lyman already has the cherries, and they already make HP "spuds" in each of these calibers, it's just a matter of putting the cherry and spud together in the same mould.

The pleasurable pastime of bullet casting allows the handloader to get that much more out of his shooting hobby by allowing him to put that much more of his own tastes into it. Typically cast bullets are associated with non-expanding hard-cast projectiles, producing deep, narrow wound channels. This is of real value when the handgun hunter takes on large, dangerous animals that require several feet of penetration to kill efficiently, but how often does your typical handgunner get a chance to hunt Cape buffalo or guar? For lighter, thin-skinned game (like deer and antelope), an expanding bullet offers the handgunner a wider, leakier wound channel, generally resulting in a quicker kill with these fleet-footed animals. The cast HP is ideally suited for hunting medium-sized game. In the past, this niche was filled by the Keith and Thompson HP moulds, but sadly these fine moulds are no longer produced. Lyman has redesigned the HP concept to accommodate the somewhat harder and more brittle wheel-weight alloy that is most commonly used to cast bullets today. Lyman's line of Devastator HP moulds provides bullets that are well-suited to varmint hunting (9mm), varmints and small/medium game up to about 50-75 lbs (10mm), small/medium game up to about 150 lbs (.45 ACP), and medium game up to about 300 lbs (.44 Magnum). A one-time investment of a HP bullet mould allows the handloader a lifetime supply of these fine bullets, and the pride of making his expanding hunting bullets with his own two hands.

- Glen E. Fryxell

Cast Hollow-points and the Contender

By: Glen E. Fryxell

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Glen E. Fryxell and Sixgunner.com

At the turn of the last century, there were a total of 3 hollow-pointed bullets available for use in handguns, the Ideal 31133 (a 115 grain HP for the .32-20), the Ideal 40090 (a 168 grain HP for the .38-40) and the Ideal 42499 (a 195 grain HP for the .44-40). These bullets were marketed as "express bullets" for the lever-action repeating rifles of the day and the claim was made that they "increased the killing qualities of these rifles by 50%". These bullets were obviously made with black powder in mind as they were designed without a crimp groove, relying instead on a compressed case full of black powder to prevent the bullet from being jammed into the case under recoil as they waited in line in the tubular magazine. Since the revolvers of the 1890s were also chambered for these cartridges, these cast hollow-points could also be fired in handguns (in revolvers, a crimp groove wasn't necessary as a simple crimp over the ogive prevented the bullet from inching forward under recoil and tying up the cylinder). The advantages of expanding bullets in handguns are obvious to us today, so why didn't 19th century sixgunners flock to these HP designs like hungry dogs to fresh meat? Simple, at that point the handgun was viewed basically as a last ditch defensive tool, and at black powder velocities the standard bullet designs served adequately.

As handgun quality improved, a number of new bullet designs were brought forth in an effort to improve handgun performance. This was a truly fascinating time in terms of cast bullet design! Developments like the Himmelwright wadcutter (Ideal 429220, 1900), the beveled crimping groove for revolver bullets (first embodied in the 98 grain RN for the .32 S&W Long, the Ideal 313226, 1900), the gas-check (the first GC bullet suitable for use in a handgun would be the Ideal 311316, the 115 grain GC-FP for the .32-20, 1906), and Ed McGivern's hollow-based wadcutter (Ideal 358395, 1915) all were introduced between 1900 and the beginning of World War I. Ideal brought out literally hundreds of new bullet designs during the first quarter of the 20th century. However, inspection of Ideal Handbooks #9 (1897) and #25 (1915) through #30 (1931) reveals that not one new hollow-point design suitable for handguns was added to the catalog; the selection was still limited to the three designs listed in 1897. Elmer Keith was to change this around 1932 with the introduction of the Ideal 358439, a 160 grain hollow-point version of the Keith SWC (Ideal 358429) for the .38/44 Heavy Duty. In the mid-1930s, he followed this with hollow-point versions of his landmark semi-wadcutters, the Ideal 429421 and 454424. These three bullets were the first cast hollow-point bullets created specifically for handguns. Later, in the mid-1950s, Ray Thompson put his touch on this concept by drawing up a similar series of cast HP's adorned with gas-checks (Lyman-Ideal 358156 HP, 429215 HP, 429244 HP and 452490 HP). The Keith and Thompson hollow-points are among the best revolver hunting bullets ever designed -- the 358439, 358156 HP, and 429215 HP for vermin, and the 429421 HP, 454424 HP, 429244 HP and 452490 HP for medium game.

Handgun hunting began to grow in popularity in the 1950s, especially with the introduction of the .44 Magnum, but it took a while for the factories to figure out how to mate dissimilar metals to make a JHP that would reliably deliver the superb performance of the Keith and Thompson HP's. In the early 1960s, a surge in popularity of handgun hunting led to several new developments like the Ruger Hawkeye and the Remington XP-100, as well as several new hunting oriented cartridges, like the .22 Jet, .221 Fireball, the .256 Winchester and .41 Mangum. Rock-n-roll (or at least muzzle blast) was here to stay.

In 1966 the Thompson-Center Contender was introduced, chambered in such mild-mannered cartridges as the .22 Long Rifle and the .38 Special. Later, experimentation revealed that this versatile break-action single-shot was capable of handling considerably more powerful cartridges, and the race was on to see who could squeeze the most power out of the Contender platform with both factory and wildcat cartridges. Some of these experiments went too far, resulting in stretched frames and/or torn under-lugs. As a result, a pretty solid understanding took shape as to what the Contender would (and would not) handle and still provide a long, healthy service life. A series of Contender-based wildcat cartridges (most notably the JDJ's and the TCU's) were developed that provided excellent performance in the hunting fields. However, to achieve this success, it was necessary to pair these cartridges with jacketed bullets that were soft enough to expand reliably at the reduced velocities of these wildcats from Contender length barrels (typically 2000-2400 fps). In some calibers (e.g. 6.5 mm) this was readily done, in others (e.g. 7 mm) it was more problematic due to the prevalence of hard bullets, designed for belted magnum velocities. In general, the mindset surrounding much of the wildcat development for the Contender seems to have been "What can we do to squeeze the most possible velocity out of the gun so we can make jacketed rifle bullets expand?". I'm not criticizing this mindset (my high-performance SSK T/C barrels are among the most reliable and cherished hunting tools that I own), but this is not the only way to get reliable bullet expansion from the Contender. Certainly, there have been exceptions to this wildcatting strategy (e.g. the .338 Woodswalker), but these efforts took specific jacketed bullets that were known performers at moderate velocity (in this case the 200 grain Hornady FP) and then delivered them at that velocity. It is simply a question of balancing bullet construction with impact velocity. An alternative strategy -- instead of trying to force the cartridge/gun combination to live up to the velocities needed to drive jacketed bullet expansion, we can attain the same level of bullet expansion by making softer expanding bullets that expand reliably at the moderate velocity levels of the 10" Contender. This article is intended to provide an overview of how reliable expansion can be provided at velocities where jacketed rifle bullets simply do not expand. Like the Keith and Thompson hollow-point that went before them, this level of Contender performance is provided by the cast hollow-point. The beauty of this approach is that because the cast HP will expand reliably at modest velocities, one can resort to a heavier bullet than would be used in jacketed form, resulting in both controlled expansion and deep penetration. An added benefit is the tendency of cast HP's to expand down to the bottom of their cavity and then have the petals shear off, leaving a solid "wadcutter" to penetrate through the off-side, much like the highly respected Nosler Partition.

There are a number of rounds that the Contender has been chambered for over the years that operate in the velocity range where jacketed rifle bullets generally fail to expand (i.e. 1300-1800 fps). While these rounds garnered a following in competition (e.g. the .30-30 in silhouette, the .270 Ren in NRA silhouette, etc.), poor bullet expansion in the hunting fields led handgun hunters to turn to other cartridges. For the investment of a single hollow-point mould, these "competition only" T/C's can be transformed into excellent hunting weapons. Other T/C chambering's that are already "hunt-worthy" can have their versatility extended considerably through the use of cast hollow-point bullets. In addition, some old cartridges for which expanding ammo is simply not available can be given new life when loaded with a suitable cast hollow point. Let's look at some examples of each.


The .270 Ren and the 139 grain Ideal 280412 HP, a fine combination for fur-bearers.

.270 Ren: .270 Jacketed bullets were designed for muzzle velocities of 3000 fps, and don't expand at all at .270 Ren velocities (1400-1600 fps). As a result, these jacketed spitzers behave pretty much like a FMJ spitzer, and they just don't have the diameter or velocity to carry much "thump" from this little gun. However, an expanding 100+ grain .270 bullet at these velocities makes a dandy varmint round. The Ideal 280412 HP drops from the mould at 135 grains (139 checked and lubed) when cast of WW alloy sweetened with 2% tin. 9.0 grains of H-110 motivates this bullet to 1425 fps from a 10" Contender. Expansion of this load is positive, and accuracy is superb. In my gun, this load shoots well above the iron sights, requiring the use of a scope to get point of aim and point of impact to jive, but groups are one ragged hole at 50 yards. This level of ballistic performance is intermediate between the Ruger Blackhawk .30 Carbine and typical .357 Magnum ballistics (with significantly better sectional density than either), making this combination ideally suited to javelina-sized game, coyote and other fur-bearers, like fox and bobcat, and perhaps even turkey (where handguns are legal for turkey). This cast HP expands in a manner similar to the Nosler Partition (i.e. after the front half expands, the petals break away, leaving the wadcutter back half to punch out the other side), which should result in small exits on the furbearers, and therefore less pelt damage. The cast HP makes a legitimate hunter out of the .270 Ren.


The .30-30 Winchester loaded with the 157 grain Lyman 311466 HP. Expansion of this bullet at 1800 fps is violent.

.30-30 Winchester: The 10" Contender chambered for the .30-30 Winchester cartridge has always been kind of an "odd duck". When the 10" .30-30 was first introduced, standard weight jacketed bullets (150-170 grain) didn't expand at the velocities obtainable from this little gun (1700-1800 fps), but they were very effective at knocking over steel silhouettes. Lighter weight varmint bullets expanded, but ballistics were not uniform with this combination of a large case and short barrel (this is why Steve Herrett and Bob Milek developed the .30 Herrett). Thus, the 10" .30-30 had a brief run of popularity in silhouette circles, then faded from the limelight as flatter-shooting, lighter recoiling cartridges and longer barrels came into their own. It wasn't until Nosler came out with their line of fragile Ballistic Tip bullets that the 10" .30-30 T/C really had suitable hunting bullet, but by this time other cartridges had taken center-stage in the handgun hunting press. The Guy Loverin designed Lyman 311466 HP weighs 157 grains after the addition of a gas-check and lube. Loaded over 32.0 grains of H4895, this bullet leaves a 10" Contender at 1790 fps. 5-shot groups at 50 yards run 2 1/2" (iron sights), and expansion is violent.

These are flat-shooting, hard-hitting and accurate loads, that give the deer-hunter all that he could ask for from a 10" .30-30. The combination of a cast HP with an iron-sighted 10" .30-30 Contender makes for a very portable, very practical hunting tool for deer-sized game. The "odd duck" has grown a leaden fist.

The 6.5 TCU and the 122 grain Ideal 266455 HP -- a fine combination for critters up to about 100-150 pounds.

6.5 TCU: The 6.5 TCU was designed by Wes Ugalde specifically for the Contender and silhouette competition. The chambering specifications adopted by T/C gave the 6.5 TCU a very long throat so that heavy bullets could be seated long, to maximize knock-down power on those heavy steel rams, 200 meters away (chamber casts that I've made on several factory barrels have revealed that the factory throat is almost half an inch long and commonly as much as .267" in diameter). This over-sized throat means that short varmint weight bullets (i.e. 85 to 100 grain) have an excessive jump to reach the rifling and typically have accuracy problems, while the 120 and 140 grain bullets (that are long enough to be seated to reach the lands) tend to shoot very well indeed. However, the limited case capacity provided by the blown out .223 case means that the 140 grain jacketed bullets are going too slow to expand. Therefore, as far as the handgun hunter is concerned, the 6.5 TCU is basically a one bullet weight gun. The 120 grain bullets are exceptionally good deer bullets (particularly the 120 Nosler BT and 120 grain Speer), and flatten deer/antelope way out of proportion to the round's pipsqueak appearance, but unfortunately they don‘t expand worth beans on pint-sized varmints. The 85 and 100 grain varmint bullets expand just fine at 10" TCU velocities, but accuracy is generally so poor that hitting yon varmint can be frustrating (3+ MOA is not unusual for the lightweight bullets). This is where cast HP's come in -- by using an appropriate cast HP, it's possible to have them be long enough to align/engrave properly, and you can cast them large enough to fit the throat snugly and still be soft enough to expand on varmint sized game. The throat on my factory 6.5 TCU barrel runs .267" and I size all cast bullets for it to .266" (bullets sized .264" give poor accuracy). The Ideal 266455 HP weighs 122 grains after the installation of a gas-check and lube. When this fine bullet is loaded on top of 26.0 grains of H4895 a muzzle velocity of 1838 fps is obtained. 5-shot groups at 50 yards run right at one inch and expansion is excellent. Because of the fine performance of the 120 Nosler and Speer jacketed bullets on deer, I tend to think of this cast HP load mostly for vermin (this is a favorite coyote load), but it might also serve nicely for smaller deer and exotics. Again, this cast HP displays expansion behavior similar to the highly regarded Nosler Partitions, which makes it particularly useful as a hunting bullet.

.357 Hartley: Conceptually, the .357 Hartley can be thought of as more or less a .35/.30-30 "Improved" (the shoulder has been moved forward somewhat in this wildcat). It is an excellent cast bullet round, and is well-served by a wide variety of cast bullet designs (my 10" .357 Hartley is particularly fond of the 250 grain LBT LFN at 1400-1500 fps). Being based on the .30-30 case, this wildcat faces the same challenges as the .30-30 when housed in a 10" Contender -- jacketed bullets that are light enough to expand may deliver less than desirable uniformity due to the combination of large case capacity and short barrel, and those jacketed bullets that are heavy enough to compress the P-T curve and give good accuracy from the short barrel are going too slow to expand (again, this is why Steve Herrett and Bob Milek developed the shorter .357 Herrett). The Lyman 358009 HP weighs 288 grains (checked and lubed) when cast with WW alloy sweetened with 2% tin. When launched with 32.0 grains of H4895 this blunt behemoth achieves 1460 fps and delivers positive expansion, and excellent accuracy (5 shots into an inch and a half at 50 yards with iron sights). This is basically .44 Magnum performance, with a holiday helping of sectional density, and not only expands well, but should also penetrate nicely (I haven't shot anything with this one yet). In short, it promises to be excellent 100 yard thumper for deer, black bear, elk sized critters in heavy timber.

The .357 Hartley loaded with the 288 grain Lyman 358009 HP. This load delivers 1460 fps from a 10" Contender; expansion is positive.

Old-Timers:

Shooters have a tendency to be historically minded. One manifestation of this is the practice of exploiting the easy "wildcat-ability" of the Contender to rejuvenate old low-pressure black-powder cartridges from the 1870s and 1880s (e.g. 40-82 Winchester, .50-70 Government). While the full-length Sharps cartridges would make an odd bed-fellow for a 10" Contender, the somewhat smaller .40-50 Sharps Straight is right at home in this portable platform.

The .40-50 Sharps Straight loaded with a 214 grain Winchester HP. An old-fashioned deer cartridge, loaded with style!

.40-50 Sharps Straight: The purpose of this exercise was not to see how much velocity could be squeezed out of some poor, helpless, 120 year-old geezer of a cartridge, but rather to rejuvenate the old Sharps round and reproduce its black-powder ballistics (265 grain lead bullet at 1360 fps) from a 10" Contender. This is easily done, and at moderate pressures. A variety of .40 caliber cast bullets weighing between 200 and 330 grains have been tested and shoot just fine in this little gun, and while they make legitimate hunting loads in their own right, I was also looking for an expanding bullet for deer-sized game. A vintage Winchester HP mould for the .40-65 was obtained to scratch this particular itch. This mould had been modified by milling off the top of the mould blocks to remove the base band on the bullet; it drops a plain-based bullet weighing 214 grains when cast of 20-to-1 alloy. When loaded with 35.0

grains of 3031 this bullet leaves the 10" .40-50 Sharps Straight Contender at a little over 1400 fps. Accuracy is good and expansion is positive. This is a very fun gun to hunt deer with (you should see some of the looks I get from other hunters when they ask me what I'm hunting with!). For those of you thinking that this is basically a .41 Magnum with 1880s panache, you get a gold star.

Lyman doesn't make very many HP moulds anymore (only the Gould .45-70 bullet, #457122, and the Devastator handgun line of HPs are cataloged at this point). However, Lyman/Ideal HP moulds show up on the used market regularly and can be found at gun-shows and online. In order to cast high quality HPs, turn up the pot temperature and cast fast. Keep that HP pin hot! In general, you should keep the antimony content of your alloy below 4% (to minimize brittleness) and make sure to include at least 2% tin (for improved "castability"). It's an easy matter to vary the hardness of your alloy to tailor the expansion of your cast HP's to your exact wants and needs (20-to-1 for the soft stuff at lower velocities, and "sweetened" WW alloy for the harder bullets at higher velocities are good places to start).

For best accuracy, size the cast HP to be a snug fit in the throat of your barrel (and remember that T/C throats tend to be somewhat oversized). As a result, a little thumb-pressure may be needed to chamber these rounds. Also, for those who aren't used to loading cast bullets in bottlenecked cases, make sure you flare the cases (just as you would typical handgun loads) to avoid damaging the bullet’s base during seating. The bullet should slide into the case as though greased (it is after all). If you feel unusual resistance, or the stepwise stop-n-go entrance of the driving bands, then you’re probably damaging the bullet during the seating operation and need to open up the case mouth a little more. I made a universal flaring die (from a surplus 9mm expansion die) for this operation for all my cast bullet shooting, and it works quite nicely. A gentle flare is all that's needed.


Home-modified universal flaring die

It's not necessary to red-line the loads to get reliable bullet expansion out of the Contender. It's simply a question of balancing the bullet construction to the velocity. The cast hollow-point bullet allows the Contender shooter to get reliable bullet expansion in a velocity range where jacketed rifle bullets typically fail to expand, thereby allowing the handgun hunter to enjoy the hunt with guns that might otherwise get left at home.

- Glen E. Fryxell

Safe Handling Of Lead When Casting *And* Tumbling Brass

By: Glen E. Fryxell

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Question from a reader: *I'm interested in casting lead bullets. My concern is lead poisoning and my 2 1/2 year old son. Of course I'll do all of this out in the garage, but will the smoke and vapor accumulate on the walls to the point where simply touching them could cause problems? How old can a child be before exposure isn't quite as harmful? I'm willing to put casting off for a few years if that's what it takes.*

As a Ph.D. chemist involved in the environmental chemistry of heavy metals and heavy metal toxicology, perhaps I can add a few helpful comments here. First off, you are right to be concerned about your children. Lead is considerably more dangerous to kids than it is to adults. A healthy 200 lb man can carry a lead burden (with no symptoms) that would cause severe mental retardation in a 5-year old. This is because one of the main effects that lead has is on the developmental biochemistry of the brain and spine. Once you've grown up, lead can't enter that particular pathway anymore. There are still other toxicity mechanisms to be concerned about, but the neurological development of children is easily the most serious. If you want to learn more about lead and its effects on kids, the CDC has an excellent report that they will send you free of charge from their website (I recommend this report to anyone who shoots cast bullets -- notice I did NOT say "bullet casters").

As to your concern about fumes and vapors, my opinion is that with the fan you describe, that is the least of your worries. I cast in a lab-grade fume hood in my garage that should provide similar ventilation to what you describe. I have been actively casting bullets for about 10 years. My wife has her blood chemistry evaluated quarterly as a result of having MS. They can't find ANY lead in her blood. Not just acceptably low levels, they can't find ANY. So, with adequate ventilation, general lead vapor contamination can be easily controlled or eliminated.

I would be much more concerned about general "lead housekeeping", especially with small, teething age children around. Discovery of an interesting new object seems reason enough for a child to put that object in their mouth and chew on it (this is why we got rid of lead-based paints). Ingots, stray sprues and shiny new cast bullets are all potential teething rings, and should be kept away from children.

Don't think that just because you aren't casting your own bullets that you don't run any risk from lead poisoning. T'aint necessarily so! Simply handling/loading commercial cast bullets followed by eating, drinking or smoking can still put lead into your body. As mentioned above, **WASH YOUR HANDS BEFORE EATING!** Also, shooting on an inadequately ventilated indoor range can give you a substantial lead dose from the airborne lead oxide aerosol from the primers.

I know of at least two individuals (each of whom haven't cast a bullet in many years)

who have suffered from severe lead levels as a result of shooting on an inadequately ventilated indoor range. One had to go through over a year's worth of IV chelation therapy and the other should, but is too stubborn (or too afraid of needles).

I have been an active bullet caster for about 10 years now and my bullet casting has brought me countless hours of pleasure, education and satisfaction. It's affordability has allowed me to practice enough to become an Expert class bullseye shooter and allowed me to shoot odd-ball calibers that commercial jacketed bullets weren't available for. It is a wonderful hobby, but like any other aspect of guns, you have to THINK about what you are doing and how you are doing it. Just like handloading, bullet-casting is only as safe or as dangerous as you make it.

Question from a reader: *I've often wondered about the dust from my brass tumbler. It seems like all the residue would collect in the media and would be harmful. Is that in fact a danger?*

I have often wondered about that myself. I have no hard data on that one way or the other, but I believe that lead contamination of tumbling media is inevitable due to residues left in the cases from the lead styphnate priming compound.

BUT, I haven't lost any sleep over it and here's why. Seven or eight years ago I was visiting a friend of mine who is a commercial reloader; Mike processes more brass in a day than most of us do in a year (for brass tumblers he has 4 cement mixers going on his back porch at all times). I noticed that after he put his brass in the mixers, he would add water. I asked him about this, and his response was "Ask any machinist, when you want to polish metal, do they polish it wet or dry? They polish it wet." Water also helps to keep down the air born particulates (ask any road crew, wheat farmer or baseball groundskeeper). The lead is still there in my tumbling media, it's just no longer easily inhaled. Now before you go hosing down your tumbler, let me emphasize that there is such a thing as too much of a good thing! For an average reloader's tumbler (12-14" in diameter) that is properly filled with media, all you need is about a shot-glass full of water, and no more than a 1/4 cup (more will just make your media clump-up badly, make everything soggy, get caked-up media stuck inside your cases and make the tumbler work harder to clean less efficiently). Add the water when the tumbler is going so that it gets dispersed evenly throughout the media. This is an electrical device and there are potential shock hazards involved, so make sure the water goes into the tumbler bowl and not on the motor or floor. Your brass will come out cleaner, come clean faster and airborne dust will be significantly reduced.

- Glen E. Fryxell

Cast Bullet Alloys and Obturation

By: Glen E. Fryxell

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Bullets cast of very hard alloys seem to be quite the rage these days, especially with the commercial bullet casters. Sure, hard alloys have their place, but there's not really much need for ALL cast bullets to have a Brinell hardness of 24, especially not for use in everyday sixguns. In fact, these hard bullets may well be inadvertently causing leading. How?

These commercial alloys are commonly too hard to "bump up" (or obturate) and seal the bore at typical revolver pressures. The resulting blow-by of the hot gases past the bullet's bearing surfaces can leave significant lead deposits in the barrel.

What is obturation and is it really an issue? Obturation is the plastic deformation of the cast bullet alloy due to the force of the expanding gases on the bullet's base. How do we know about it? Many years ago, some intrepid sixgunners fired lead bullet loads from barrel-less revolvers into snow banks, oiled sawdust and such. Recovered bullets showed significant evidence of base expansion. These experiments may not be conclusive, but they do suggest that cast bullets do indeed obturate, given that the alloy is appropriate for the pressures generated. In the intervening years, extensive experimentation has revealed the empirical correlation of 3 x 480 x Brinell Hardness Number (BHN) (or more simply, 1440 x BHN) as an estimate of the minimum peak pressure required for bullet obturation (the reason for the "3 x 480" format is the number "4 x 480" also has significance, and this format makes it easier to remember both formulae). Thus, a bullet with a BHN of 24 (typical of commercial hard-cast bullets) will not undergo plastic deformation and obturate until pressures exceed 34,000 psi.

So why are commercial cast bullets made so hard? Simple, hard bullets withstand the rigors of shipping much better than do soft bullets. Nobody wants to order cast bullets made of the ideal alloy for their pet .44 Special Triple Lock, only to have the bullets show up on their doorstep looking like chewed up pieces of bubble-gum. Also, the commercial caster has to make a product that is as generic as possible so it will satisfy the greatest number of customers, and hard bullets handle rough guns and sloppy loading techniques better than soft bullets. The bottom line is commercial cast bullets are usually cast to a BHN of 24 as a means of damage control, not because hardness makes for a better projectile.

Recently, I did a simple little experiment that demonstrates the concept of bullet obturation and the value of matching the alloy to the internal ballistics of the cartridge. Using the RCBS 45-255 Keith SWC mould, I cast one batch of bullets with wheel-weight alloy (plus about 1% tin), and a second batch using linotype alloy. The wheel-weight bullets weighed an average of 266 grains, while those cast of linotype weighed an average of 255 grains. All bullets were sized .452" and lubed with my homemade Moly lube (equal parts beeswax and Sta-Lube Extreme Pressure Moly-Graph Multi-Purpose Grease), loaded over 9.0 grains of Universal Clays into W-W cases, and primed with Federal 150 primers. These .45 Colt loads were then test fired for velocity (all chronographing was done within a 1 hour period, under constant weather conditions). The results are summarized below:

Velocity Data From .45 Colt Trials with RCBS 45-255 Keith SWC				
Bullet/Gun	3" S&W M625	4 5/8" Ruger Black Hawk	6" S&W M25	7 1/2" Ruger Black Hawk
Linotype (255 gr)	838 fps	887 fps	872 fps	940 fps
WW (266 gr)	879 fps	942 fps	947 fps	999 fps
Difference	41 fps	55 fps	75 fps	59 fps

No, the numbers are not transposed. The lighter, harder bullet was traveling an average of 58 fps slower than the heavier, softer bullet in what was otherwise identical ammunition. The same amount of chemical energy was released each time the hammer fell, it's just a question of how efficiently that energy was converted into velocity. All else being equal, the lighter bullet should end up going faster, and the fact that it was found to be slower indicates that some of the energy was lost as a result of gas leakage around the linotype bullets. This is due to the fact that this .45 Colt load generates only moderate pressure (about 16,000-18,000 psi) and the linotype bullets (BHN 22) were too hard to "bump up" and seal the bore effectively, whereas the softer wheel-weight bullets were able to do so (wheel-weights have been variously reported to have a BHN between 9 and 12, I generally use 10 as being representative). Using the empirical correlation outlined above, the linotype bullets would require a peak pressure of almost 32,000 psi to seal the bore effectively, while the wheel-weight bullets accomplish this feat at a modest 14,000 psi (easily surpassed by this load). Clearly, the handgun hunter is better served with the more moderate alloy, since more weight and more velocity results in greater penetration and better wound channels.

- Glen E. Fryxell

Skeeter's Bullets

By: Glen E. Fryxell

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Skeeter Skelton was a handgun man. He was a lawman, an outdoorsman, and a competitive shooter, but the bottom-line is that he was plain and simple a gun-crank whose favorite form of blued steel slid into a holster. At one time or another he owned and/or shot just about every variation on the handgun theme in existence; Colt SAA's, Lugers, S&W's, 1911's, Ruger Blackhawks, Pythons, and more. He loved his .45 Colts, and .44 Specials, the .32-20s and .45 ACP's, his flat-top .44 Magnum and the ever-popular .22s. But he positively doted on the .357 Magnum. Whether this was because of his extensive experience as a lawman, or because he lived most of his life in the desert southwest where many of the hunting "chores" (javelina, turkey and jack rabbits) were readily handled by the .357 Magnum, or simply because he was an eminently pragmatic man, it really doesn't matter. The sermon from the scrub oak was the same, Skeeter Skelton was positively enamored with the .357 Magnum. Nor was he shy about declaring his preference in projectiles; while he generally preferred plain-based bullets for his big-bore shooting, he was resolute in his preference for gas-checked cast bullets in the .357 Magnum. After trying out a variety of different cast bullets, Skeeter settled on the Lyman 358156, a GC-SWC designed by Ray Thompson, and its hollow-pointed kid brother (the 358156 HP).

Skeeter was also one of the more knowledgeable handloader's of the last 50 years. He performed many experiments and tried lots of combinations to see what worked and what didn't. But given an option, his sweat-stained pragmatism lead him focus on two of the best all-time pistol powders, Unique and 2400. This logic saved his readers from having to buy dozens of different powders to assemble his preferred handgun loads, but it also has its limitations.

One of the more popular question in gun shops, discussion boards and magazines, is "If you could only have one gun...". Well, once upon a time back in the early 1960s, an editor asked Skeeter this question, and phrased it from a unique Cold-War perspective, "If you could only have one gun with which to survive nuclear holocaust, what would it be?" Hmmm.. Skeeter argued that both gun and ammo would need to be small and easily transported (preferably by horseback) since he would want to "weather the storm" in the mountains, it would need to be easily reloaded using tong tools (no loading benches in the rimrock), it would have to shoot bullets cast over a campfire, it had to be powerful enough for both self-defense and hunting, but frugal enough that a valuable stash of components would outlast the hostilities. His conclusion was logical, the .357 Magnum.

The kit that would go along on such a trip included ingots of bullet metal, a brick of primers, a pound or two of powder, an appropriate tong-tool, gas-checks, spare brass, a small cast-iron lead pot and ladle, a pair of mould handles and one bullet mould -- the 358156 HP (he argued that standard SWC's could be cast by using a shortened spud, or by dropping BB's into the cavity). All this was packaged in a small Army surplus canvas backpack that was easily grabbed on a moments notice. One of the most knowledgeable handgunners of the smokeless era had chosen these two bullets (the 358156 SWC and HP) to feed and defend himself and his family for "the duration" in the event of nuclear holocaust. While the editor's scenario may be viewed as a bit extreme today, Skeeter's was not a trivial decision, nor was it a trivial endorsement.

I feel that part of the reason that Skeeter was so adamant about GC bullets in the .357 was due to his choice of powders. Both Unique and 2400 have fairly high nitroglycerine content, which leads to relatively high flame temperatures, and in high-pressure small bore cartridges (where expansive cooling doesn't kick in as quickly due to the lesser expansion volume), leading can be a real problem with plain-based bullets. However, GC bullets are not the only solution to this problem). But Skeeter worked up his loads in a simpler time with a much more limited powder selection that we enjoy today. Unique and 2400 delivered the ballistics that he wanted and did it in a highly reliable fashion, so that's where he hung his hat (and his gas-checks).

We've had a lot of very good powders come along since Skeeter did those campfire experiments and I wanted to see how some of the newcomers stacked up against his landmark loads. The 358156 SWC's I used were cast from wheel-weight alloy with about 2% added tin and water quenched as they fell from the blocks. They weighed 161 grains thus cast, after being checked and lubed. The 358156 HP's were cast of similar alloy, but allowed to air cool after casting. They weighed 153 grains checked and lubed.

Test loads for Lyman 358156 GC SWC-HP
153 grains checked and lubed
Velocities

Powder	Charge	3"	6"	8 3/8"
W296	16.3 gr	1125	1312	1360
2400	14.0 gr	1141	1307	1357
AA #9	13.0 gr	1080	1196	1231
AA #7	10.5 gr	1088	1273	1301
HS-7	10.0 gr	1115	1267	1278

Test loads for Lyman 358156 GC SWC
161 grains checked and lubed
Velocities

Powder	Charge	3"	6"	8 3/8"
W296	16.3 gr	1175	1324	1343
2400	14.0 gr	1177	1350	1368
AA #9	13.0 gr	1056	1226	1222
AA #7	10.5	1122	1202	1262
HS-7	10.0	1088	1221	1267

Three guns were chosen for this evaluation: a 3" CS-1, the S&W 686 that was made for the US Customs Service back in 1988, a 6" Classic Hunter 686 made in the same year, and an 8 3/8" S&W 586 dating from 1984 (this gun is a varmint hunter's delight!); all are guns with well-established accuracy capabilities. Most of the accuracy testing was done with the Classic Hunter, comparison tests were run with the others; velocities were collected using all three guns.

All loads shot reasonably well in that 10 shot groups generally hovered just under 2" at 25 yards, with very few over that mark. As expected, 296 and 2400 were the velocity leaders, but it came as a pleasant surprise that they were the accuracy leaders as well, with 10-shot groups generally running in the 1 1/2" range at 25 yards for the full-sized guns and somewhat larger for the 3" snubby. The most accurate load tested was the 358156 HP loaded over 16.3 grains of 296 sparked with a CCI 550 primer at 1 1/4" from both the 6" Classic Hunter and the 8 3/8" 586. Both 2400 and 296 drove either of these bullets to 1300-1350 from the full-size revolvers and 1150 fps or so from the snubby. These were numbers that the other powders flirted with, but generally fell just short of. Skeeter liked to load his 2400 .357 Magnum loads a little stiffer than those shown here, but today's 2400 seems to burn a bit hotter than that of earlier days, so I'll stick with the 14.0 grain load. Either way, a cast HP at 1300+ fps is a deadly load.

Yeah, a lot of powder has gotten burned since Skeeter originally worked up his .357 Magnum loads for the 358156 back in the Cold War era of the 1950s. We have lots of options now that he didn't have, but none of them are decidedly better than what he finally settled on (some are just as good, but none are better). Good pair, the 358156 and the .357 Magnum. Seems I've read that somewhere before... Vaya con Dios Esquiter.

- Glen E. Fryxell

The Bullets of SSK

By: Glen E. Fryxell

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We have learned much over the last century about what makes an accurate, and hard-hitting cast bullet. An extended bearing surface was found to ensure better bullet alignment within the throat, leading to better concentricity of the bullet while it's being engraved, which in turn leads to a more stable, accurate flight. However, this longer bearing surface requires additional lubrication, so the most successful of these designs decorated their longer bearing surfaces with multiple lube grooves, as exemplified by the Loverin designs (which are still among the most accurate cast bullets designs available today). Many cast bullet designs have also featured a bore-riding nose section, the purpose of which is to ride the top of the lands, helping to center the bullet as it's leaving the throat and starting to be engraved. The role of the meplat in crushing meat and opening wound channels has been well-recognized for several generations. Elmer Keith put big, flat noses on his SWC's back in the late 1920's for exactly this reason, and his classic designs have proven themselves as killers of the first order for the last 70+ years. Others have followed his lead by putting a large meplat onto their hunting bullets, most recently would be the wide-flat-nosed (WFN) designs available through Rob Applegate.

SSK Industries (www.sskindustries.com) has been making precision-crafted guns and accessories for over 25 years now. They are perhaps best known for their finely made custom Contender and Encore barrels, available in a wide assortment of cartridges, many of which originated at SSK. More recently, J. D. Jones et al. have also made a name for themselves doing big-bore conversions on Ruger Number 1's. They also do specialty work for law enforcement involving full-auto and suppressed weapons as well.

J. D. is also a globetrotting handgunner, traveling the world over to hunt diverse species in exotic locales, field-testing the products of his shop. He subscribes to a very simple philosophy when it comes to hunting – do whatever it takes to make 2 holes (entrance *and* exit) in whatever critter you're hunting, from whatever angle the shot is presented. This philosophy has been manifested by using high-performance wildcat cartridges, premium controlled expansion projectiles, and heavyweight cast bullets. The key is to make sure that the cartridge does not stress the bullet beyond its structural limitations, and that the bullet has sufficient weight and sectional density to penetrate deeply. This philosophy is blatantly obvious in J.D.'s cast bullet designs. The SSK flat-pointed (FP) bullets are designed to provide maximum penetration capability for their respective cartridges. These heavyweight cast bullet designs aren't needed for light, thin-skinned game like whitetail and pronghorn (and in fact J. D. himself recommends expanding jacketed bullets for these animals), but they earn their keep when the quarry gets bigger, hairier and of nastier disposition. High velocity lightweight bullets can kill spectacularly, but then again, they can also fail spectacularly. A heavyweight, big-bore FP revolver bullet will do neither, it will just plow through flesh and bone, and leave a big, leaky hole in its wake. If well-placed by the hunter, such a wound channel will reliably result in a dead critter in relatively short order. I can testify that a good sixgun loaded with SSK's heavyweight FP's is a very comforting companion in bear country…

J.D.'s extensive hunting experiences have led to some firmly held convictions about what a good cast bullet for hunting should look like, and these features were incorporated into the SSK mould designs. The design features that are common throughout the SSK line are a healthy meplat on top of a truncated cone ogive, that runs into a short bore-riding nose, and a small forward driving band, a crimping groove (sometimes 2, for different OAL's), and lots of bearing surface, usually with multiple lube grooves. Adequate amounts of bearing surface are a critical component of determining whether or not a cast bullet will be capable of good accuracy. The SSK designs all have more than ample bearing surface (generally .550" to .600"), and all have delivered excellent accuracy in my guns. This extra bearing surface goes hand in hand with the extra bullet weight that was targeted for exceptionally deep penetration. The SSK designs were made in plain-based, bevel-based and gas-checked forms, so the customer could get exactly what he (or she) wanted. J. D. contracted with NEI (www.neihandtools.com) to have these moulds manufactured according to his specifications. Originally, these mould blocks were only available through SSK. The blocks of the moulds were stamped "SSK" and so that's what I've gotten used to calling them, but, in point of fact, they were originally marketed under the "JDJ" label. Some time later, JD sold the rights to the JDJ mould designs to Pete Pi at Cor-Bon (www.cor-bon.com), and the moulds were subsequently available for a short time through Cor-Bon (this is no longer true). Cor-Bon at one point incorporated these bullets into their hard-cast hunting line of ammunition, but this ammo has featured LBT cast bullets for the past several years, which means a shooter must cast his own if he wants to shoot the JDJ sledgehammers today. The internet has made finding the SSK moulds on the used market fairly straightforward, both through businesses specializing in used moulds and via the electronic auction houses.

These are heavy bullets. As with any heavy bullet, they are best served by big, strong guns as their launching pad; the SSK FP cast bullets just seem to go hand in hand with Ruger revolvers and the T/C Contender.

The .41 Magnum - NEI #225B, a PB variation on the .411-300-GC theme.

As is my usual habit for magnum revolver bullets, I tend to cast these bullets out of WW alloy with about 2% added tin, and then water quench the bullets as they fall from the blocks. This gives a bullet that has a hardness of around 16-18 BHN, is not the least bit brittle, and weighs as much as 5% more than the listed linotype weight. I lube these (as I do virtually all my cast bullets) with my homemade moly lube (50/50 by weight of beeswax and Sta-Lube Extreme Pressure Moly-Graph Grease). No significant leading was encountered with any of the loads described.

We'll start with the littlest of the big bores, the .41 Magnum. The SSK bullet for .41 is listed as a 275 grain FP, that runs 286 grains when cast as described above. It is .900" long, has a meplat that measures .275" in diameter (i.e. identical to Elmer

Keith's time-proven 429421). Some .41 Magnum revolvers don't shoot long, heavy bullets like this very accurately, but my Redhawk slept through that particular sermon. It shoots these just fine, usually keeping 12 in about 1 ½" to 1 ¾" at 25 yards (but only if I don't have that second pot of coffee in the morning!). I must confess that I haven't done much load development with this bullet, the first load I tested was 18.5 grains of Winchester 296 over a CCI 350 primer, which delivered 1376 fps from the 7 ½" Redhawk.

It continues to deliver such consistent, accurate performance that I've just stopped looking for other loads (it's not uncommon for the standard deviation for a shot string to be less than 4 fps). Long range plinking with this combination reveals that this bullet at this velocity is remarkably flat-shooting. Some guns are interesting simply because of what they are (the Model 1950 Target, the timeless 1911, the Flat-Top Super Blackhawk); some guns require a little "dressing up" to achieve a similar level of desirability. The Redhawk is not among my favorite revolvers, but the way it shoots the .41 SSK bullet, it's such a flat-shooting, accurate, hard-hitting package, that it's hard for me to ignore!

The .44 Magnum NEI #266, a PB variation on the 429-330-GC theme.

In terms of handgun hunting cartridges, the .44 Magnum is truly a definitive landmark. Likewise, in terms of handgun hunting bullets, the SSK .44 FP has an equally important and unique niche in handgun hunting history. This bullet loaded into .44 Magnum revolvers has penetrated the thick, tough, pithy skulls of bull elephant, and slain them in their tracks. It has laid low Cape buffalo, bashed the big bears, and slain kudu bulls and tough zebra stallions. While other bullets (e.g. the 429421) may be better suited to deer/antelope sized game, the SSK .44 FP has a truly remarkable history of killing very large and very tough animals. It weighs 323 grains cast of WW alloy (linotype weight is listed as 310 grains). It is .940" long and has a meplat of .275" (which just so happens to be identical to the 429421), and it seems to penetrate flesh and bone like a drilling-rig punches through soil. You know how sometimes different guns get assigned specific tasks? I have a stainless 7 ½" Super Blackhawk that is my "heavy bullet .44" (so I don't have to make sight corrections each time I'm working with different bullet weights). This gun takes to the SSK FP like my 130 lb. black lab takes to a deer's leg bone! Launched with 20.5 grains of W296, this bullet leaves the SSBH at 1274 fps, and 12 shot groups consistently hover right at 1 ½" (as with all of my .44 magnum loads, the spark is provided by the CCI 350 primer). Even after a busy afternoon and hundreds of rounds of this load, the barrel is shiny and clean. The only drawback to this bullet is that when loaded into .44 Mag cases, the OAL of the loaded round is just long enough that most of the common 50 round ammo boxes won't close. That's OK, because a 20 round slip-top box works just fine.

The SSK .44 Magnum bullet has a gas-checked big brother. It weighs 349 grains checked and lubed, when cast of WW alloy. It's .985" long and has a meplat of .290" and very similar ogive and bore-riding nose to the lighter .44 plain-based bullet described above. In my opinion, this bullet is too heavy for the .44 Magnum, but would be right at home in the .445 SuperMag or, in one of my all-time favorites, the .444 Marlin Contender. Over the years, I've learned a few things about loading the .444 Marlin for a 14" Contender: for bullets under 300 grains, it's hard to beat 4198 and Re 7, for bullets heavier than 300 grains, H322 and AA 2520 are superb,


The .444 Marlin Contender (NEI #266, 429-330-GC)

and magnum primers give superior uniformity across the board. My first .444 Marlin Contender barrel was cut with a SAAMI spec reamer, and while it shoots reasonably well, I've never been able to get it to shoot below about 1 ½ MOA on any kind of regular basis, presumably due to the .008-.009" slop between the dimensions of a loaded round and the chamber. A custom reamer was made up with only .003" clearance (which just *barely* cleaned up the T/C .44 Magnum chamber), and a somewhat more civilized leade, and this reamer was used to re-chamber a stainless 14" Hunter .44 Magnum barrel. The 1 in 20" twist used in the T/C barrels makes them ideally suited for heavy bullets like the 349 grain SSK GC-FP. My favorite load for the SSK 350 grain FP bullet in the .444 Marlin Contender is 42.0 grains of H322, sparked with a Fed 215 primer to give right at 1650 fps. 5-shot groups at 50 yards are typically 1 ragged hole with this combination. This is a very accurate cast bullet, and with 350 grains of bullet metal flying at 1650 fps, topped with the SSK meplat/ogive, it punches a deep straight hole through pretty much anything a hunter is going to steer it towards.

The .45 Colt is one of the truly great revolver cartridges, and the SSK bullet design allows the timeless Colt round to be all that it can be. NEI actually made two closely related designs for SSK, design #320A and design #320B. #320A drops from the blocks at 335 grain when cast of WW alloy (linotype weight is listed as 325 grains), is .875" long and has a meplat diameter of .300" (just for reference, this is almost exactly halfway between the 429421 and the 454424). The 335 grain slug loaded on top of 21.0 grains of Winchester 296 leaves a 7 ½" Ruger Bisley Blackhawk at 1245 fps, and provides exceptional accuracy (12 shot groups of 1 ¼" or less are not unusual). Like its .44 Magnum "little brother", this bullet penetrates like a jack-hammer. It punches through heavy, dense, creosote-saturated railroad ties like they're not even there.


The .45 Colt – (NEI #320A, .451-325-PB


The .45 Colt – NEI #320B, 451-345-PB.

The somewhat chunkier #320B weighs 349 grains when cast as described, is .895" long and has a meplat of .320" (similar to Elmer Keith's 454424). When loaded on top of 19.0 grains of W296 and sparked with a CCI 350, the 350 grain SSK bullet leaves my 7 ½" Ruger Bisley at 1125 fps. While not quite as accurate in this gun as the 335 grain bullet described above, it nonetheless typically turns in 12 shot groups right around 1 ¾", well inside "minute of Cape Buffalo" (a highly technical concept, mathematically derived from the level of accuracy required to hammer large animals at halitosis distances). With the additional bullet weight and the fatter meplat, this is an outstanding hunting load!

In summary, J. D. Jones designed a series of first-class hunting cast bullets. The SSK designs provide ample bullet weight, sectional density, meplat diameter, bearing surface, and bullet lube to give the handgun hunter excellent accuracy, reliable penetration and the ability to put 2 holes in just about any critter hunted with handguns. What happens after that just depends on *where* the handgunner puts those two holes…

- Glen E. Fryxell

The "Simple" Act of Fluxing

By: Glen E. Fryxell

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Questions that often get asked by bullet casters just getting started are, "What's the best flux to use?", "How much flux should I use?", and "How often should I flux the pot?"

The source of this confusion is easy to find; just about everything that can burn, smoke or raise a stink has been reported at one point or another as a flux for bullet metal, usually with varied claims of success.

Some of the more commonly recommended materials are paraffin, beeswax, bullet lube, oiled sawdust, and rosin, as well as a variety of commercially available formulations. Heck, I've even seen used motor oil recommended to flux bullet metal (this just can't be a good way to make points with one's Better Half, or even the neighbors!). About the only thing I haven't seen recommended is tire rubber, but it wouldn't surprise me if somebody has tried it!

Let's look at what a flux is expected to do, and how some of the different fluxes work. When we melt a pot of bullet metal, we have a high temperature pool of liquid metal in contact with the air. The oxygen in the air slowly oxidizes the metal at the interface; the hotter the metal, the faster this oxidation takes place. Since this is a heated liquid pool, convection leads to rapid turnover at the surface of the liquid, and the more easily oxidized components of the melt are preferentially oxidized as this mixing takes place. The resulting oxides are almost always insoluble in the molten alloy, so they tend to separate and form a separate phase. In the case of bullet casting alloys, tin is more readily oxidized than is lead, so the tin oxide forms a "skin" across the surface of the melt.

Some of the other metals that may be present as minor impurities are even easier to oxidize, and "follow" the tin up into the "skin" (lead is pretty dense stuff and most all of these oxides are of lower density, so they float).

What we want a flux to do is to remove those impurities that affect the surface tension of the alloy and cause problems during casting (most notable here are things like calcium, aluminum, zinc and copper). In addition, we want to remove any wettable particulate matter that might go on to form inclusions in our bullets. Since tin is so valuable to the bullet caster, it would be helpful if we could slow down, or even reverse its oxidation. These are the things that we ask a flux to do.

Some folks seem to think that if they sprinkle some "magic powder" on the top of their lead pot and it pops and fizzles, smokes and stinks, then presumably all of these things are being accomplished. T'aint necessarily so. While it may be fun to put on a wizard's cap and play modern alchemist for a little while, that doesn't automatically force the chemistry to conform to the wizard's wishes.

Now that we know what we want a flux to do, let's look at how some of the different fluxes work.

Waxes, greases, oils and other hydrocarbon fluxes all serve as a sacrificial reductant and reduce the tin oxide back to the metallic state, returning it to the molten alloy, where it can still do the caster some good (reduction is the reverse of oxidation). In addition, if used in sufficient quantity to form a pool across the entire surface of the alloy (usually about 1/4" deep), then the molten wax forms a barrier to prevent oxygen from re-oxidizing the tin during the course of the casting session.

Paraffin and beeswax are both equally effective in doing this (but paraffin is much cheaper, I prefer to save the beeswax for bullet lube, where its flow properties provide major advantages over paraffin). Using paraffin as a bullet flux has the advantage of being cheap and widely available in most grocery stores, but it doesn't necessarily remove detrimental impurities, like calcium, aluminum, copper and zinc.

Some of the commercial bullet fluxes are formulations that have the advantage of generating virtually no smoke or odor (in contrast to the waxes just discussed). These formulations are commonly based on borax, or other boric acid derivatives. The way these commercial fluxes work is to combine with the oxidized components of the alloy (including any oxidized tin) and form an insoluble molten borate glass, which collects on top of the melt as a dark molten crust. This process is smoke-free and cleans the alloy very effectively, but the dark molten crust must be removed to prevent inclusions in the bullets. Unfortunately, any oxidized tin is also removed in this process. Relatively little of these borate-based fluxes is needed to effectively clean up bullet metal (only about half a teaspoon is needed for a 10 lb pot), but too much can cause problems by generating excessive amounts of this molasses-like glass that sticks to the ladle and lead-pot, and can cause inclusions if not removed.

Sawdust is another material that has been used as a flux for bullet metal, and it has the advantages of both the previous classes of bullet fluxes (it has often been employed in conjunction with oil, but all that does is make fluxing smokier and smellier). Sawdust is also a sacrificial reductant that reduces tin, thereby returning it to the melt (again, reduction is the opposite of oxidation). It also has many building blocks (lignin's, tannins, gallates, etc.) that bind to oxidized metals. Lead, tin and antimony are fairly easy to reduce back to the metallic state, others are not so easy.

Of particular interest to the bullet caster are calcium, aluminum and zinc -- all of which are difficult to reduce and all of which cause casting problems if present in any significant amount (they muck up the surface tension of the alloy and prevent the alloy from filling out the mould properly). As the sawdust chars, it can be thought of as a kind of activated carbon. Both the lignin's of the original sawdust and the oxygenated sites of the activated carbon are very effective at binding metal ions like calcium, aluminum and zinc. Thus, the advantage of sawdust is that it does both jobs, returning the tin to the melt and removing the problematic impurities. Sawdust has the added benefit of being free.

I generally use walnut sawdust, left over from my grip-making activities. Different types of wood are known to give rise to grades of activated carbon with different activities, but whether or not this would make any difference to the bullet caster I don't know (doubtful, any sawdust should work just as well, and some, like cedar, redwood and pine smell awful purty!). A heaping tablespoon is just about right for a 10 lb pot, stirred in thoroughly to begin with and then left in place. Halfway through the pot, the lead-pot is stirred again, this time the activated carbon (dross) is removed. By leaving the charred sawdust on the melt for the first half or so of the casting session, a barrier is formed to slow down the oxidation of the tin, and by removing the charred dross before reaching the bottom, the sequestered impurities are removed before they can sneak through the bottom-pour spout and possibly cause inclusions.

- Glen E. Fryxell

A Few Comments on Cast Bullet Alloys

By: Glen E. Fryxell

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Cast bullet hardness, specifically the hardness of the various alloys used to make cast bullets, has raised a lot of questions and confusion lately. A very common misconception is that leading is caused by the bullet being too soft and the lead gets stripped off or abraded away from the bullet's bearing surface as it passes down the bore. This misguided belief leads many new bullet casters to turn to expensive alloys like linotype, and/or elaborate heat treating methods to harden their bullets, thinking that this is the only way to prevent leading.

There are very, very few revolver applications that require a BHN of over 20. In my experience, revolver leading can almost always be traced to some other factor (inadequate lubrication, improper sizing, barrel/frame constriction, etc.). Only very rarely is barrel leading caused by the bullet being too soft. In support of this claim, let me point out that many muzzle loaders prefer bullets cast from 30-to-1 alloy (which is quite soft, BHN of about 9) and these smokepole slugs are routinely driven to 1300-1400 fps. In addition, high-velocity .22 Long Rifle ammo uses an even softer bullet at over 1200 fps (and if a .22 leads, it's a gun problem, not an ammo problem). Elmer Keith's favorite cast bullet alloy was 16-to-1 lead/tin, which has a BHN of only 11. This is the alloy that gave a roaring birth to the .44 Magnum using plain-based cast bullets loaded to 1400+ fps. Properly loaded and lubed, Elmer's alloy will leave a magnum revolver barrel shiny and clean after a long day shooting.

Plainly stated, hard-cast bullets with a BHN well over 20 are simply not necessary for the vast majority of handgun applications. A novice bullet caster can have much of his or her new-found enthusiasm quenched by the clamor, confusion and paranoia surrounding bullet hardness. This is a shame because understanding alloy suitability is not that complicated and bullet casting really is a lot of fun and allows a shooter (novice and master alike) to get so much more out of their hobby.

Just about every conceivable alloy has been used at one time or another to make bullets. The cast bullet alloys most commonly encountered today are linotype (12% antimony, 4% tin, BHN of 22), Lyman #2 alloy (5% antimony, 5% tin, BHN of 15), and wheel weights (the composition varies somewhat, but usually runs 3-4% antimony and about 0.5% tin and a BHN of 10-12). These hardness values are for air-cooled bullets; heat treating or water quenching these alloys will raise these values notably. For an excellent, detailed treatment of the metallurgy of lead-tin-antimony alloys and how their properties can be best exploited by bullet casters, the reader is wholeheartedly referred to the Lyman Cast Bullet Handbook, "Cast Bullets" by the NRA and "The Art of Bullet Casting" by Wolfe Press. My intent here is to provide an easily digested overview so that new casters will have a clean and simple introduction to the subject and start casting good bullets as quickly as possible.

Historically, tin was used to harden bullet alloys because it was widely available, it was easily mixed with molten lead, and it improved the "cast-ability" of the alloy considerably (tin lowers the surface tension of the molten alloy and allows it to fill out the mould more completely). However, in recent years tin has gotten to be rather expensive. In addition, it's really not all that effective at hardening lead alloys. Antimony hardens lead alloys much more effectively than does tin, and is cheaper to boot, so antimony is the primary hardening component used in lead alloys today. In addition, antimony allows the alloy to be hardened via heat treatment, something the chemistry of tin doesn't allow (and arsenic is even better for heat treating than is antimony). Antimony has limited solubility in molten lead, but tin enhances its solubility through the formation of an inter-metallic SnSb compound, which is more soluble.

Thus each component contributes something different to the whole: tin provides cast-ability (2% is really all that's needed) and "mix-ability", antimony provides hardness and the ability to harden through heat treatment, and a small amount (0.05-0.5%) of arsenic (which in and of itself doesn't harden the alloy appreciably) significantly enhances the heat treat-ability of the mix.

There's been a lot of interest in recent years about making cast bullets very hard (BHN of 20 to 35), either through the use of very high antimony content (e.g. 12%), water quenching or heat treating. The only time that such hardness is needed by a revolver shooter is when dealing with very high pressure, high velocity loads (e.g. .454 Casull). If the hardness isn't required, why use linotype at $1 a pound for sixgun fodder when wheel-weights are free, or at most about 15 cents a pound? Remember, the mighty .44 Magnum was born with plain-based cast bullets with a BHN of 11 ... and Elmer was pleased.

The metallurgical details of what happens to lead-tin-antimony alloys during heat treatment are beyond the scope of this article, but Dennis Marshall has an excellent treatise on this subject in "Cast Bullets" by the NRA. The bottom line is that lead alloys that contain antimony can be hardened considerably (10 or more BHN) by heating them to about 400F degrees for an hour or two, and then water quenching. Small amounts of arsenic enhance this tendency considerably. Somewhat similar results can be obtained by casting fast and hot and quenching the hot bullets in water (keep the water away from the lead pot and use some sort of splash control!).

It is important to recognize that lead-tin-antimony alloys work soften (as opposed to brass and steel alloys that work harden), so sizing the bullets will soften those areas of the bullet that get worked. If I'm going to shoot heat-treated bullets, then I size them first (but apply no lube), heat treat, then lube in the same sizing die (this time-consuming process is why I shoot so very few heat-treated bullets). If I'm shooting water-quenched bullets, I choose a sizer die that is just large enough that very little sizing occurs and just run the bullets through one time to get lubed (MUCH quicker and easier).

Tin and lead are infinitely soluble in one another and their binary alloys form true solid solutions. This is how chem-geeks and metallurgists say that the tin is evenly mixed throughout and does not separate. Antimony is much less soluble in lead, and lead-antimony alloys generally have some degree of phase segregation (i.e. antimony crystals surrounded by lead alloy). Lead-tin alloys tend to be much more malleable than do lead-antimony alloys, so straight lead-tin alloys are better suited for cast bullets that are intended to expand readily (i.e. hollow points), especially at lower velocities. They mushroom more smoothly and are less prone to fragment. At higher velocities, a small amount of antimony is acceptable, but it should be limited to no more than 3% to minimize brittleness and fragmentation. The harder (and more brittle) antimony alloys are better suited for bullets that are not meant to expand.

Why not just cast all revolver bullets out of linotype (BHN = 22)? The short answer is because barrels aren't perfect. The long answer is because cast bullet obturation is a good thing. Obturation is the plastic deformation of the bullet alloy as a result of the pressure applied to the base by the burning powder. By making the bullet soft enough that it can deform slightly upon firing, it does a better job of sealing the gases off behind it and minimizing blow-by and the leading that results from it.

Usually when obturation is brought up, the topic of conversation is groove diameter. I'd like to suggest that perhaps this is inappropriate. Most barrels made today are cut with a pretty consistent groove diameter; it may be "tight" or it may be "loose" but it will usually be reasonably consistent throughout its length, generally within +/- .0005" (this didn't used to be true). However, the width of the grooves/lands may well vary by several thousandths. The reason for this is during the repetitive operation of cutting the grooves, the placement of the cutter may not be exactly reproducible, or there may be chatter, or localized hard or soft spots so the cutter drags or skips. Yes, modern barrel-makers are very, very good; but minor variations in the cutting operation, or minor defects within the barrel steel can make the grooves/lands vary ever-so-slightly in width. The forward edge of the land is of little consequence because the bullet's forward momentum is continuously forcing it into this edge. Where the variation of groove/land width raises its hoary head is on the trailing edge.

Once the bullet is engraved, if the land/groove width varies, then the seal is broken on the trailing edge. How many times have you seen barrel leading "follow the rifling"? That is a sure sign that the bullet was too hard for the pressures generated by the load. This is why bullets of moderate hardness are desirable, by obturating they can seal this trailing edge. At extremely low pressures (e.g. 600-700 fps) obturation isn't quite as important since at these low pressures blow-by isn't as much of a problem and the lube serves as a floating fluid gasket and seals the gases (thereby limiting blow-by). Unfortunately, at the higher pressures that most sixgunners operate at, the lube gets blown out the muzzle if it doesn't have obturation playing a supporting role.

So, for routine sixgunning applications what do we want from our cast bullet alloy? In the 800-1000 fps range we should probably keep the alloy at a BHN of 12 or below. From 1000-1400 fps, 12 to 16 is a very useful range of hardness. For velocities of 1400 to 1700 fps, this window slides up to 14 to 20. Above 1700, linotype at a BHN of 22 is an excellent choice.

What does this mean in terms of alloys? For general all-round revolver shooting, I find it hard to beat 10 lbs of wheel weight alloy with a couple ounces of added tin. This comes out to roughly 4% antimony, 2% tin (similar to the old electrotype alloy). This makes excellent bullet metal, it casts well and is hard enough for almost all handgun applications (BHN of about 12). If harder bullets are called for, then this alloy can be water quenched from the mould (or heat treated), which raises the hardness considerably, and I commonly do this for my .44 Mag cast bullets. Its not really necessary, but the water quenched bullets are a little bit more accurate and water quenching is so easy to do, so why not? I tend to think of this approach as "tight-wad's linotype". I haven't actually measured the hardness of this alloy, but I would guess that it's running around a BHN of 18 or so. It's hard enough, put it that way...

That pretty much covers the non-expanding cast bullets. When I'm casting hollow-point bullets intended for full-house magnum loads (1200-1400 fps), then I soften WW alloy a little bit by using 8 lbs WW with 2 lbs pure lead and a couple ounces of tin. By diluting the antimony with a little extra lead, this alloy comes out a little softer (about 3% antimony, 2% tin) and has a BHN of about 11, and similar to the alloy used by Elmer Keith for his cast HP's (less brittle, more malleable, and very shoot-able). An alternate for this alloy is to mix Lyman #2 alloy with an equal part of pure lead.

For lower velocity HP loads (below 1000 fps), I have grown fond of using 25-to-1 alloy (6 lbs pure lead with ½ lb of 50/50 solder). This alloy is soft enough (BHN of about 9) to expand readily at impact velocities down to about 850 fps (depending on the HP design) and is very useful for things like .38 Special and .44 Special loads. It casts beautifully!

I only resort to using linotype for cast bullets that will be shot above 1700 fps. Expensive high antimony or high tin alloys are really not needed for high-quality revolver loads. Medium hardness alloys will do just about everything you need for sixgun shooting. If you decide that you want them to be somewhat harder, then just water quench the bullets as they drop from the mould. Most leading is caused by some form of dimensional mismatch or by inadequate lubrication, not by the bullet being too soft (don't blame the alloy for something it didn't cause). As the old adage goes, "Moderation in all things..."

- Glen E. Fryxell

Lubricating Cast Bullets

By: Glen E. Fryxell

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OK, I'm going to ask a stupid question. What does bullet lube *do*?

I'll bet most of you answered that bullet lube lubricates the passage of the bullet down a rifled bore, to eliminate galling of a soft metal as it traverses a hard metal cutting edge. Well, yeah, I suppose that's true enough, but that's not all it does, nor is it necessarily even the most important job that it does. Let's assume for the moment that lubrication is the sum total of its job -- is the lube on a given bullet lubricating the passage of the bullet that carries it, or the bullet that follows after it? Another way that I've had this question posed to me was, should the lube groove (s) be on the front of the bullet (where they could lube the passage of that bullet), or towards the rear of the bullet (where they could leave a healthy lube film for the next bullet in line)?

Part of the problem with this line of reasoning is that it assumes that the lube is delivered to the bore by simple bullet/barrel contact and smearing, and hence the lube can only lube that which is behind the reservoir (lube groove). Looking at things in this manner results in a fairly simplistic, almost static picture (hard surface, soft surface, slippery stuff in between), and the firing of a revolver shot is a very dynamic process. What *else* does bullet lube do? Or perhaps more accurately, what else is done *to* the bullet lube?

Let's just set the record straight, lube is not simply smeared from the lube grooves onto the bore, nor is lubrication the sole function of bullet lube.

There were a couple of excellent articles published a few years back in The Cast Bullet on lube pumping mechanisms. In a nutshell, the conclusions were that bullet lube was pumped to the bore surface by 3 different mechanisms -- compression, linear acceleration and radial acceleration. In compression, the force applied to the base of the bullet causes the compression of the bullet's core underneath the lube groove, resulting in expansion of the core diameter and shrinkage of the lube groove width. Both of these factors results in the reduction of the volume of the lube groove itself, and hence compress the lube and force it to the bullet/barrel interface. There is solid physical evidence supporting this mechanism (especially in rifles). The linear acceleration mechanism is pretty straightforward -- the inertia of the lube at rest causes it to be forced towards the rear of the lube groove as the bullet is accelerated forward by the burning powder. When the lube encounters the beveled (or radiused) rear face of the lube groove, it is once again forced to the barrel surface. In the third lube pumping mechanism, radial acceleration, as the bullet begins to spin faster and faster as it progresses down the barrel, at some point sufficient radial acceleration (think "centrifugal force") is generated to overcome the viscosity of the lube and it gets flung off of the lube groove surface and outward onto the barrel. All three of these mechanisms come into play when any cast bullet is fired, although the magnitude of each will vary significantly with the application (e.g. .38 target wadcutter vs. .30-06 or .45-70 hunting load), and will be dependant on velocity, pressure, alloy hardness, bullet diameter, etc. Indeed, the magnitude of each will vary for any given shot, depending on where the bullet is in the barrel -- linear acceleration will be dominant early in the shot, compression will take over as pressure peaks and radial acceleration will become more significant as the velocity increases.

Delineation of these mechanisms provides a significant level of understanding in terms of cast bullet shooting and design, as well as bullet lube formulation. However, these mechanisms still have the bullet serving as nothing more than a brute-force paintbrush, slapping on a fresh coat of grease of the bore for the next bullet in line. This is all well and good, but it is an incomplete description of the process. I believe that there is another mechanism operating, one that accentuates a second and perhaps even more important role that bullet lube serves.

Back in the 50s and 60s, some very knowledgeable Handloader's performed extensive tests to understand what made the best bullet lube and why. One of the more notable efforts in this area was the work done by E. H. Harrison of the NRA Technical Staff. These results were originally published in the American Rifleman, and were subsequently reprinted in "Cast Bullets" by E. H. Harrison, and available through the NRA (buy this book if you don’t already have it!). The most important property of the lube formulation was found not to be the inherent lubricity of the mix, but rather its flow properties (we will return to this shortly). It is interesting to note that Mr. Harrison was singing the praises of moly loaded bullet lubes back in the 1950s. It seems "the wheel" has been rediscovered…

Why are flow properties important? Most barrel tolerances are generally good to less than .001", where can the lube flow *to*? As the bullet undergoes the violence of being engraved by force, if there is *any* slippage or variation in groove/land width, this will result in there being a gap between the trailing edge of the land and the groove engraved in the bullet’s face. Gas molecules are very, very small things, and at the temperatures and pressures of burning powder they‘re buzzing like an angry swarm of hornets.

Even a gap between the trailing edge of the land and the engraved groove of the bullet of only .001" will leave enough room for over 50,000 of these gas molecules to line up "shoulder to shoulder" and still not bump into the outer boundaries of the gap.
The point of bringing all this up is to show how easy gas leakage is through this sort of defect channel, even though at first glance it appears to be quite small. In addition, there are similar (somewhat smaller) channels on the grooves and lands, left over from the machining processes that gave rise to the rifling, and these defects also contribute to potential gas leakage. Gas pressure rises much faster than the bullet is accelerated, so therefore as the bullet’s surface is ravaged by the lands and gas leaks past the base band, the lube reservoir becomes pressurized, with the gases entering from the rear and pushing forward. This rapid pressurization forces the lube to flow into the defect channels in the engraved driving band in front of the lube

groove, sealing off the gas flow and limiting the damage due to gas cutting. If the cast bullet is appropriately sized, then this controlled injection forms a floating pool of lubricant that follows the bullet down the barrel, lubricating the bullet/barrel interface and sealing the high-pressure gases. Kind of a ballistic stop-leak, if you will.

This is why some of the new hard lubes perform their best at higher pressures. Gas leakage into the lube groove melts the lube, and the liquid lube then gets forced into the microscopic defect channels ahead of the groove. Some of the commercial hard lubes work just fine at 800 fps and 1300 fps, but at intermediate velocities or say 1000 fps, they lose some of their shine. At the lower velocities/pressures there are few demands placed on the lube, and these can be addressed by simple frictional smearing of the lube displaced from the lube groove by the land. As the pressures/velocities rise into the intermediate range (+P level, 20,000 psi, 1000 fps) however, the mechanisms outlined above can’t pump the hard lube to the bullet/barrel interface fast enough to keep up with the lubrication/sealing demands of the system, resulting in leading and poor accuracy. As pressures/velocities climb into the magnum level (35,000 psi, 1300+ fps), enough hot gases are injected into the lube groove to melt some or all of the hard lube, allowing all of the lube pumping mechanisms outlined above to come into play, resulting in effective lubrication. These high-pressure gases also cause the molten hard lube to be injected into the defect channels in the forward driving bands, thereby sealing off gas cutting. Lube pumping and high-pressure injection cannot take place efficiently until a hard lube melts. For a soft lube, it’s not necessary to melt the lube for this injection to happen, the soft lubes are capable of flowing from the start, which is why they lubricate cast bullet revolver loads effectively across the entire range of velocities from 600-1500 fps. The commercial hard lubes are well-suited for magnum revolver and rifle cast bullet velocities.

Undersized cast bullets leave a gap between the bullet and barrel, leaving them unable to restrict this pressure-induced lube flow. As a result, the lube very quickly gets blown out of the barrel in front of bullet, leaving the bullet "naked", un-lubricated and unprotected. This phenomenon is especially problematic with the hard lubes; once molten, the low viscosity liquid lube gets blown out rapidly if the bullet is undersized.

Concerning the flow properties vs. lubricity issues cited above, E. H. Harrison explored the use of molybdenum disulfide (aka "moly") as a bullet lube back in the 1950s. He found that dry Moly was inadequate as a bullet lubricant for .30-06 loads at 2000 fps, but that when it was incorporated into a more traditional grease/wax lube formulation, that it worked quite nicely indeed. By incorporating Moly into a soft lube, the desirable flow properties of the lube are maintained, as is the ability to leave behind a moly coating on the barrel. This Moly coating serves to protect the bore from oxidation, in addition to serving as a lubricant, preventing adhesion of leading deposits. More recently, a lot of work has been done looking at hard-cast bullets dry coated with Moly, and this has been found to work nicely for routine handgun velocities in the 800-1000 fps range. These observations reinforce the conclusion that simple lubrication is sufficient at lower velocities, but as pressures and velocities climb, the role of bullet lube is also that of a fluid gasket to seal the bullet/barrel interface.

In summary, bullet lube is pumped from the lube groove to the barrel surface by compression, linear acceleration and radial acceleration. In addition, lube is injected forward during the firing process, as the result of high-pressure gas leakage into the lube groove. This injection process forms a floating fluid gasket around the bullet, and serves to limit gas cutting and is a kind of ballistic stop-leak. Hard lubes must first melt before they can be pumped or injected by any of these mechanisms. By incorporating Moly into the mix, the lube delivered to the barrel surface can serve to prevent adhesion of future leading deposits by passivating the steel surface.

- Glen E. Fryxell

A Cast Bullet For All Seasons

By: Glen E. Fryxell

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The old adage of "Moderation in all things" has a great deal of merit for handgun hunters. Moderate velocity plus moderate bullet diameter plus moderate bullet weight has added up to quite a pile of venison in the freezer over the years. Trajectories aren't overly curvaceous, chamber pressures aren't riding the "red zone" and bullet cores aren't overly taxed. This formula has led to my fascination with things .35 caliber. This is not an effort to get on the nearest soapbox and preach some "sanctimonious higher inner truth" (which you may abbreviate anyway you see fit), just an explanation of my own particular fixation. Every shooter has their favorite cartridge, caliber, load, bullet and phase of the moon. For my dollar, nothing covers the spectrum quite so completely as .35 caliber. Starting with the diminutive .380 and climbing through the ranks (which include such time-honored cartridges as the 9mm Parabellum, .38 Special, .357 Magnum, .35 Remington and .35 Whelen) to the thunderous .358 Norma Magnum, most any shooting chore from thinning the local gopher population to stopping a grizzly charge can be responsibly handled with a .35 caliber firearm.

In discussing this point of view with some of my bullet casting buddies, the question arose of what the all-round bullet might look like. It would need to be gas-checked so as to function at maximum cast bullet velocities. It would need to be reasonably heavy in order to function as a big-game bullet. It would need to have a flat point in order to maximize its effectiveness on game. It would need to be a semi-wadcutter for Bullseye competition. And clearly, it would need to be .35 caliber. Lyman recently started making moulds for a 215 grain gas-checked SWC (mould #358627) in .35 caliber. Now before you scoff at the idea of loading bullets of this weight in the dainty .38 Special, remember that the original Police load consisted of a 200 grain lead round nose.

In any event, the mould was promptly purchased and a loading project was underway. I enlisted the aid of friend Dan Adams to help out with the loading and shooting "chores". Thousands of rounds later, this bullet just seems to get better and better.

Casting details first, the pistol bullets were cast from straight wheel-weights, and were sized .358" (except as noted). With wheel-weight alloy, these bullets came out of the mould weighing 216.3 +/- 1 grain (221.1 grains checked and lubed). Only those bullets with visual defects were discarded (i.e. no weight segregation was used for the pistol bullets). All bullets were lubed with Thompson's Cold Bear Lube and gas-checked with Hornady crimp-on gas-checks.

Taking measurements from the bullet and using the old Remington/DuPont wall charts, en estimated ballistic coefficient of 0.285 was arrived at. Sectional density of a 220 grain .35 caliber bullet is 0.245.

The loading was routine, but one comment should be made for the record, and that is that all cases (both straight-walled and bottle-necked) need to be flared (an RCBS .38/.357 flaring die was used for this data). The short-cut of not flaring cases was tried with the initial .35 Remington test loads, and my 97 year-old grandmother (grand old lady that she was) could throw bricks with better accuracy than that ammo was capable of. Flare the cases. All loads employed a healthy crimp. This bullet has two crimping grooves. The upper crimp groove (i.e. the one resulting in the shorter overall cartridge length) was used for the straight-walled pistol cartridges, whereas the lower crimping groove (resulting in the longer overall cartridge length) was generally used for the bottlenecked cartridges. In any case (pun intended, of course), five rounds were loaded at what was deemed a suitable starting point. The ammo was shot for accuracy and the load increased incrementally until the usual visual signs said "Stop!". The starting load, the most accurate load and the maximum load were then fired separately for velocity. These loads were safe in our guns and are presented only as an accurate record of our findings. As always, start at the low end and work up carefully. Without any further ado, let's get to the loading data.

.38 Special:

The .38 Special is one of the most loaded cartridges in history. It is a relatively low pressure cartridge, and the faster burning pistol powders are best suited for this case. Accuracy of this cartridge is usually quite good, and this bullet was no exception. Five shot groups at 25 yards were typically under 2 inches, and usually much better, when fired from an open-sighted, rested revolver. Velocities ran in the 500-700 fps range, as might be expected for a 6" revolver. It's worth noting that Accurate Arms #2 gave a satisfying combination of good accuracy and very consistent velocities. A general trend seems to be that this bullet in .38 Special is most accurate around 625 fps.

Some of you may be asking "What possible use could there be for a 220 grain SWC in .38 Special?". Windy day loads for outdoor Bullseye competition? Maybe. Custom butchers typically employ two guns in their trade, a .22 rifle for the routine jobs, and a "big gun" (traditionally a levergun in .25-20 or .32-20) for the bigger tougher animals. In recent years, more than one custom butcher has switched over to a Marlin levergun chambered for .357 Magnum and shoots .38 Special loads in it. The .38 Specials aren’t as loud as the .357 Magnums (and therefore scare less of the barnyard stock), and are capable of all the penetration needed for brain shots. The extra weight of this 220 grain SWC should insure that the brain is reached in those thick-skinned and thick-skulled critters that are sometimes encountered in this line of work. Carl Adams is in his 70s and has been a custom butcher most of his life. He has killed more animals than most hunters will ever *see*, so he was given a batch of this ammo (loaded with 3.5 grains of Unique) to “field test”. Carl reported back to say that both cattle and hogs dropped *right now* with this load. No staggering, no wobbling; they simply turned into so much suspended mass for gravity to act upon. Frontal brain shots typically liquefied the brain (“turned it to mush” were Carl’s exact words), exploded the upper neck joint of the spine, and then penetrated under the hide of the neck for several inches (for about 15” of total penetration). Not surprisingly, recovered bullets showed no expansion, only engraving from the rifling and nose scarring. He also reports that this ammo is noticeably quieter than the .38 ammo he had been using (undoubtedly because of the light powder charge).

.357 Magnum:

The .357 Magnum was born as the "world's most powerful handgun" cartridge, which at the time was probably not the over-used cliché that it is today. It is an extremely versatile and popular cartridge, both for personal protection and hunting. Whether or not the .357 Magnum is an adequate big-game cartridge is a long-standing argument. This 220 grain SWC could easily find use in the hunting fields.

Some .357 Magnum brass is thicker than others in the lower portions of the case. Once this long bullet is loaded into the case, all loaded rounds bulge somewhat and some will not chamber. Load a dummy round first to make sure your lot of brass will chamber in your gun once loaded. Federal nickel plated cases were used for the test data. The medium to slow pistol powders gave the best results. Unique was too fast -- pressures climbed too quickly while velocities were still low. With powders slower than Unique, accuracy ranged from fair to excellent, with several 1" groups at 25 yards. Accuracy was generally best in the 1000 fps ballpark (from a 6" barrel).

From a 6" revolver, 1100 fps was the upper velocity limit for the .357 Magnum.

Accurate Arms #7 proved to be the single most accurate load, putting five shots into under 1" at 25 yards with 9.0 grain charges, and velocities were quite respectable at over 1000 fps.

Another of the more accurate loads was 10.0 grains of Accurate Arms #9. This load delivered 875 fps from a 2 1/2" revolver, 959 fps from a 6" and 1012 fps from and 8 3/8" barrel. Firing this load in a 10" Contender gave 1096 fps. This load was field tested on Montana jack rabbits over the summer. Launching this load from a 6" S&W 686 consistently resulted in a solid "Thump!" and a 1/2" to 3/4" exit. Well hit jacks were flattened instantly, while more poorly hit jacks never traveled more than 20 yards.

Bullets don't need to be crimped in the Contender, so some test loads were assembled seating the bullets out to where they just touched the lands (OAL = 1.725"). Working up to 17.5 grains of Acc. Arms 1680, it was possible to achieve 1300 fps. It should be emphasized that this was possible only in the T/C and that this load is not suitable for .357 Magnum revolvers. This is a heavily compressed load and it was not possible to increase the load any further and still maintain the 1.725" overall length.

As a result, recourse was made to a slightly faster burning powder in order to minimize powder bulk and maximize velocity. When these bullets were launched out of a 10" iron-sighted Contender with 11.5 grains of Accurate Arms #9, accuracy was outstanding (1.0" five shot groups at 25 yards), and velocities average 1221 fps. The maximum charge of 13.0 grains of AA #9 wasn't too far behind in the accuracy department at 1.3”, with truly impressive a (and consistent) velocities averaging 1358 fps. Working up in similar fashion with W296 revealed a maximum charge of 13.0 grains and a velocity of over 1400 fps! Again, these loads are for the Contender only, with the 358627 seated to an OAL of 1.725”.

These results should qualify the .35 Magnum as an adequate deer load out to about 75 yards in a suitably loaded Contender. There are some good ol’ boys down Georgia way that I met when I lived down there that like to hunt feral hogs with .357 revolvers, and dollars to donuts says they’ll be real interested in this bullet. This combination in the Contender could prove popular in silhouette circles as well. Time will tell.

.357 Maximum:

The .357 Maximum was created in order to convince any stubborn rams that they really wanted to fall down. This 220 grain SWC at 1400+ fps should prove to be quite convincing. In addition, this combination could prove to be a good handgun hunting load for deer-sized game, out to perhaps 100 yards. The loads fired in this Dan Wesson revolver were sized .356”. Accuracy of most of these load were excellent (as seems to be the norm with DW revolvers), with several shooting into 1” or less at 25 yards. Stick with the slower burning powders in the .357 Maximum, the medium burners delivered significantly less satisfying results with this bullet. The overall winner seems to be Winchester 680, both in terms of accuracy and velocity. Bulging cases were also observed in the .357 Maximum loaded rounds, however in no cases did these minor bulges keep the rounds from being chambered.

.35 Remington:

The arthritic old .35 Remington has been with us since 1906 (a very good year for cartridges it seems). Thank goodness! It may be old and decrepit, but year after year it proves itself to be one helluva good hunting load by putting ton after ton of venison into the deep freeze. With T/C chambering their Contender for this venerable old-timer there has been a resurgence of interest in this cartridge in recent years. Never meant as a long-distance proposition, the .35 Remington will cleanly take deer out to 150 yards, and the 220 SWC fits into this philosophy quite nicely. What’s more, with the penetration that this cast bullet is capable of, black bear and elk are also fair game for this combination. Accuracy was generally quite good, with all powders tested succeeding in shooting 1” 5-shot groups at 50 yards from a 14” Contender with a 5x scope. The clear winner was 35.0 grains of IMR 4895 producing a 50 yards group consisting of one ragged hole and averaging over 1800 fps.

Lyman 358627 & Remington 357 Maximum.

Cartridges for the Contender were loaded to OAL of 2.42” (i.e. crimped in the bottom crimp groove). Assembled in this fashion, the bullet was lightly engraved upon closing the action. This OAL was found to be too long to chamber in a Marlin

336 .35 Remington, so test loads assembled for the rifle were crimped in the upper crimp groove (OAL = 2.30”). Loaded with 33.0 grains of IMR 3031, the rifle printed 2” groups at 50 yards (open buckhorn sights), with velocities just over 1900 fps. This OAL length was found to be too short to allow smooth functioning of the action is the magazine was loaded (the carrier would hang up on the next round in line), thereby limiting this load to double loading (i.e. one in the chamber, one in the magazine), which worked very nicely.

.35 Whelen:

The .35 Whelen is a grand old cartridge, with a well-earned reputation as a serious
hunter’s load. This Lyman 220 grain SWC could be hard-pressed to find a better home than a .35 Whelen case. Early tests utilizing bullets cast with straight wheel-weights revealed that velocities in excess of 1900 fps resulted in key-holing and abysmally large groups (when lubed using commercial hard lube), thereby revealing after the fact that the .35 Remington loads were pushing the wheel-weight bullets to their limits. As a result, recourse was made to a harder alloy consisting of 7 parts stereotype and 2 parts wheel-weights (this alloy is approximately as hard as linotype). These bullets could be pushed up to about 2000 fps with very good accuracy. A general trend was noted in the rifle testing -- groups would shrink as the load was increased until the 2000 fps mark was reached, beyond which group size grew quickly. As a result, the loads listed are the starting load and the most accurate load for a given powder. Surprisingly, IMR 3031, traditionally a favorite in the .35 Whelen, provided very inconsistent velocities with this bullet. Much more consistent velocities (and better accuracy) was obtained with slower powders. The most accurate loads shot right at, or just below, 2 MOA (using a 4x scope). The clear-cut winner was 43.0 grains of IMR 4895, giving an excellent combination of velocity and accuracy.

These bullets were also employed in putting together “grouse loads”. For this purpose, 6.0 grains of Unique is hard to beat as it is quiet, very accurate and shoots to the point of aim at 25 yards (when sighted in with full hunting loads). For those who want a little more punch for their small game loads, 20 grains of IMR 4198 is also a good choice. Both loads are accurate and generate little noise and recoil.

This may not be the ideal cast bullet for all applications, but it will comfortably handle grouse, ground squirrels, mule deer and moose, just depending on how it’s served. I’d say that qualifies it as a candidate for all-round cast bullet. It serves well for paper-punching, silhouette tumbling and for slaughter around the farm. It’s there for springtime plinking, summertime varmint shooting fall meat gathering and winter hide hunting. Truly, a cast bullet for all seasons.

- Glen E. Fryxell

Load Data From Article
A Cast Bullet For All Seasons
Below

Test Gun: 6” Taurus 66 .38 Special

Cases: Winchester Lyman 358627

Primers: CCI 500

Powder	Charge	Velocity	Comments
Bullseye	2.0	546	
	2.5	629	Accurate
	3.0	720	
Accurate Arms #2	2.5	546	
	3.0	629	Very accurate
	3.5	704	Accurate
Unique	2.5	516	
	3.5	708	Good accuracy
Winchester 540	4.5	607	Accurate
	5.0	718	

Test Gun: 6” Taurus 66 .357 Magnum

Cases: Federal (nickel) Lyman 358627

Primers: CCI 500

Powder	Charge	Velocity	Comments
2400	8.0	807	Accurate
	10.5	1084	
Accurate Arms #7	6.5	750	
	9.0	1011	Very accurate
	9.5	1088	
Accurate Arms #9	7.5	767	All #9 loads shot well
	10.0	959	Very accurate
	10.5	1068	
Winchester 296	8.5	748	Poor
	11.5	1008	Accurate
	10.5	959	Very accurate
	13.0	1113	Fastest .357 load
Accurate Arms #1680	12.5	857	Accurate
	13.5	914	
	15.5	1028	Accurate, 1096 fps in 8 3/8”, 1154 fps in 10” T/C

Test Gun: 8” Dan Wesson .357 Maximum

Cases: IHMSA Lyman 358627

Primers: CCI Small Rifle Magnum

Powder	Charge	Velocity	Comments
Accurate Arms #7	9.0	961	All #7 loads shot well
	12.0	1231	Accurate
	13.0	1307	Very accurate
Winchester 296	18.0	1318	
	19.0	1357	Good velocity
Winchester 680	19.5	1328	
	20.5	1409	Fast and accurate
IMR 4227	18.5	1280	Accurate
	19.5	1341	Accurate

Test Gun: 14” Contender .35 Remington

Cases: IHMSA Lyman 358627

Primers: CCI 200

Powder	Charge	Velocity	Comments
H322	31.0	1710	
	32.0	1834	Accurate
	33.5	1887	Consistent velocities
IMR 3031	31.0	1593	
	33.0	1785	Accurate
	35.0	1882	Compressed
Accurate Arms #2230	34.5	1593	Fair accuracy
	36.0	1927	Fastest .35 Rem load
IMR 4895	34.0	1755	
	35.0	1822	Very accurate
	36.5	1871	Compressed
H 335	31.0	1572	
	33.0	1713	Accurate
	37.0	1836	

Test Gun: Remington 700 Classic .35 Whelen

Cases: R-P Lyman 358627

Primers: Winchester Large Rifle

Reduced loads

Powder	Charge	Velocity	Comments
Unique	6.0	862	Very accurate, on at 25 yards
IMR 4198	20.0	1349	Accurate, on at 50 yards

Full power loads

Powder	Charge	Velocity	Comments
IMR 3031	38.0	1851	Erratic velocities
	40.0	1971	Reasonable
IMR 4895	40.0	1845	
	43.0	1972	Very accurate
IMR 4064	40.0	1802	
	42.0	1916	Accurate
Accurate Arms #2520	41.0	1946	Very accurate

Mountain Molds

By: Glen E. Fryxell

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It seems as though everybody has their own idea of what the perfect cast bullet should look like (I know that I certainly do!). You might think that custom mould makers would be rolling in business to answer this market need, but the traditional cherry-based method of making bullet moulds is both costly and time consuming, and only allows bullets of one diameter to be produced from a given cherry. The relatively high cost of this process tends to dampen the enthusiasm of many would-be mould designers. Modern CNC machining methods allow the operator to lathe bore most any mould design that can be captured in a CAD file. All this then requires that the bullet design be reduced to the appropriate series of dimensions, angles, arcs, etc. Modifications to a given design only require a few keystrokes at a computer, instead of machining a completely new cherry. Dan at Mountain Molds has made capturing this information very easy with his calculation spreadsheet and drawing program. I recommend that you go to his website: http://www.mountainmolds.com and play with his software to see how easy (and how fun) this is. The ease of this process allows you to run through several design iterations and quickly refine your design to optimize those features that you want to capture, or to take an existing design and tailor the bullet diameter to fit your particular gun. Once you have the bullet you want, you simply click on a button to place the order. He plugs your numbers into his CNC and your mould comes out the other end and is shipped to your door. Custom-made 2-cavity bullet moulds for $75 are hard to ignore!

I like lots of lube, lots of bearing surface and lots of meplat. I tend to lean towards a Keith-style lube groove(s) -- wide, flat-bottomed, and with beveled edges. Concurrently, I like wide driving bands to allow the lands to “bite” the bullet more firmly. Best bullet alignment is obtained with those bullets that have bearing surface over at least half of their length. Review of the accurate bullet designs that exhibit long range stability and don't tend to tumble on impact and penetrate in straight lines (Keith SWC's, SSK FP's, LBT LFN, etc.) reveals meplats of 65-75% of bullet diameter. Larger meplats lead to bullets that have marginal stability and can tumble on impact (wadcutters, some WFN's, etc.). This observation has led me to adopt a 73% meplat as my approximation of ideal (nose length and ogive radius also factor into this, but that's a separate discussion). So those are the basic design concepts that led me to design these moulds. You may have different ideas that you can incorporate into your mould designs just as easily as I did mine.

Dan offers moulds made in both aluminum and brass, so I bought 2 of each in order to compare and contrast. Dan's basic mould design changed after I ordered the first mould, to include a 3rd alignment pin (for more positive alignment), and to use 3/16" 4140 steel for the sprue plate, instead of the tool steel that had been used previously. The new sprue plate design has the striker plate at the 12 o'clock position instead of the 3 o'clock position. He has also cut the sprue plates so the back side of the striker plate is cut at a 45 degree angle, which saves material (holding costs down), but it also makes closing the sprue plate after dumping bullets a smooth, sliding motion rather than a striking motion, a change that I like very much and one that should add to mould longevity. The first mould I ordered from him took 3 weeks to arrive, the second order of 3 moulds took 4 weeks to get here. Outstanding turnaround for custom work! The workmanship displayed in all 4 moulds is excellent.

The 4 moulds I had Mountain Molds (his spelling, not mine...) make for me were:

> A .404” 200 grain Keith-style SWC, designed for the Herter’s .401 Powermag revolver

> A .312” 100 grain Keith-style SWC for the .32 H&G Magnum

> A.412” 300 grain GC-FP for the .405 Winchester

> A .453” 325 grain FP for the .45 Colt

All of these bullets were designed as hunting bullets, have meplats that are 73% of bullet diameter and the 3 revolvers bullets have deeply cut beveled crimp grooves. I did not have a crimp groove put on the .405 Winchester bullet as I will be using this in a single-shot and therefore don’t need a crimp.

The Keith-style SWC bullet designed for .401 Herter's Powermag dropped from the blocks at .404" and weighed 199 grains when cast of WW alloy sweetened with 1-2% tin. This is exactly the diameter I wanted for this bullet as the Herter's (Hawes) revolver has .405" throats and a groove diameter of .403".


.40 caliber Keith-style SWC for the Herter's .401 Powermag made by Mountain Molds.

Bullets were "sized" .405" and lubed with homemade Moly lube (equal parts by weight beeswax and Sta-Lube Extreme Pressure Moly-Graf grease). The bullets were round (i.e. diameter didn't vary from point to point, a common problem with mass-produced bullet moulds), and dropped from the cavities smoothly and easily. This bullet has provided the best accuracy of the 10 or so bullets tried in this revolver to date. The best load tried so far is 18.0 grains of Accurate Arms #9 with a CCI 350 primer for 1405 fps, with 5 shots going in to about 2" at 25 yards (6 1/2" barrel).

The meplat diameter on this bullet is .295", which is actually larger than that found on the highly respected .44 Keith SWC (Lyman/Ideal 429421, meplat diameter .275"). Since it is the meplat that is responsible for creating the wound channel, I anticipate this bullet should do just fine on deer sized game, and I intend to hunt with it this fall. As for larger sized game, I would prefer a heavier bullet (from a revolver).

The Keith-style SWC designed for the .32 H&R Magnum was also nice and round, and also fell from the blocks with ease. Bullets were .313" in diameter and weighed 101 grains when cast with WW alloy. Again, this is just the diameter that I wanted, and an excellent fit for my .32s. Sized .312" and lubed as above, and loaded into .32 H&R Mag cases over 6.5 grains of Accurate Arms #7 and a CCI 550 primer grouped 5 shots into 1 1/8" at 25 yards. Velocity was 1174 fps from the 6" S&W Model 16 .32 H&R Mag. This is a very clean load, and is ideally suited to small game and vermin.


.32 caliber Keith-style SWC for the .32 H&R Magnum made by Mountain Molds.


300 grain GC-FP bullet for the .405 Winchester made by Mountain Molds.

I have a 14" Contender barrel that started off life as a .41 Magnum. It has a .411" groove diameter and was re-chambered to .405 Winchester. When fired from a Contender, the .405 Winchester must be kept at or below about 42,000 psi peak pressure to keep back-thrust within the capabilities of the Contender's frame. "Load From a Disc" calculations suggest that this is possible by keeping velocities with 300 grain bullets below 2000 fps with powders slower than the IMR 3031 and H335 class. The flat-point bullet that I designed for the .405 Winchester was put together explicitly for this gun. Previous work with 370 grain cast bullets at 1700 fps revealed that recoil was, shall we say "brisk", and trajectories were somewhat curvaceous. The standard weight for the .405 Winchester is 300 grains and I wanted a useful hunting bullet of this weight both to flatten trajectory and to reduce recoil (relative to the 370s that I had been using). Since it's a single shot, there is no need for a crimp groove, so I didn't ask for one (besides, that gives me that much more bullet metal for positive engagement with the lands). It has 2 wide, flat grease grooves, and a GC shank cut for Hornady .416 GC's. These bullets drop from the blocks at .412" diameter and weigh 290 grains when cast of water-quenched WW alloy. Adding a GC and lube raises their weight up to 298 grains; exactly what I was looking for. When seated on top of 55.0 grains of H4895 and sparked with a Fed 215, this bullet delivers 1929 fps and is very accurate. This combination is remarkably flat-shooting, and now constitutes my preferred load for this gun.


325 grain PB-FP mould for the .45 Colt made by Mountain Molds.

The fourth mould I asked Dan to make for me was for the .45 Colt. I have a Ruger Super Blackhawk that I converted to .45 Colt with .480" chambers and .452" throats, and I wanted a 325 grain plain-based bullet with a 73% meplat specifically for this gun. This 2-cavity brass moulds drops bullets that weigh 325 grains and measure .453-.454" in diameter when filled with WW alloy. Sized .452" and loaded on top of 21.3 grains of H110 with a CCI 350 primer, this bullet delivers 1227 fps and good accuracy from the 7 1/2" Ruger. With a .330" meplat and 325 grains of bullet weight this promises to be an excellent hunting bullet! It is my intention to introduce a large pig to one (or more) of these bullets this fall. I'll let you know if he's impressed.

The two Keith-style SWC moulds were cut from aluminum, while the 2 ogival flat-point moulds were cut from brass. The surface finish of the brass moulds is beautiful. The aluminum moulds show more tooling marks than do the brass moulds (which one would expect, that's just the basic nature of the two different metals), but the cavities on all 4 are well cut and release their bullets easily and smoothly. Bullet finish in all cases is smooth. I couldn't tell any significant difference in terms of how long it took moulds cut of each metal to warm up (that's more a function of how much molten metal one is pouring into the mould blocks, besides I pre-warm my moulds as I'm melting the alloy). Overall, these Mountain Molds drop some of the roundest bullets that I've ever cast, and they deliver bullets that were either spot on, or very close to the target diameter. In summary, Dan makes exactly what you order, his moulds produce bullets that are round and the right size, and his turn-around time and prices are quite good.

- Glen E. Fryxell

The .38 SWC

By: Glen E. Fryxell

The .38 Special is the most reloaded handgun cartridge in the United States. The semi-wadcutter (SWC) bullet is the most versatile and popular handgun bullet design. It logically follows that we shoot a lot of .38 SWC in this great land of ours. Ah, but "Familiarity breeds contempt"! We don't tend to think about this load much because the .38 Special and the SWC have been around longer than most any of us have, and we just plain take them for granted. Well, let's stop for a second and take a closer look at what we have. What is the history of this valuable combination? Which design features appeared when and who designed them? And perhaps more importantly, are all .38 SWC's pretty much the same, or are there some that are superior to others? Let's take a closer look at this old friend...

The first bullet that modern shooters would recognize as a SWC was the 150 grain Ideal 360271, which was designed by B. F. Wilder just after 1900. This bullet had a reputation for accuracy and for cutting clean, full-caliber holes in targets, and was recommended by the United States Revolver Association for target work. A few years later, J. B. Crabtree designed the 358345, a 115 grain wadcutting bullet for the .38 S&W Special cartridge. It too was widely regarded as an accurate short-range target bullet. Neither of these bullets had a crimp groove, and each two lube grooves. Both were intended to be seated deeply, and if a crimp was deemed necessary, the case could be crimped lightly over the forward driving band.

Early semi-wadcutters: The 150 grain Ideal 360271 (left) and 115 grain Ideal 358345 (right)

The first bullet that we might call a SWC that had a separate beveled groove specifically for crimping the case mouth into was the 311316, the GC-SWC for high-velocity loads in the .32-20 rifle. In this case, the crimp groove is probably the result of this bullet being designed for rifle use and the need for crimped bullets in tubular magazines. This bullet also came out shortly after 1906 with the introduction of the GC. All of the other pistol bullets of this era that vaguely resemble SWC's have no provision for crimping, other than the forward driving band's shoulder. This was to change.

In 1928, Elmer Keith commissioned Lyman to make moulds for revolver bullets that he had designed. The third in this series of Keith's moulds was the 358429, a 173 grain bullet that he put together specifically for heavy loads in S&W N-frame revolvers (so-called ".38/44 loads"). This was the first .38 SWC that incorporated a beveled crimping groove (he took his inspiration from the round-nosed 358311), and a large capacity "square-cut" lube groove.

Originally his .38/44 loads consisted of this long bullet seated over 12.0 grains of DuPont #80 powder for over 1100 fps. Later, in 1933, when 2400 was introduced, he switched to using this powder and increasing the velocity of these loads to 1200+ fps.

Interestingly, as near as I can tell the first use of the term "semi-wadcutter" didn't come about until the early 1950s, and came into fashion with such target bullets as the Lyman 452460. Today however, the term is most closely associated with the bullets of Elmer Keith (and those inspired by the Keith design features), even though the term was not originally applied to his bullets upon their introduction.


The Ideal 311316, the first SWC suitable for handguns to have a beveled crimp groove.

Keith made the 358429 to be the same length as his .44 SWC (which he designed first). The weight on his .38/44 bullet came out to 173 grains. In later years, Keith would admit that a lighter bullet (150-160 grains) was better suited for use in the .38 Special, but he remained steadfastly faithful to his 173 grain bullet for the .357 Magnum.


The Keith SWC, loaded in .38 Special (.38/44 loads)

In my experience, this bullet needs to be pushed hard for best accuracy, which is not surprising since, after all, EK designed it specifically to be pushed hard. Should one desire to re-visit Keith's .38/44 Heavy Duty loads, this bullet can be loaded over 12.0 grains of 2400 in a .38 Special case for approximately 1200 fps (this load should only be fired in N-frame .38s, or .357 Magnum revolvers). The most accurate .357 Magnum load I've fired using this bullet is powered by 14.5 grains of 4227 for about 1250 fps.

The 1930s were a fertile time in terms of .38 bullet design; catalyzed by the .38/44 loads of Elmer Keith, and later by the introduction of the .357 Magnum in 1935. However, the nose on the 358429 was too long to be seated and crimped in the crimp groove when loaded into .357 Magnum cases -- it stuck out in front of the S&W .357 Magnum's cylinder and prevented rotation. Phil Sharpe sat down with George Hensley (this was shortly before George teamed up with James Gibbs) and took Keith's design and shrunk it to 5/6 its size. Thus was born the Hensley's #51; this was the original .357 Magnum bullet. Loaded on top of 14.0 grains of 2400, the H&G #51 tops off a superb .357 Magnum load.


The 160 grain Hensley # 51 ("Sharpe solid"), the original .357 Magnum bullet.

Now it's not that Hensley didn't have similar bullets available that could have been loaded into these cartridges, it's just that they didn't have the full compliment of features that Keith and Sharpe wanted in their bullets. For example, there's Hensley's design #48, another 158 grain .38 SWC. But this one did not have a beveled crimp groove and the lube grooves were notably smaller (and remember what a reputation the .357 Magnum had for leading in the early days, more lube was definitely viewed as an important feature!).

The level of performance that the roaring new Magnum provided had lots of makers supplying moulds for similar bullets.

For example, in the late 1930s Cramer cataloged their #12 and #26 designs. Both of these bullets are similar to H&G #51, differing primarily in the location of their lube grooves. The nose on 156 grain Cramer #12 is midway in length between the Keith 358429 and the H&G #51 (#12 is similar to the SAECO #382 that would come along later, and since SAECO bought out Cramer in 1951 this is a likely pedigree for this design). The 153 grain Cramer #26 has a similar length nose to the H&G #51 In fact, the Cramer #26 is basically identical to the original Lyman 358477 (which would come later, in the 1950s), with a fatter base band.

The H&G # 48 158 grain SWC (no beveled crimping groove)

Ideal was not just sitting on their hands while these other companies were bringing out their new .38 SWC's. The first bullet that Lyman designed explicitly for the .357 Magnum is the Ideal 357443, perhaps the most enigmatic member of the .38 SWC family.

Designed for both the .38 Special and the .357 Magnum, it was listed as early as Ideal Handbook #32 (1936), but interestingly not in the regular line of moulds, but rather farther back in the specialty mould listing.

This unique 160 grain bullet has 3 grease grooves and a miniscule crimp groove in the middle of the front driving band. I suspect that it was most commonly crimped using the top grease groove, only filling the bottom 2 grease grooves with lube, as that dinky crimp groove is virtually useless. The 357443 stayed in the shadows for its entire production life, being quietly dropped from the catalog in the 1960s.

Photo of the Cramer # 26 (two bullets on left), Cramer # 12 (mould, center) and the H&G #51 (two bullets on right) for comparison.

Starting in Ideal Handbook #33 (published in 1939), Lyman touted the 160 grain plain-based 357446 as "the standard bullet for the Magnum", and continued to promote it as such for many years. This bullet is similar to the H&G #48, except that the forward lube groove had been converted to a beveled crimp groove. It also represents a natural evolution of the homely 357443 -- the upper grease groove converted to a beveled crimp groove, the miniscule crimp groove eliminated, the meplat/ogive filled out, the base band fattened up slightly, with a bullet nose short enough to function in the S&W .357 Magnum. While the 357443 wallowed in obscurity, the handsome 357446 was a well-received and popular bullet for the .357 Magnum. It served equally well in the .38 Special. In the late1930s, between the

H&G, Cramer and Ideal designs, the shape, weight and function of the preferred form of the .38 SWC
was coming into focus.


Unusual crimping.

The GC was introduced for various rifle calibers in 1906 by John Barlow (the head honcho of Ideal). Pistol shooters had noticed the advantages of the GC for high velocity .32-20 and .44-40 revolver loads, so it's no surprise that when the spectacular velocities of the .357 Magnum were reported (1500-1600 fps), shooters naturally started to think about adding a GC to bullets for the magnum.


"The Standard Bullet for the .357 Magnum" for many years, the Lyman/Ideal 358446.

As near as I can tell, the first GC .38 SWC's were the Cramer #13 and #14 (cataloged in 1939). These bullets are very similar to the more familiar 358156 GC-SWC that we have today. The two Cramer bullets were designed by Ross Sernow of Los Angeles, and had 2 crimping grooves so they could be loaded and crimped to .357 Magnum OAL in .38 Special cases (.357 Magnum brass was hard to come by in those days so shooters would load up .357 Magnum loads with .38 brass and seat these bullets long and crimp in the bottom crimp groove). The #13 was a 158 grain bullet that was "specially adapted to hunting" (although it was not explicitly referred to as a hollow point in the catalog), and the #14 was listed as a 169 grain "solid point version of #13" (alloy unspecified).

After WW II, Ray Thompson designed a series of GC-SWC's for Lyman in the early 1950s. The 160 grain gas-checked Lyman/Ideal 358156 was specifically designed for the .357 Magnum and was similar to the Cramer designs just discussed, right down to the dual crimping groove concept. The Thompson 358156 was also quite reminiscent of the old 358446, ("the standard bullet for the Magnum") with the addition of a GC and a second crimping groove. The 358156 has spent the last 50 years as what is likely the most popular cast bullet for the .357 Magnum, and I see no reason for that to change any time soon. It is a superbly accurate bullet. My favorite load for this bullet in the .357 Magnum is 14.0 grains of 2400 for about 1350 fps (or 1750 fps from a lever-gun). Every .357 Magnum that I have owned has shot this load very well.

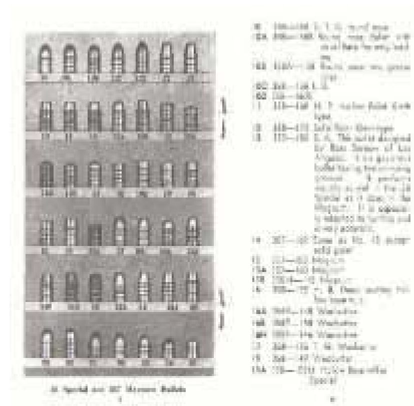
The mid-1950s were another fertile period for the .38 SWC with the introduction of the K-framed S&W Combat Magnum and the Ruger .357 Blackhawk. Velocity was the selling feature of the cartridge and Lyman chose to capitalize on that feature, while simultaneously capturing those features that Keith and Sharpe had espoused in their designs, with the 150 grain 358477 (cataloged in 1957).

With this bullet it was easy to achieve 1500+ fps from the .357 Magnum and 1000 fps from a .38 Special, and do both with superb accuracy and no leading.

For my money, the original 150 grain 358477 is the finest .38 Special bullet ever designed. Loaded over 5.4 grains of Unique, it generates 982 fps from a 6" K-38 Masterpiece with exceptional accuracy.

Gordon Boser was an active handloader and wildcatter of the 1930s, '40s and '50s. He also designed some very interesting bullets. Basically, the Boser SWC's (Lyman/Ideal 357453, 401452, and 429360) were similar to the Keith SWC's, except that they had rounded grease grooves, the forward driving band was smaller than the back two driving bands, and the ogive was straight instead of radiused. It's not uncommon to hear the uninitiated refer to these Boser bullets as "Keith SWC's" but to do so is to ignore the contributions of both men. The Boser .38 SWC (Lyman/Ideal 358453) weighs about 150 grains. The straight ogive SWC was resurrected by Lee in the 1970s.

Jim Harvey brought an interesting twist to the .38 SWC concept in the mid 1950s with this "Harvey Pro-Tex Bore" line of bullets. These bullets were designed without lube or crimp grooves and were cast through the hole in a zinc washer, permanently imbedding the washer into the bullet.



A portion of the Cramer catalog (circa 1939); of particular interest are the GC-SWC's #13 and #14 (scan taken from the excellent reference resource "Castpics Research and Development" http://www.castpics.net/research.htm)

Not having to size and lube these bullets was a selling feature. The hard zinc washer allowed soft lead alloys to be used to promote expansion. Extravagant claims were made about "the solid lubricating ability of zinc", and how this lead to unprecedented velocities, etc. Some pretty eye-popping velocities were reported, but top accuracy was generally limited to moderate velocity loads.

Lachmiller was an active player in the bullet mould field in the 1950s, and like most other mould makers they had a 158 grain SWC for the .38 Special and .357 Magnum.

The Lyman 358156 GC-SWC; probably the most popular cast bullet ever for the .357 Magnum.

This bullet, perhaps best of all the moulds discussed here, captures the design features that Keith and Sharpe promoted -- 3 full-size driving bands, a full-size flat-bottomed grease groove, a beveled crimp groove and a functional ogive/meplat that would work in all guns.

This is an excellent bullet and one of my personal favorites. Lachmiller was bought out by RCBS in the late 1970s.

The 150 grain Lyman 358477 SWC; a fine bullet for both .38 Special and .357 Magnum.

Ohaus started making bullet moulds in 1972 and later that decade RCBS bought them out and took over mould production. These moulds are well thought-out derivatives of proven designs. In terms of .38 SWC's, RCBS makes 2 particularly well designed moulds, the 150 PB SWC and the 158 grain GC-SWC.

The GC 158 is very similar to the 358156 (having a somewhat larger grease groove and lacking the second crimp groove), and like the .358156, is a superb all-round .357 Magnum bullet.

Gordon Boser's SWC design.

Lee started making bullet moulds in 1973, and not surprisingly, they also included various .38 SWC's in their line. The first bullet mould I bought, when I started casting, was a 6-cavity Lee .38 150 SWC. I used that mould to make a lot of bullets. Lee not only offers PB and GC designs, but also came out with their novel tumble-lube (TL) designs. Their affordable 6 cavity moulds allow a budding young caster on a limited budget to make a pile of bullets in a hurry, but in general, their lube grooves are too shallow for my taste.

In the late 1980s, a new handgun game had come to national prominence and Lyman brought out its 215 grain GC-SWC (#358627) to address the silhouette market. This bullet is basically the Keith SWC with a GC shank added onto the base and an extra crimp groove added up front. While this husky bullet shoots fine in both the .38 Special (800 fps) and the .357 Magnum (1100 fps), it was really designed for the .357 Maximum. 1400+ fps is no problem with this heavyweight from a .357 Maximum, making this the hardest hitting member of the .38 SWC clan.

The Lyman 357500 Harvey Pro-Tex Bore SWC mould (the slot at the base of the bullet is where the zinc washer fits into the mould prior to pouring the molten alloy into the cavity; the conical rivet below that is what holds the washer in place).

Bevel bases are popular in cast bullets designed for commercial production. This is due to the fact that the BB bullet releases more readily from the casting machine moulds used by these outfits, and therefore production rates are higher when using BB moulds (there's no significant difference for the home caster).

Lachmiller 3-cavity 358 158 SWC mould.

In addition, the commercial caster wants to provide a product that is going to generate the fewest number of complaints, and well to be honest, there are some handloaders who are a little rough during load assembly, and if the BB bullet slips into the case more easily and with less damage, then those customers aren't going to whine as much.

However, in some guns, BB bullets can lead to increased leading in the forcing cone area, as the throat/bullet seal is broken while there is lots of exposed lead in the cylinder gap (this problem is most commonly encountered in guns with a large cylinder gap). The bottom line is that, as far as the shooter is concerned, beveled bases on cast bullets are kinda like earrings on professional football players, some folks may think they're fashionable, but they provide nothing in terms of actual performance. There have been a number of other designs with long noses (e.g. the H&G #73), small meplats, or minor variations on these designs. In an effort to sharpen the focus of this discussion, I will draw the line here.

The design elements espoused by Keith and Sharpe (full diameter forward driving band, beveled crimp groove, large grease groove, moderately large meplat and radiused ogive) are just as valuable today as they were back in the 1930s. Which of

The RCBS 150 SWC, an excellent bullet for both .38 Special and .357 Magnum.

Lyman 358627 SWC loaded in .357 Maximum.

these bullets best capture these features in a form most usable in the .38 Special and .357 Magnum cartridges? That is a question of weight, bearing surface, balance and nose length. All of these bullets have given me fine accuracy when launched from properly assembled, well-balanced loads. OK, so which of these .38 SWC's provide the best combination of velocity and accuracy from the .38 Special and the .357 Magnum? For somebody who is just starting out and may not have the connections to find moulds that were made 50+ years ago, what is currently available and what would be their best choice? Having fired many, many thousands of these bullets, my votes fall thusly:

Best SWC for the .38 Special:

Putting a GC on .38 Special bullet is kinda like putting a frilly lace dress on John Wayne -- it just doesn't belong there! As mentioned above, my personal favorite bullet for the .38 Special is the original 150 grain version of the Lyman 358477. Any number of good loads will generate 950 fps with this bullet, and do so quite accurately, but my favorite is 5.4 grains of Unique. As far as what is available today, the RCBS 38 150 SWC (they call it a "Keith" but it's doubtful that Elmer actually designed it) is an excellent mould and gets my vote for the best bullet currently available for the .38 Special. The lighter weight of these two bullets allows the sixgunner to get optimum performance out of a .38 Special revolver.

Best SWC for the .357 Magnum:

The higher pressures and higher velocities of the .357 Magnum make a GC much more at home in this cartridge. While GC are by no means required for this level of ballistic performance, they can make a contribution and fit in nicely here. The Lyman 358156 is probably the most popular cast bullet of all time for the .357 Magnum, and is certainly one of my own personal favorites. The very similar RCBS 38 158 GC-SWC serves with equal distinction, it just doesn't have as long, or as colorful, a history behind it. Both of these bullets are currently available for the new caster just starting out. I also shoot a number of plain-based cast bullets in my

.357s, my favorites being the H&G #51 (H&G moulds are currently available through Ballisti-Cast), the Lachmiller and Cramer SWC's; excellent .357 bullets all. For all of these bullets, my preferred powder charge is 14.0 grains of 2400.

Best .38 SWC All-round:

As an all-round cast bullet for both .38 Special and .357 Magnum, my own personal choice would be for a plain-based bullet of 158-160 grains, with the driving bands as close to one another in size as possible, with a flat-bottomed grease groove, and a beveled crimp groove. These features are captured in the 160 grain H&G #51, the Lachmiller 38 158 SWC, and the Cramer #12.

Best All-round. the H&G # 51, the Lachmiller 38-158 SWC, and the Cramer # 12.

All of these bullets perform beautifully in both the .38 Special and the .357 Magnum. Currently available moulds in this class are the H&G #51, which is available through Ballisti-Cast, and the SAECO #382 (which, as discussed earlier, can trace its heritage to the Cramer line). All of these bullets are versatile, accurate and deadly.

SAECO # 382 150 Grain PB.

The .38 SWC was born at the dawn of the 20th century. Elmer Keith took some of the ideas captured in some of the early target bullets and incorporated a beveled crimping groove and a larger, "square-cut" grease groove.

Phil Sharpe shortened Keith's design to make it function in the original N-frame .357 Magnum. Others, like Ray Thompson and Gordon Boser, added their touch to this basic design, massaging it slightly for each successive generation of .38 shooters. As a result of these men's efforts, the .38 SWC is a refined, versatile and highly useful bullet design. If the value of a bullet can be judged based upon the gross tonnage of that bullet design sent downrange each year, then the .38 SWC is clearly one of the most valuable handgun bullets of all time!

- Glen E. Fryxell

The .44 SWC

By Glen E. Fryxell

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Human society has always valued marksmanship, and bestowed honors upon those who have proven their skills in competition. This is a time-honored tradition that goes back to Biblical times (e.g. the story of David and Goliath), and comes up through the Middle Ages with colorful characters like Henry VIII, to the modern day. In the second half of the 19th century, handgun design had progressed to the point that handguns were beginning to be thought of as something more than last ditch defensive tools, or weapons of the duel. The ability to accurately place a handgun projectile on a distant target began to be a realistic goal, and shooters' skills began to grow to achieve this goal. Not surprisingly, this led first to informal, and later to formal competitions. In 1870, S&W began production of their large-frame Model Number 3 revolver, which was quickly recognized for its fine accuracy. The Russian Army ended up ordering over 100,000 of these guns, chambered for the new "inside lubricated" .44 Russian cartridge. Bullseye shooters of the day flocked to this gun like flies to honey. This market demand led to the first mass-produced revolver made specifically for target competition, the S&W New Model Number 3 Target, introduced in 1886. This combination of revolver and cartridge became the standard for accuracy in handgun marksmanship for many years.

The bullet used in these competitions was the standard lead round-nose bullet. While superbly accurate, these bullets did anything but cut clean holes in the targets, and sometimes accurate scoring was difficult, making the outcome of closely competed matches somewhat contentious. In 1900, A. L. A. Himmelwright designed the so-called Himmelwright wadcutter (Ideal #429220), an oddly shaped bullet, designed to cut clean, full-diameter holes in target paper. The extended proboscis found on Himmelwright's bullet was presumably to help maintain aerodynamic stability in flight. It became known simply as "The Wadcutter".


The Himmelwright wadcutter (Ideal 429220)

The concept of designing bullets specifically for target shooting took hold and a flurry of activity followed over the next several years. The first of these bullets that a modern-day shooter would recognize as a semi-wadcutter, would be the Ideal 358271 designed by B. F. Wilder in the 1903-1904 timeframe. This 150 grain .38 caliber target bullet had 2 lube grooves, a wadcutting shoulder, a radiused ogive, leading to a flat meplat; a familiar combination to shooters today, but a novel development for the day. The .44 Russian was the leading target cartridge of the period, so it's no surprise that the success of the Wilder wadcutter led to the design of a similar bullet for the .44 round. C. E. Heath of the Boston Revolver Club designed the Ideal 429336 as a target bullet for the .44 Russian cartridge (remember, the .44 Special was not introduced until 1907). This bullet was similar to the Wilder wadcutter in that it had 2 narrow lube grooves, a wadcutting shoulder, a radiused ogive, coupled with a flat meplat. It was a popular target bullet, and would inspire one of the greatest bullets ever made.

In 1928, Elmer Keith drew up his design for the now famous 429421, what is now known universally as the Keith semi-wadcutter (SWC). The SWC terminology wasn't initially used for this type of bullet design, but came into fashion later in the 1950s. Originally this design was simply known as the Keith bullet. In essence, what Elmer did was to take the 429336 basic design and convert the forward grease groove to a beveled crimp groove, and then fatten up the rear grease groove to hold more lube. He cited the 358311 .38 round-nose as his inspiration for these features -- he liked how that bullet behaved during casting, loading and shooting (but not how the round-nosed bullet killed game), and wanted to capture those desirable features in the bullet he was designing for the .44 Special. The weight, ogive and meplat of the 429336 were left unchanged. The result was the Ideal 429421, and it was everything that Elmer had aimed for. It delivered target grade accuracy, cut clean holes in paper and meat, killed game quickly and humanely, and was accurate over long ranges. How we think of revolver bullets was forever changed. A HP version of the 429421 soon followed, providing an expanding version of the Keith SWC for enhanced game-killing capability.

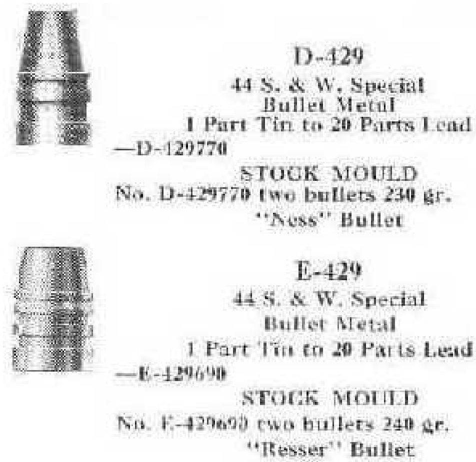

The Heath target bullet (Ideal 429336).


The Keith SWC and HP (Lyman/Ideal 429421).

In pre-WWII America, Hensley & Gibbs were also making moulds for the .44 SWC, such as their designs #35 and #45. These are both 240 grain, plain-based bullets, that differ in the design of their lube grooves and nose length. I have a GC version of H&G #45 (basically a 240 grain version of their #140), and it is an exceptionally accurate bullet. Later, in the early 1960s, Elmer Keith was frustrated with the changes that Lyman had made to his SWC designs, so he turned to H&G and commissioned them to reproduce his original SWC designs. The results were the H&G #503 (.44 SWC), the #501 (.45 SWC) and the newly designed #258 (.41 SWC) for the brand new .41 Magnum.

Modern-Bond was also producing moulds for .44 SWC's during the 1930's and '40s. Their catalog included the D-429 (D-429770, the 230 grain "Ness" bullet) and E-429 (E-429690, the 240 grain "Resser" bullet), both of which captured the design features we think of as SWC today. The Ness bullet had a thick base band, a square-cut grease groove (a true 90 degree cut), a beveled crimp groove, and a skinny little forward driving band, leading into a long straight ogive and a moderate sized meplat. The Resser bullet had a radiused ogive, similar to the Keith SWC, but had a narrow forward driving band and two different sized square-cut grease grooves. These moulds are not commonly encountered today.

During this timeframe, Cramer was also making SWC moulds for the .44 Special. The Cramer #7 was listed at 250 grains (unspecified alloy) and was very similar to the original Keith SWC, Ideal 429421, with 3 sizable driving bands, a beveled crimp groove, a wide flat-bottomed grease groove, a double radius ogive and large flat meplat. When cast with WW alloy, the Cramer #7 drops from the blocks at 260 grains, and is a dandy bullet. I know one very knowledgeable bullet caster who has chosen this bullet as his one and only .44 Magnum bullet. It does everything well; given its heritage and its weight, there's little wonder why. Cramer was bought out by SAECO in the early 1950s.

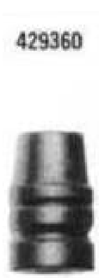


Catalog entries for the Modern-Bond .44 SWC's (this figure was taken from the scans online at http://www.castpics.net/research.htm -- an excellent online resource for cast bullet data)


The Cramer #7 (photo by Robert L. Applegate).

Gordon Boser also designed a SWC for the .44 Special. The Ideal 429360 was first cataloged in Ideal Handbook #37, published in 1950. By cherry number, it would seem that #360 might have come out sometime in the pre-WWI period, but Boser didn't come on the scene until much later and this bullet wasn't included in the Ideal Handbooks until 1950, so I suspect that this is a recycled cherry number (I haven't found any reference to the original #360, perhaps this number was skipped in the original series?). Boser's bullet featured a straight ogive, and a sharp corner where the ogive met the meplat (similar to the Modern-Bond "Ness" bullet, described above). It had a thick base band, and a small, round grease groove. It also had a somewhat undersized forward driving band (bullets from my mould measured about .424" across the forward driving band, perhaps this was intended to be some sort of bore-riding band? or perhaps it was designed for Colt SAA revolvers with tight bores?). As a result of its short bearing surface (i.e. only the last two driving bands) and undersized front driving band, this bullet tends to have alignment problems in modern revolvers, and accuracy is generally poor.

In the post-war growth of the early 1950s, S&W was selling a lot of .357 Magnum revolvers. Now keep in mind that reloading components were not as prevalent in those days as they are today, and to be a pistol shooter in those days pretty much meant that you were a bullet caster. Well, the blistering velocities of the First Magnum got some of the shooters of the day thinking about adding gas-checks to their revolver bullets. Ray Thompson designed such a bullet (the Ideal 358156) for the .357 Magnum. This excellent bullet not only provided superb accuracy, it also basically eliminated the leading problems that many of the early Magnum shooters were complaining about.



The Boser Bullet (Lyman/Ideal 360).

The 358156 was, and remains today, immensely popular for the .357 Magnum. When the .44 Magnum was unveiled in the mid-1950s, Mr. Thompson followed suit with gas-checked .44 SWC's of 215 and 255 grains (the Ideal 429215 and 429244, respectively). All of the

Thompson SWC's are superbly accurate. The Thompson SWC's were also available in HP form, which make excellent hunting bullets (the 429215 HP for vermin and the 429244 HP for larger game).

Lachmiller was a significant player in the field of reloading tools throughout the 1950s. In the 1960s they added bullet moulds to their product line. One of which was a .44 SWC very similar to the now modified Lyman 429421, with its rounded grease groove, and somewhat smaller forward driving band. Like the Lyman and Cramer designs that preceded it, this bullet shoots, and kills, very well. Lachmiller made a wide variety of fine 2 and 3 cavity bullet moulds, for both rifles and pistols. They were bought out by RCBS in the late 1970s

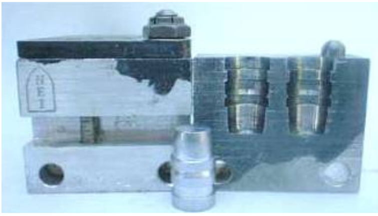
The Thompson SWC's; the Lyman/Ideal 429244 SWC and HP, and the 429215 SWC and HP.

The Lachmiller .44 SWC mould.

Ohaus jumped into the bullet mould business in a big way in the early 1970s with an extensive selection of mould designs. Included in these 60+ moulds designs was a .44 SWC similar to the Keith design. RCBS bought out the Ohaus line in the late 1970s. The RCBS line now includes several .44 SWC's, ranging from 225 to 300 grains, one of which is marketed as a .44 Keith. While this design captures virtually all of the design features that Elmer drew into his landmark 429421 back in 1928, it is also graced with an unusually wide v-shaped crimp groove that was not a part of the original Keith design (at least not according to the original drawings of the Keith bullet on page 90 of the Ideal Handbook #29, published in 1929). The other RCBS .44 SWC's have a more traditional beveled crimp groove. I have worked with most of the RCBS line of .44 SWC's, and they have all shot very well for me.

NEI has a whole host of 44 SWC's ranging from 225 grains to 300 grains, largely paralleling the classic designs of RCBS and Lyman. Most notable to my eye is the beautifully balanced design #256, which is listed as a 255 grain plain based SWC. This must be a linotype weight as these bullet drop from my mould at 270 grains with WW alloy. This is a very useful weight for the .44 Magnum, and this well-proportioned SWC captures all of the features that Elmer wanted, and tops it off with a .340" meplat.

The RCBS .44 250 grain SWC.



The NEI #256 (.44 SWC, 270 grains WW alloy).

For the most part the .44 SWC has stayed true to the original Heath design weight of about 250 grains. Ray Thompson designed a lightweight 215 grain GC-SWC for high velocity .44 Magnum loads in the 1950s, and Ohaus/RCBS followed suit with their 225 grain SWC, as did NEI. In more recent years, following the introduction of the SSK 320 grain sledgehammer in the early 1980s, the pendulum has swung the other direction, towards heavyweight bullets for the .44 Magnum. The two most notable contributions here are the GC heavyweight SWC's from Lyman and RCBS. Both of these bullets are exceptionally accurate, hit hard and penetrate deeply, whether from a sixgun at 1300+ fps or a lever-gun at 1600+ fps. NEI and H&G also offer 300 grain .44 SWC's (the NEI #268C is a GC design, while the H&G #328 is PB). H&G moulds are now available from Ballisti-Cast.

.44 Special:

When loading the .44 Special for general use (i.e. 800-1000 fps), it almost seems wrong to load the case with anything other than a SWC that captures the elements of Elmer Keith's basic design, whether from Lyman/Ideal, Cramer, RCBS, H&G, or NEI. Gas-checked bullets are not needed, or even appropriate, for this level of ballistics, and heavyweight bullets raise pressures faster than velocities in this cartridge, making the PB 250 grain SWC's the logical choice for optimum performance from these guns. If the shooter wants more expansion than these bullets offer, then the Keith SWC (429421) was also made in HP form. Cast soft (i.e. BHN of 7-8) these cast HP's expand just fine at 1000 fps

The RCBS 44 300 GC-SWC, and the Lyman 429650 GC-SWC (310 grains WW alloy).

.44 Special +P+:

I don't load "Elmer Keith loads" for general purpose use in the .44 Special anymore. The only reason I load the .44 Special to 1200 fps these days is to re-live history, to feel with my own two hands what Elmer Keith felt as he experimented in those long-gone days, to understand where the .44 Magnum came from, and to hunt with the loads that Keith hunted with back in pre-WWII Idaho. Since the motivation behind these loads is heavily steeped in nostalgia and historical accuracy, the only bullets used to construct these loads are the Lyman/Ideal 429421 (the original version with the full-width forward driving band and flat-bottomed grease groove), in both SWC and HP form (the HP's are generally cast 20-1). It can be very satisfying to re-visit history periodically.

.44 Magnum:

The .44 Magnum is an amazingly versatile cartridge! And this versatility plays itself out in the wide selection of .44 SWC's that are of value to the .44 Magnum shooter. While GC bullets are not required for the .44 Magnum, the higher pressures and higher velocities experienced with this round mean that the presence of a GC can help to make up for modest deficiencies in the alloy or lube, and therefore make the sixgunners life a little simpler. While the Himmelwright wadcutter might look a little odd loaded in the .44 Magnum case, and the Boser SWC probably wouldn't deliver all the accuracy that the cartridge is capable of, any of the other SWC's from Keith or Thompson, or those inspired by them, is of value to the .44 Magnum shooter. The 215-225 grain GC-SWC's provide higher velocity and lower recoil for hunting animals ranging from rodents up to deer in size. The 240-250 grain SWC's are excellent general purpose .44 Magnum bullets, for silhouette competition to hunting deer, black bear and even elk. If the hunter wants an expanding version of these bullets, the Keith and Thompson SWC's were also made in HP form. Cast to a BHN of about 12 (e.g. WW alloy sweetened with about 2% tin), these bullets expand fine on game. For the larger stuff like elk and moose, the 300 grain SWC's couple deep penetration with excellent accuracy. There are many useful SWC's for the .44 Magnum, but perhaps the most versatile overall is the 265 grain Thompson SWC (the Lyman 429244 GC-SWC). I know one very successful handgun hunter who uses only the 429244 in his .44 revolvers. To date, he has taken a couple dozen elk and a bunch of deer with this bullet. He really likes it.

The story of the .44 SWC started back in the 1860s with the introduction of the S&W Model No. 3 revolver. Thus, was created the need for the Himmelwright wadcutter, which begat the Heath bullet, and the Heath bullet begat the Keith SWC, and the Keith SWC begat the Thompson SWC. As a result of these pioneers and their experimentation, the .44 caliber revolver established a firm place in American history, because without these bullets, the .44 revolver would have never delivered the level of performance (and hence acceptance) that we associate with it today. What started out as a bullet designed solely for competitive paper punching, morphed into a general purpose bullet, and ultimately resulted in an outstanding series of handgun hunting bullets. The story of .44 SWC continues, under a full head of steam, head-long into the 21st century.

- Glen E. Fryxell

The .45 Keith SWC

By Glen E. Fryxell

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In 1928 Elmer Keith scratched out the design for his landmark .44 SWC, which later gained fame as the Ideal 429421. Shortly thereafter, he drew up his plans for a bullet engendering the same features for the .45 Colt. Thus was born the Ideal 454424, one of the greatest revolver bullets of all time.

Lyman bought out Ideal and continued production of many of the Ideal bullet designs. Over time however, Lyman has changed many of their designs for one reason or another. The 454424 has undergone a number of changes over the years, and these changes have generated lots of questions and confusion among each new crop of bullet casters that comes along. The purpose of this piece is to outline the history of the .45 Keith SWC, explain the changes that have taken place, and show the new caster what some of the options are today, and how they stack up relative to the original.

Elmer Keith designed his semi-wadcutters to have 3 driving bands of equal width (he felt very strongly about a full-width forward driving band), a deep, "square-cut" grease groove, a beveled crimp groove, a wad-cutting shoulder, a gently curved ogive for stable long-range flight and a hearty meplat to generate dependable, open wound channels. Three sizeable and well-spaced driving bands combine to provide lots of bearing surface to keep the bullet aligned in the cylinder throat, the full-width forward driving band provides positive engagement as the bullet transitions between the cylinder and barrel and starts to be engraved. The so-called "square-cut" grease groove was actually beveled slightly so that bullets would release from the mould more easily, but he used the "square-cut" description to differentiate between his design and the rounded grease grooves of other designs (which he didn't care for since they didn't hold as much bullet lube). The original Ideal 454424 embodied all of these concepts. Bullets drop from my old Ideal 454424 right at 250 grains using WW alloy, seasoned with a pinch of tin. The bullets are .676" long and the distance from the top of crimp groove to meplat is .380". Both of the front two driving bands are about .075" wide and the base band at .070". Meplat diameter is approximately .330", square-cut grease groove is cut with what I would guess to be a 75 degree bevel (as a result, the bullets are sometimes still a little reluctant to drop from the blocks). Overall bearing surface (i.e. the distance from the bottom of the bullet to the forward edge of the front driving band) is about .375".

One of the changes that Lyman made later on was to change the grease groove from the original "square-cut" design that EK preferred to a radiused design intended to allow the bullets to drop from the cavities more easily. We normally think about alloy shrinkage in terms of diameter, but a 3-dimensional bullet shrinks in 3-dimensions as the alloy cools, roughly towards the geometrical center of the bullet.

Thus, if the mould has sharply cut right angles in it (like the 90 degree grease


Lyman 454424

grooves of the old black powder bullet designs) the bullet metal can "pinch" these ridges upon shrinkage, thereby causing the bullet to hold fast when the blocks are separated. This is why some of the old black powder designs can be such a pain to cast, and one of the reasons why Elmer Keith stipulated a slight bevel for the grease grooves he designed for the 429421 and 454424 (my old 429421 looks to be roughly 60 degrees, while my old Ideal 454424 is closer to about 75 degrees). His "square-cut" (more accurately "flat-bottomed") grease grooves also held more bullet lube than the radiused design adopted by Lyman. I had originally believed that this change was made concurrent with Lyman changing the nominal bullet diameter from .454" to .452", but I recently have found moulds stamped Lyman 454424 that have the radiused grease groove (see photo above). Bullets drop from this newer 454424 at about 263 grains (same alloy as before), with an overall length of .698". The distance from the top of the crimp groove to meplat is .385". Ogive appears identical to the original. In this bullet, the front driving band measures about .070", but the middle driving band and the base band are somewhat wider at .105". Meplat diameter is still approximately .330". Overall bearing surface of this version of the 454424 is .398". This bullet is heavier than the original because it is longer (wider driving bands) and because the "square-cut" grease groove has been replaced with a smaller radiused grease groove.

Later, when the change was made to the smaller diameter (.452", which I believe took place sometime in the late 60s) there was also a change made to a slightly more tapered and rounded ogive, resulting in a slightly smaller meplat. I'm not sure why Lyman did this (possibly to enhance the aerodynamics of the design?). There is certainly nothing wrong, or bad about the newer 452424 design, it's just that one of the reasons the .45 Keith SWC is so popular and useful is that big, flat nose - to reduce that meplat is to turn one's back on what Elmer Keith taught. The new bullets are still perfectly good, and perfectly deadly, it's just that they're almost as good as the original.

The newer, re-designed 452424 has been made in both the round grease groove or the "square-cut" grease groove configuration (although the square-cut version is notably harder to come by).

Many mould makers produce moulds that are very similar to Lyman's most recent (round-groove) version of the .45 Keith SWC. The version I have at the moment is the NEI #309 .451-250 (which is a plain-based version of their GC design #308). The NEI bullet is a virtual carbon copy (do the 20-somethings in the audience know what a carbon copy is?) of the "modern" 452424. It weighs 258 grains (same alloy as before) and is .700" long. The distance from the top of the crimp groove to meplat is .375". The front driving band is still about .075", while the middle driving band measures .100" and the base band is .125" thick. Meplat diameter is approximately .320". Overall the bearing surface of this bullet runs about .410" (the slightly longer bearing surface arises directly from the thicker base band). I have personally seen 2 moulds stamped "Lyman 452424" that were cut with square-cut grease grooves, and I bought one of them. Bullets drop from these blocks weighing 253 grains, and are .695" long. The distance from the top of the crimp groove to meplat is .380". The front driving band is .070"wide, while the middle driving band mics at .080" and the base band at .125". Meplat diameter is approximately .320" and overall bearing surface runs right at .400". The ogive is now a single radius instead of the compound radius used in the previous designs. The slightly lesser bullet weight (5 grains) is due to the larger and deeper "square-cut" grease groove, the rest of the bullet is virtually identical to the round-groove version described above.


Lyman 452424

Of these 4 Lyman/Ideal designs, by far the most commonly encountered these days is the round grease groove 452424, which is a dandy bullet for plinking, hunting and competition, but it's not what Elmer Keith designed for the .45 Colt. If a new caster wants to get a little closer to the original Keith design, what are the options available? To my mind, there are 2 notable variations on the original theme: the easiest to find is the RCBS 45-255-SWC. This bullet weighs 266 grains (again, WW alloy, plus about 2% tin), and drops from the blocks .725" long. It has a square-cut grease groove with approximately 60 degree bevel (so bullets drop from the mould easily), and the forward 2 driving bands are about .075", while the base band is .110". The distance from the top of crimp groove to meplat is .385" and meplat diameter is .330". It has .422" of bearing surface, and the original Keith ogive. In a nutshell, the RCBS bullet is the original 454424 with a thicker base band and a slightly improved grease groove.

Another very good alternative is the NEI 265 451K (this is a variation of design #317, which is a 275 grain bullet, the 265 grain version has slightly narrower base band, and hence lesser weight). This bullet is proportioned somewhat differently than the 454424 (the front end is actually somewhat reminiscent of Elmer Keith's other .45 SWC, the 452423), but it captures all of the design features that Elmer wanted - 3 approximately equal width driving bands, a beveled crimp groove, a "square-cut" grease groove, and a big, flat meplat. These bullets weigh 260 grains cast with WW alloy. They are .700" long. The forward 2 driving bands are about .105" and the base band is .095". The distance from the top of the crimp groove to meplat is .355", and meplat diameter is .345". Overall, this bullet has .458" of bearing surface.


RCBS 45-255-SWC
and the NEI 265 SWC.

You might notice a few similarities in these bullets; all are about 255-260 grains, all are about .700" long, all have a meplat of at least .320", all have ample bearing surface and all have at least half of the bullet seated outside of the case. Any one of these moulds will provide many, many years of happy plinking, and there isn't a buck alive that could tell the difference between these bullets upon impact. Each of these bullets has given me excellent accuracy, and all are killers of the first order in the hunting fields. If your goal is an accurate and hard-hitting cast bullet to feed your pet .45 Colt, then any of these bullets will serve superbly. If you seek the nostalgic satisfaction of shooting a bullet with the specific features that

Elmer Keith drew up in those halcyon days before the Great Depression, then the playing field isn't quite so level. If you can find an old Ideal 454424 then you're all set, but those are getting harder and harder to find. If not, then the next closest bullet design is probably the RCBS 45-255-SWC.

A lot has changed since 1928, but a lot has also remained the same. A Keith SWC weighing about 250 grains, with a big, fat meplat, the right ogive, sufficient bearing surface and a healthy dollop of grease is still one of the best loads you can drop into a sixgun.

- Glen E. Fryxell

The Himmelwright Wadcutters

By: Glen E. Fryxell

This article by Glen E. Fryxell written for LASC.US

Himmelwright Wadcutter (Left) Ideal #429220 (Right) Ideal #360302

In the last quarter of the 19th century, the way in which handguns were viewed and used was changing dramatically. Originally, handguns had been viewed as weapons to be used in a last-ditch effort to stave off hand-to-hand combat. By the 1880s manufacturing methods had advanced to the point where accuracy and reliability were getting to the point that a good shot could legitimately expect to hit a softball-sized target at 50 yards. As these skills developed, so did the desire to compete and pit those skills against those of one's friends and neighbors. Thus, bullseye competition was born. In the early days of bullseye competition, the S&W Model Number 3 chambered in .44 S&W Russian was one of the most accurate revolvers of the day, and was used by the vast majority of the champions. The standard load was a 246 grain lead round-nose bullet, launched at a little over 750 fps. This load, while very accurate, made targets very difficult to score due to the irregular holes it tore through the target paper. Something better was called for (probably by some guy who lost a match by 1 point).

Around 1900, this need led to the Ideal #429220, also known as the Himmelwright wadcutter, a 175 grain target bullet for the .44 Russian (this was before the .44 Special was introduced in 1907). The Himmelwright wadcutter was specifically designed for the S&W Model Number 3 in an effort to cut full caliber holes in target paper. The Himmelwright wadcutter came out around 1900. The description provided by Ideal was:

> "For the .44 S&W Russian revolvers, designed by A. L. A. Himmelwright, former president, United States Revolver Association, especially to cut a clean full-sized hole in the target and give the shooter the full value of his shot. Known as the "wad cutter bullet."

Early Ideal Handbooks called for loading this bullet over 2.8 grains of Bullseye in the .44 Russian case for about 725 fps. This bullet has no crimp groove, and apparently the standard practice was to fill its two generous grease grooves with lube, seat the bullet deeply and place a light roll crimp over the forward driving band. The prodigious proboscis meant that the seating and crimping operation could be carried out in a single step (something not always possible with later wadcutter designs as the seating stem could interfere with the crimp). Such loads recoiled more lightly than the standard .44 Russian loads, allowing shooters to recover their sight picture more quickly in rapid fire strings, and the wide shoulder was intended to cut a clean full caliber hole in target paper.

This is a landmark bullet, not just for its bizarre shape, but because it is the first handgun bullet that was designed for *one specific task*, as opposed to being a general purpose projectile. We take that concept for granted today with highly specialized projectiles for everything from self-defense, to hunting dangerous game, to various forms of competition (silhouette, bullseye, IPSC, etc.). The Himmelwright wadcutter is kind of an odd-duck as projectiles go, but I think it's important that we recognize the significance of Mr. Himmelwright's willingness to tailor bullet design for a highly specialized function. This was an important step in the development of the high-performance handgun ammunition that we take for granted today.

In 1899 S&W unveiled a new revolver that would become a landmark in revolver design for the next 100+ years. The First Model Military and Police Model of 1899 (known affectionately as "the M&P") was the first fixed-frame, medium frame (K-frame) hand-ejector, in which the cylinder swung out of the frame for loading and unloading. This accurate and reliable design would go on to become incredibly popular, with both private citizens and law enforcement organizations. The Model 1899 was also the first revolver chambered in the perennial .38 Special. Shortly after Mr. Himmelwright designed his wadcutter for the .44 Russian, he designed a similar bullet for the .38 Special (the Ideal 360302-S). The Ideal Handbooks of the day described the 360302-S as:

> "For .38 S&W Special revolvers. Bullet as illustrated, cast of 1 part Tin to 25 parts Lead, will weigh about 112 grains. It is very accurate for short range and cuts a large clean hole in the target. Designed by A. L. A. Himmelwright.... (Can also furnish a mould to cast bullet with base band about as wide again, weighing about 130 grains.)"

Of the various powder charges recommended for this bullet in the .38 Special was 2.5 grains of Bullseye for 790 fps.

A while back I bought a S&W First Model Military and Police, with a serial number in the 11xx range. This gun was made in the first couple of months of the first production run of guns ever chambered for the venerable .38 Special. This gun has been polished down and re-blued, so it has lost a significant portion of its collector's value, but mechanically it's in good shape -- the timing and lock-up are good, and the bore and cylinder are very good. The one unfortunate detail of this gun is the fact that at some distant point in the past someone had ground down the front sight to roughly half of its original height, presumably to get point of aim and point of impact to jive for their particular pet load. Not surprisingly, with standard weight bullets (i.e. 158-160 grains), this gun tends to shoot quite high at normal ranges. In thinking about light bullets that I could use to get this revolver to shoot closer to point of aim, it occurred to me that this revolver was contemporary with the Himmelwright wadcutter and the selection of lightweight .358" diameter bullets was pretty limited during that timeframe (there *were* a few others, but very few). Thinking that perhaps the previous owner had set this old M&P up for target shooting and had regulated it for the Himmelwright wadcutter, I decided to assemble some test loads and see what I could learn.

So I broke out my 2-cavity Ideal 360302 and fired up the lead pot. Casting the 360302 was pretty much like casting any other bullet, and soon I had a shiny little

Ideal 360302

pile of Himmelwright wadcutters (114 grains when cast with a 3:1 mix of range scrap to linotype, approximately BHN 12, similar to WW). For a modern caster, that is pretty much where the similarity to modern cast bullets ends. With that pronounced proboscis sticking out the front, none of the standard nose punches work (and nose-first sizing, as with the Star, may blunt the nose in the process of pushing the previous bullet along). A number of years ago I had made a nose punch for .30 caliber spitzers in which I had center-bored a .30 caliber nose-punch, and then taper-reamed the cavity. This nose-punch proved satisfactory for the Himmelwright wadcutters (although it did leave a slight "ring around the collar" of the sized/lubed bullets). Bullets were sized .358" and lubed with homemade Moly lube. Test loads were assembled with 2.6 grains of Bullseye and Winchester Small Pistol primers. Bullets were seated using a standard round-nose seating stem, and this blunted the tip of the nose very slightly, but not enough to be of any consequence. Test firing at 50 feet revealed that the Model 1899 First Model M&P was still shooting somewhat high, but at least now many of the shots fell into the black.

An interesting observation -- while the full profile of the bullet was indeed visible on the target, the hole in the paper was not the clean round hole that we would associate with a wadcutter today. Portions of the bullet holes were gone, but a significant portion of the paper still remained in each bullet hole, and there were typically horizontal tears emanating from the top and bottom of the bullet hole going out to both sides for half an inch or so (targets were hung from a clip and not stapled onto a backer, and this may have influenced the tearing pattern). The original Ideal advertising copy claimed that the Himmelwright design would cut "a large clean hole in the target", and in these tests that did not prove to be entirely true (however it is clearly true that scoring these targets would be significantly easier than if round-nosed bullets had been used). In any event, with the exception of a flyer or two, the old Model 1899 M&P seemed to shoot the Himmelwright wadcutter acceptably well, and closer to point of aim than any other bullet I've tried to date in this gun, however accuracy wasn't what one would normally associate with a highly regarded target bullet, so I decided to run some of these loads through another gun to see if the limitation was due to the gun or the bullet. A .38 Special M&P Model 1905 Target (circa 1909), with an established reputation for fine accuracy (and a pristine bore), was chosen as a suitable (and period correct) test vehicle. Long story short, time and time again, 10-shot groups at 50 feet consistently went into one ragged hole measuring about 1 1/4". Clearly, the .38 Himmelwright wadcutter is capable of providing good short-range accuracy, in the right gun.

As expected, recoil with these light target loads was in the pop-gun class, and there was zero problem with leading.

These results got me to thinking about the original Himmelwright wadcutter and learning more about how it shot. I do not have a S&W Model 3 .44 Russian to shoot these in (maybe someday....), but I do have one or two .44 Specials that I could make do with. To start off with, I chose a 5" 2nd Model Hand-Ejector (circa 1931) since it was the closest thing I had to being contemporary with the


38 HWC and Model 1905 target

Himmelwright bullets (the Himmelwright wadcutter was originally designed around 1900 and cataloged up through Ideal Handbook #39, published in 1953). I do not have a mould for the Ideal 429220, but a good friend of mine does (an old 6-cavity Ideal Armory mould that has been in the family since it was bought new in 1910). He was kind enough to cast up a batch of these for me a while back (178 grains, cast with wheel weight alloy), and here was my chance to work with them. These Ideal 429220s were sized .431" and loaded over 2.9 grains of Bullseye in W-W .44 Special cases. Not surprisingly, this light 178 grain bullet shoots low (~4" at 50 feet) from the fixed sight 2nd Model Hand Ejector (which is nicely regulated for 250 grain bullets). Once again, groups were acceptable for a service revolver, but not good enough for serious target work (~2 1/2" at 50 feet). The unusual horizontal tears in the target paper (described above) were once again observed. And once again, recoil was light and there was no problem with leading.


HWC and USFA FT-Target .44 Special

Since experience with the .38 Himmelwright wadcutter had shown that a cleaner, tighter bore could have an impact on group size, I decided to try these loads in a USFA Flat-top Target .44 Special, with an immaculate bore (while this gun was not itself contemporary with the Himmelwright wadcutters, its design most certainly is). Once again, groups were in the 2 1/2" to 3" range at 50 feet, and this fine sixgun is capable of significantly better. I can only conclude that there must be some limitations to the Himmelwright wadcutters. I suspect that this has something to do with alignment issues, as the Himmelwright wadcutters have the combination of a short overall bearing surface and a long nose. In other handgun bullets this combination of short bearing surface with a long unsupported nose can be the kiss of death in terms of accuracy (in rifle bullets this can be overcome by gaining additional support/alignment from the tops of the lands and making the nose bore-riding, but that is not possible in the throat of a revolver cylinder). Of the guns I shot the Himmelwright wadcutters in the Model 1905 Target has by far the most shallow forcing cone (only ~.050"), meaning that the gap between the throat and the lands/grooves is unusually short, so the bullet is still supported by the throat when it's getting engraved. This leads to better alignment, and hence, tighter groups. The other guns have more deeply cut forcing cones, leaving more "wobble room", and greater chance for misalignment. There is a reason that wadcutter design evolved towards bullets with longer bearing surface (e.g. the classic H&G #50, or the Lyman/Ideal 358495). Longer bullets are still well supported by the throat as they reach across the forcing cone gap to begin the engraving process.

Aside from the unusual nose on the Himmelwright wadcutters, another unique feature found on these bullets is their capacious lube grooves, especially for a bullet intended for light target loads. I suspect that this is a reflection of the times in which they were designed. This could be a hold-over of "black powder mentality" in the hopes of maintaining competitive accuracy for as many shots as possible by minimizing fouling with an abundance of lube, or it might even be a hint that some of the early target shooters were shooting the Himmelwright wadcutters with black powder. In any event, these bullets hold far more lube that is needed for mid-range target loads assembled using smokeless powder.

All in all, this has been a very fun little project, a chance to shoot the original target bullet out of some old period-correct revolvers and experience first-hand what some of the early bullseye competitors worked with in order to earn their medals and trophies. All told, I don't really see that there is much call for the Himmelwright wadcutters today, as there are more accurate bullet designs out there now, and bullet designs that do much a better job of cutting clean holes in target paper, and the Himmelwright wadcutters provide no advantages for use in speed-loaders, or handgun hunting, or the long-range accuracy needs of silhouette competition. Nonetheless, there is a nostalgic itch that can only be scratched by using the original bullet, and the Himmelwright's are the original wadcutter, and a bold step forward for competitive handgun marksmanship.

- Glen E. Fryxell

In search of the perfect bullet...

By: Glen E. Fryxell

RCBS 44 300 Gr. HP GC
Loaded 44 Magnum

Does the perfect handgun hunting bullet exist? No. As soon as somebody declares they've found "the perfect bullet" then somebody else is going to come along and disagree with them, because we all have different tastes, priorities and criteria. Perfectly predictable, and as it should be. As Elmer Keith liked to say, "I'm all for a man killin' his own snakes, his own way."

Part of the fun of handgun hunting is the experimentation -- working with wildcat cartridges, fine-tuning handloads, figuring out which bullets work best for the velocity range of interest, etc. It's a good excuse to do a lot of shooting, learn some interesting (and sometimes useful) things, and fine tune your hunting tools to fit your tastes so you can get more out of your hunting experiences.

Years ago, JD Jones wrote an outstanding article for Handgun Digest (3rd Edition) called "It's the bullet!" where he outlined the thesis that the bullet is what does all the work, and therefore is arguably the most important variable in the overall hunting equation. For the handgun hunter, bullet selection takes on added importance because not all hunting bullets perform well at handgun velocities. Matching the expansion properties of the bullet to the gun and the game animal is key to success for the handgun hunter.

Back in the 1980s, JD Jones ushered the handgun hunting world into the realm of 300+ grain .44 Mag bullets with the introduction of the SSK 320 grain truncated cone. This bullet is designed to be a deeply penetrating solid for large game animals, and has racked up an impressive performance record, including elephant, Cape buffalo, Kodiak bear, and more. The commercial bullet manufacturers followed suit with a variety of 300 grain jacketed bullets for the .44 Mag. Some of these bullets are hard, and behave like solids (e.g. the Sierra JSP), some of them are soft and expand readily (like the Nosler JHP), and some are in between, providing controlled expansion (like the Hornady XTP). The advent of these heavyweights made the .44 Magnum a far more versatile hunting round.

Over the last half century, the .44 Magnum has established itself as the workhorse of the handgun hunter, and it makes a sensible starting point for the design of the "perfect bullet".

I enjoy making my own bullets. I also enjoy hunting with bullets that I've made myself. I've always wanted a 300 grain expanding cast bullet for the .44 Magnum to use on elk, caribou, moose, and such. I'm not talking about dangerous game like Cape Buffalo and grizzly (we've got solids like the SSK bullet, and several others, for that job), but rather my focus here is on the relatively large, thin-skinned herbivores in the 400-1000 lb range. I have always felt that a large, heavy cast HP should work well on this class of critter. The bottom-line is that I've long wanted a 300 grain cast HP for the .44 Magnum, and nobody makes one.

Standard bullet moulds can be converted to drop HP bullets. On the surface, this is a fairly straightforward conversion -- drill a hole, make a HP pin, and put in some sort of keeper to hold the pin in place while casting. The tough part about all this is getting that hole in exactly the right place so the HP cavity is perfectly centered in the bullet, allowing the bullet to fly balanced and true. If one is a machinist, and has a lathe sitting out in the garage, and the skills to use it properly, then this isn't a problem. However, for most folks this isn't an option. Well, in that case Plan B would be to find a machinist and explain to them exactly what you want, and if they are willing to take on the job (and not all will), then you have to hope that they have a good enough understanding of bullet moulds (and their foibles) to get it right. I have gone this route in the past, and gotten very good results (I have also had a couple of moulds ruined by machinists who didn't understand the problem adequately). There are machinists out there who know bullet moulds and do spectacular work, and there are folks out there who don't.

Recently, a new business has come online called Hollow Point Bullet Mold Service, email - modify@hollowpointmold.com, (541)738-2479) out of Corvallis, Oregon. This business is focused entirely on making and repairing HP moulds. Erik knows bullets moulds, and more importantly he knows HP bullet moulds. I have had him work on over half a dozen bullet moulds for me, and in every case he has made me exactly what I've asked for, the cavities have been perfectly centered, the fitting and workmanship first-rate, and the prices friendly. The focus of this article is one very special HP mould that I had Erik make for me.

In a standard HP mould (i.e. like Lyman/Ideal have been making since the 1880s), the HP cavity is created by a pin that is inserted through a hole in the bottom of the mould blocks. After the bullet is poured and cooled, the sprue is struck, the pin removed and the bullet dropped from the blocks. This type of HP mould is most often seen on single cavity moulds, but this conversion can also be done to one cavity of multiple cavity moulds as well (making for a very versatile bullet mould).

Another type of HP bullet mould that is less well-known is the Cramer-style HP system. In the Cramer system, the HP pin is held in place by two transverse pins that slide through two holes in one of the mould blocks. This system holds the HP pin in place and makes it harder to lose. It also holds the pin close to the blocks and keeps the HP pin warm (very important for casting high quality HP's). It also allows for multiple cavities to be converted so the caster can make a lot of HP bullets fast!

The casting sequence is a little bit different for a Cramer-style HP mould. After striking the sprue, the mould is inverted over the "drop zone". By canting the mould slightly, then rapping the hinge pin of the handles, the mould opens and the weight of the bullets pulls the pins out from the blocks and the bullets drop free from the pins. Then just close the mould and cast again. It's a much faster casting cadence since there are no steps for pin removal and pin replacement. It takes a little getting used to, but it's a very slick system.

Hollow Point Bullet Mold Service is the only business I know of that offers the Cramer-style HP conversion. For Cramer-style moulds to work smoothly, it is important that the HP pins need to be adequately tapered, polished and oxidized in order to get them to release the bullets readily. Erik understands this, and his pins make beautiful HP bullets that drop free easily. Erik has also upgraded the original Cramer design by replacing the transverse roll pins with precision ground hardened steel pins, which slide in and out of blocks effortlessly. Not only are these pins stronger and smoother than the original Cramer roll pins, they have the added advantage that if there is an overflow spill that goes over the side of the mould and onto the pins, it just slides right off the hardened steel pins and casting continues uninterrupted (for the roll pins, it sticks and you have to stop and pry it off before you can do any more casting).

OK, so I was looking for a 300 grain .44 caliber mould to convert to HP. When I found out that Erik was willing to do a Cramer style of HP conversion, then I knew it had to be a 2-cavity mould, so I could get both cavities converted. Now, it should be emphasized that not all moulds will work for the Cramer style of conversion -- there has to be enough "meat" left at the bottom of the mould for Erik to get both of the transverse pins through the mould blocks. Also, some mould designs have features in the way (mounting screws, handle slots, etc.) that can prevent this conversion as well.

For general purpose revolver work, I am big fan of plain-based bullets, as GCs simply aren't necessary for the pressures and velocities encountered in most revolver loads. However, for this bullet, I wanted to go with a GC because I wanted to be able to use it in my Marlin 1894 .44 Magnum levergun (at 1700 fps or so), as well as my .444 Marlin Contender (at around 1850 fps), and GCs are clearly an advantage in this ballistic regime.

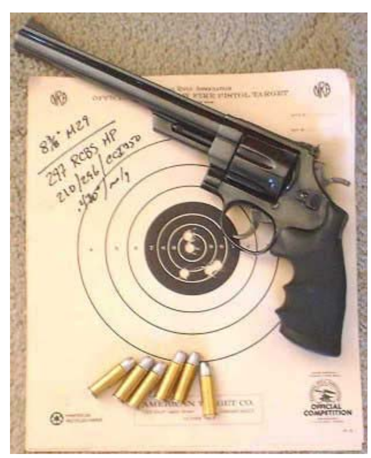
Previously, I had gotten very good results with the RCBS .44-300-GC SWC bullet, and the RCBS mould has plenty of room for the transverse pins for a Cramer-style conversion, so the decision was made to send this mould in for Erik to convert to a 2-cavity Cramer-style HP. I had very specific design criteria in mind for this HP conversion: a HP cavity of .150" diameter at the mouth, a cavity that had a 7 degree taper and extended .250" into the bullet, and a HP pin that had a rounded tip (NOT flat, a flat-bottomed HP cavity can lead to stress risers during the expansion process and promote fragmentation). This cavity is a little shallower than many cast HP's. The thinking behind this design is simple -- use the HP to induce good expansion in the front 1/4 of the bullet, keep the HP cavity narrow to avoid early over-expansion, and keep the back 3/4 intact to maximize weight retention and penetration. Even if the nose is completely blown off during the expansion process in the first foot of penetration (possible at rifle velocities, but not likely at 1350 fps), there will still be a 250+ grain wadcutter left to punch on through the other side. At .44 Magnum revolver velocities, this bullet should turn into pretty little leaden mushrooms.

The RCBS mould was returned promptly, modified exactly as requested. Once I got everything warmed up and happy, the mould was dropping "keepers" every time and I got about 200 bullets cast in less than half an hour (try THAT with a single cavity HP mould!). These bullets were cast to a BHN of about 11 using a mix of range scrap and linotype, and they weighed 297 grains. The parent RCBS SWC had weighed 303 grains when cast with WW alloy (similar hardness), so we had "removed" about 6 grains of bullet metal to make the HP cavity.

RCBS 44 Caliber 300 gr. SWC GC
Converted to Cramer style hollow point
By Erik Ohlen - Hollow Point Bullet Mold Service

One of these days I'll get around to doing some systematic load development for this bullet, but I knew from previous experience that the RCBS and Lyman 300 grain SWC's shot very well over 21.0 grains of Winchester 296 (~1375 fps from a 7 1/2" Ruger SBH), so that was my "go-to" load for preliminary evaluation. These 300 grain HP's were sized .430", checked with Hornady crimp-on GCs, and lubed with my homemade Moly lube (equal parts by weight beeswax and Sta-Lube Extreme Pressure Moly-Graph grease). Loads were assembled using Federal brass and CCI 350 primers. It was snowing at the time, so groups were shot indoors (50 feet). A variety of revolvers were used in this evaluation and what was really remarkable was how uniform the results were -- in virtually every case, 5-shot groups hovered right at 1 1/4" (the only exception being one group I shot with a 4 5/8" Ruger SBH where I flinched and threw a called flyer wide/left, the other 4 shots went into less than 1.3"). During these tests, only 2 of the revolvers were able to shoot these heavyweights to point of aim -- a 7 1/2" stainless Ruger SBH (that had an extra tall front sight installed years ago specifically for heavyweight bullets), and a stock 8 3/8" S&W Model 29-6. The other 3 revolvers employed in this test (6 1/2" S&W 629-1, Ruger 7 1/2" SBH Liberty Model, and stainless 4 5/8" Ruger SBH) still shot high at 50 feet with the rear sight bottomed out (they grouped well, they just shot high).

Chronographing this load gave velocities of 1325-1350 fps from the long-barreled revolvers and just shy of 1300 fps from the shorter guns. Expansion testing revealed that expansion was positive at .44 Magnum revolver velocities. For the most part, this load is going to be used in my 7 1/2" stainless SBH, but I haven't shot anything with this 8 3/8" S&W 29-6 yet, so I've decided to take this combination on a hog hunt I have scheduled for later this spring.



S&W M29 8 3/8" 44 Magnum - RCBS 297 gr. HP - 21.0 gr. Win 296 - CCI 350

This load feeds and chambers just fine in my Marlin 1894 .44 Mag levergun. I haven't had a chance to do any testing with it yet, but based on how the 300 grain RCBS SWC shot in this gun, I would expect the HP to put 5-shots into 2" or less at 50 yards (iron sights), and it should generate right at 1700 fps with this powder charge. Likewise, later this spring I will also be testing this bullet in my .444 Marlin Contender. I will start with H322 and Fed 215 primers, and expect that I should be able to comfortably reach 1800-1850 fps with this bullet. No matter which gun I'm shooting it out of (revolver, levergun, or Contender), this bullet should do a fine job on elk (and I have one very special 6x6 bull in mind...).

Is this the perfect handgun hunting bullet? No, probably not. Even if it was, there would still be disagreements about it. Is it one man's vision of the perfect handgun hunting bullet? Maybe, maybe not. But I'll tell you this, it's pretty doggone close! Hollow Point Bullet Mold Service transformed this vision of perfection into cold, hard steel, and made one cast bullet hunter very happy in the process. Perhaps you've been on a quest for your own vision of perfection? If so, good luck and good hunting!

- Glen E. Fryxell

The Story of Marlin and the Levergun

By: Glen E. Fryxell

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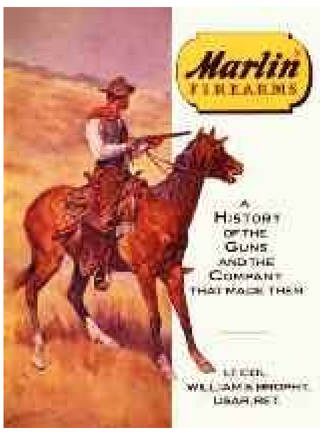
Marlin Firearms, the very name conjures the image of a lean horseman, with a red bandana wrapped around his dusty neck and a work-worn felt hat jammed awkwardly onto his head, his chestnut mount braced at a sudden stop, and both of them are intently focused on something just out of the picture. The Marlin levergun is poised, almost at port-arms, ready to snap to the rider's bestubbled face and deal the unseen threat a leaden blow. It is a picture of a man, independent and free, taking care of himself. This image has captivated generations of American shooters, and undoubtedly has helped sell countless Marlin rifles over the years. After all, it is one of the central facets of how we Americans view ourselves -- independent, free, and capable.



The Marlin rifleman (this long-standing Marlin advertising image was used as the cover art on William Brophy's excellent history of Marlin Firearms)

Most American shooters know that Marlin has been around for quite a while, and that they have been making excellent leverguns for many years, but may not realize all the twists and turns in the trail that has made Marlin what it is today. It is a trail that has been rough and rocky in places, and at times, it didn't look like Marlin would survive, but survive it did, and today's shooters should count themselves as fortunate as Marlin came back strong to make some of the most popular levergun's of all time.

The story starts in 1836, when John Mahlon Marlin was born in Connecticut. He grew up in New England and entered the tool and die trade as a young man. During the Civil War, he started building guns, working at the Colt plant in Hartford. In 1870, he struck out on his own and founded Marlin Firearms Company in New Haven, Connecticut. He started off making single-shot brass framed derringers in .22 rimfire, and eventually added .32 and .38 caliber rimfire derringers to his product line. In 1875, Marlin added rifles to his product offerings, manufacturing the single-shot Ballard rifles (which had previously been made by others). A strategic business move was made in 1881, when Marlin introduced the Model 1881 lever-action repeating rifle. This was a well-built, accurate rifle, chambered for powerful hunting rounds like the .45-70 and .38-55. Now this was in the hey-day of the powerful Sharps single-shot rifles, but Marlin was making a big-bore high-powered rifle, and they were making it in a lever-actioned *repeater* (competing for the same market niche that Winchester had created with the Model 1876). The Marlin Model 1881 was well-received and firmly established Marlin in the levergun market.

A Marlin "trademark" was established a few years later when Marlin introduced the Model 1889, the first levergun to have a solid top and eject the empties out of the side of the receiver (the origin of the term "Marlin Safety"), instead of out the top (like Winchester leverguns). While 19th century levergunner's weren't interested in mounting telescopic sights on their rifles, they did appreciate the fact that these new guns didn't toss hot brass into their faces (or down their shirt collars). The 1889 was chambered for the popular pistol rounds of the day, like .44-40, .38-40, .32-20 and .25-20. This rifle would eventually lead to the Model 1894, a design that Marlin continues to manufacture today (and is a favorite of Cowboy action shooters).

Marlin had a stroke of genius in 1891 when they applied this solid top/side ejection to a smaller framed .22 rimfire levergun, that they named the Model 1891. This would be the beginnings of the beloved Marlin 39A, giving rise to what, more or less, amounts to the longest continuously manufactured rifle in the world (production was briefly suspended from 1917-1922 for the War effort). When it was re-introduced in 1922, this beautiful little rifle was renamed the Model 39. Almost 3 million have been made to date. The Marlin 39A has been called "the Cadillac of the .22s", and I couldn't agree more. I bought my first Marlin 39A (from McBride's, a fine gun shop in Austin, Texas) when I was a freshman in college. That rifle has logged many, many miles with me over the years, perforating thousands of pop-cans, and filling many a crock-pot with the fixin's for Brunswick stew. That rifle was given to my step-son when he turned 18, and he continues to cherish it as I have over the decades (yes, I did go out and buy myself a replacement!).

In 1893 Marlin applied the "solid-top, side-ejection" concept to full-length rifle cartridges with the Model 1893. Over the years, this rifle would be chambered in .25-36, .30-30, .32 Special, .32-40, and .38-55. This rifle was later re-named the Model 1936 (care to guess when? later this designation was shortened simply to the Model 36). The 1893/1936/36 had the same side ejection that its predecessors had, with the flat-sided bolt and an open, square-cut bolt raceway milled through the rear of the receiver for the bolt to move through. The Model 36 was manufactured up through 1948.

The Marlin 39A, the "Cadillac of the .22's"

The Marlin Model 36 (both of these are .30-30s)

The .30-30 Winchester occupies a special place in my heart as it constitutes an almost perfect cast bullet cartridge. My personal favorite .30-30s are a pair of Marlin 36s, both dating from the late 1940s. These rifles have had many rounds down their bores over the years, and during the years that I've owned them, not a one of them has worn a jacket. My favorite "knock-about" load for these guns is the Lyman #311041 170 grain GC-FP over 25.0 grains of H335 (inspired by Jim Taylor's pet load using the RCBS 180 grain GC-FP), which produces about 1950 fps and fine accuracy. When the hollow-point version of the Lyman 311041 is substituted into this load one gets a load that produces violent expansion and significant amounts of bloodshot meat (i.e. an explosive varmint load, but more destructive than some meat hunters care for). Excellent expansion and minimal bloodshot meat can be obtained with cast hollow-points at around 1600 fps (18.0 grains of 4198 is a good recipe for this velocity in the .30-30).

As long as we're on the topic of 1890s vintage leverguns, a little-known fact is that Marlin made the first 8,000 or so Savage 1895s (the predecessor to the Savage 99). It seems that Mr. Savage had the rifle design, but did not have the manufacturing capabilities, so he contracted this work out to Marlin. These rifles can be identified by the "JM" that they have stamped on the bottom side of the barrel.

After the turn of the century the Marlin Company went through a tumultuous series of ownership changes. In 1901, John Marlin died and his two sons inherited the business as a part of his estate. In 1910, John Barlow retired from his post leading the Ideal Reloading Tool Company, and Marlin bought Ideal, makers of the respected Ideal bullet moulds (Marlin also took over publication of the Ideal Handbooks, which they had been contributing to previously). In 1915 the winds of war were swirling and it became apparent that the United States might get involved in the war festering in Europe. A group of investors (William Bonbright & Co. and Kissell-Kinnicut & Co., both associated with J. P. Morgan) bought the Marlin Company (at about the same time Marlin sold off the Ideal Reloading Tool Company to Phineas Talcott, who later sold it to Lyman). A. F. Rockwell became president of the new Marlin Arms Corporation, and in 1916 re-named it the Marlin Rockwell Corporation, which went on to become one of the largest machine gun manufacturers in the world. In 1919, the owner/investors were lead by John. F. Moran. As World War I ended, business faltered, and Marlin began to divest itself of the various other businesses that it had acquired during the war years (including the manufacture of ball bearings, roller bearings, radiators, automobiles, wire, bombs and high explosive projectiles). With a vastly simplified product line focused specifically on sporting firearms, the Marlin Firearms Corporation was formed in 1921. But business was not good, and in 1922 the company filed for bankruptcy and went into foreclosure. In 1924, the company was put on the auction block. According to the history posted on the Marlin website (http://www.marlinfirearms.com), this auction was attended by "several curious children, a small dog and a lawyer named Frank Kenna". Mr. Kenna bid $100 on the Marlin properties, and won the auction. He also got the $100,000 debt that went along with them. Kenna got the business back on stable footing and re-introduced several of the popular guns from before the War. The Marlin Firearms Company has been in the Kenna family ever since.

In 1949 the Model 36 was slightly redesigned, and re-introduced as the now familiar Model 336, which Marlin still makes today. The 336 had a bolt made out of round-stock, and an improved extractor stamped out of spring steel. The receiver was milled with a window on the side for ejection and a round window in the rear for bolt travel (instead of one big slot cut all the way through), leaving the rear sidewall of the receiver intact, resulting in a somewhat more solid, and stronger, receiver block. A year later they added the .35 Remington (a rimless round that Remington had first introduced in their Model 8 semi-auto) to create one of the finest hunting rifles ever made. There have been over 6 million rifles made in the 336 "family" of leverguns.

I have long been a fan of the .35 Remington. I have been shooting, handloading for, and hunting with the .35 Remington now for over15 years, and have used it to kill mule deer and feral hogs. I have grown quite fond of the Marlin 336 in .35 Remington and can testify as to how well this combination shoots cast bullets. A while back I had the opportunity to go hog hunting with some friends, and I got the chance to use a special Marlin 336 in .35 Remington to shoot a pig with (this rifle was a gift from a good friend, who knows how much I like both the .35 Remington and the Marlin 336). The RCBS 200 grain GC-FP at 2100 fps (38.0 grains of H335) flattened a nice little 150 lb meat hog with authority. I like the way the .35 Remington does its job -- you shoot a critter with it, and that critter tends to go down, quickly.

The Marlin Model 336 (l-r: the 336 Carbine (336-RC), the 336 Sporting Rifle (336-A), and the 336 "Texan" (straight grip version of the 336-RC); all three in .35 Remington).

In the post-war growth of the "Baby Boom" Marlin began to experiment with a number of new ideas. Up to this point, all Marlin rifles had been made with so-called "Ballard rifling". This was typically 6-groove rifling that was cut one groove at a time, with each groove being cut by multiple passes of the cutting head, generally to a depth of about .004". This is the time-tested method for making a rifled bore, but it is time-consuming and tedious. In the early 1950s Marlin started experimenting with a new form of rifling that was cut with a single pass of a multiple grooved tool head (which presumably speeded up production significantly). Each groove was smaller and shallower than "normal" in this process. Since each land would provide less overall "traction" on the bullet, Marlin put in a lot more grooves and lands (commonly 16 or more). Thus was born Micro-Groove rifling. After Micro-Groove rifling had proven itself in Marlin's line of .22 rimfire rifles, it was added to the centerfire line in the mid-1950s. Claims were made that Micro-Groove rifling produced better accuracy because it distorted the bullet less, but I have never been able to tell any significant difference in the accuracy between Ballard rifling and Micro-Groove rifling in my own group shooting.

Please allow me a brief caveat -- Micro-Groove rifling somehow gained an undeserved reputation for not being able to shoot cast bullets very well. This just flat isn't true; some of my best cast bullet groups have been shot with Micro-Groove barrels. For best accuracy in Micro-Groove barrels, cast bullets need to be over-sized, moderately hard (BHN of 12 or more), and gas-checked. If one does these three things, then a Micro-Groove levergun will shoot cast bullets just fine. Now it IS true that a well worn Micro-Groove barrel may have trouble with cast bullets, but that's true of any worn (or pitted) barrel. It's not due to the form of the rifling, but rather the condition of the bore. In good condition, Micro-Groove rifling will shoot cast bullets as well as a cut rifled barrel in similar condition.

Micro-Groove rifling was the standard of the Marlin line from the mid-1950s up through the mid-1990s. Along about 1997 or so, Micro-Groove rifling was dropped from the big-bore 336s and 1894s, and Marlin returned to 6-groove "Ballard" rifling for these guns. The .22 rimfire guns and .30-30 336s are still made with Micro-Groove rifling.

In the mid 1950s, Marlin began experimenting with modernizing levergun design. In 1956, they introduced the Model 56, the first of an entirely new class of Marlin leverguns.

These rifles had a very short 2" lever-throw, allowing for very speedy reloading, and were named the Marlin "Levermatic". The Model 56 was chambered for the .22 Long Rifle, and was fed with a box-magazine.

Shortly thereafter, a tubular magazine version was introduced (named the Model 57), along with the Model 57 Magnum, chambered in the .22 Magnum round. Winchester was making news with its sleek, new Model 88, chambered in hunting rounds like the .308 Winchester, and in 1962 Marlin entered the centerfire market with a version of it Levermatic, tailored for short centerfire rounds. Thus was born the centerfire Model 62, chambered in .357 Magnum, .256 Winchester Magnum, and .22 Remington Jet (and later on in .30 Carbine). The Marlin Levermatic's were not popular sellers and were dropped from production by 1973.

An example of the Marlin Levermatic; this one is a Model 62 chambered in .30 Carbine.

Starting somewhere around 1960, Marlin also made a number of "store brand" rifles for a variety of outlets (Sears, J. C. Higgins, Wards, etc.). Most notable in this regard was the Glenfield line of guns that were produced by Marlin up through about 1982. The Glenfield Model 30 was basically a Marlin 336 with a cheaper birch stock, and stamped checkering. The Glenfield line was made for high volume mass-marketers (e.g. Wal-Mart, K-Mart), who were looking for an affordable rifle that still provided good value. The Glenfield rifles do not have the Marlin signature bullseye, or white line spacers, but they shoot and handle just like Marlins.

Marlin's next new idea was the introduction of the .444 Marlin in 1964. The Model 444 was built on the 336 action, and when loaded with factory ammo would launch a 240 grain bullet at over 2300 fps (later a 265 grain load at 2200 fps would be added). When hand loaded, the .444 Marlin could easily reach 2100 fps with 300 grains bullets, in some ways reminiscent of the grand old .405 Winchester (which shot a 300 grain bullet at 2200 fps). What's more, having shot both rifles, I can testify that the .444 Marlin delivers this level of ballistics from a stock design that is far more comfortable to shoot than the .405 Winchester (that crescent steel butt-plate of the Winchester Model1895 can be hard on the shoulder with a cartridge that develops this level of recoil). I have often wondered why the ammunition makers don't offer a 300 grain load for the .444 Marlin -- it makes a fine combination. I suspect that Teddy Roosevelt would have rather liked it. Shooters tend to have a nostalgic streak, and Marlin has learned to cater to this tendency. In any event, the .444 Marlin has gained a following and has been a mainstay in the Marlin line ever since 1964.

Working up loads for new guns is one of my favorite past times. I have played with a lot of different rounds over the years, but one of my favorite ones is the .444 Marlin. In fact, I like it so much that I recently had Mountain Molds make a mould for me, designed specifically for the .444 Marlin levergun -- a 300 grain ogival round-nose flat-point with a GC, and a 73% meplat. My favorite load for this bullet is 49.0 grains of H322 for 2100 fps, which delivers excellent accuracy. If you find me in the woods during elk season in the Pacific Northwest, don't be surprised if I'm carrying this load. I really like it.

The Marlin Model 444-S (.444 Marlin).

The next new idea that Marlin came out with was a mixture of old and new. With the surging popularity of the .44 Magnum handguns in the 1960s, Marlin re-introduced the short-action Model 1894 in 1969, chambered for this modern high-pressure round. This combination created a light, hard-hitting carbine, ideal for still-hunting in brushy country, where the fast-handling characteristics of the 1894 were a real bonus. The .357 Magnum chambering was added in the 1970s, and later (around 1990) a short run of .41 Magnum 1894s was also made. With the growing popularity of both the 1894 and cowboy action shooting, other cartridges were added to the line, later in the 1990s (.32-20, .25-20, .45 Colt, .44-40, even the .218 Bee!). Over a million 1894s have been produced.

The Marlin 1894 chambered in .44 Magnum, .41 Magnum or .45 Colt makes an excellent hunter. The 1 in 38" twist used in the .44 Magnum limits this rifle to bullets no heavier than the 320 grain SSK FP, but the .45 Colt has a 1 in 16" twist and can easily handle a wide variety of bullet weights. The .357 Magnum version is one of my favorite plinking rifles when stoked with .38 special ammo, and makes a spectacular varmint rifle for game like jack rabbits and ground squirrels when loaded with ammo designed for rapid expansion. My favorite load for these pursuits is Ray Thompson's cast hollow-point (the Lyman 358156 HP) over 14.0 grains of 2400, for over 1700 fps. The short-nosed SWC profile feeds just fine in the Marlin, and the cast HP really delivers the goods when it gets where it's going.

The Marlin Model 1894 (l-r: 1895-C in .357 Magnum, 1894-S in .41 Magnum, 1894 in .44 Magnum and 1894 in .45 Colt).

The Marlin .357 Magnum also makes a first-rate home-defense gun when loaded with suitable ammo.

The next "new idea" that Marlin experimented with was another classic combination of old and new, and one that has resonated strongly with American hunters for the last 30+ years. In 1972-1973 Marlin introduced a new rifle based on their 336 action, chambered for the .45-70 Government cartridge. This rifle was named the Model 1895 (not to be confused with the old Model 1895, which was a unique variant of the 1893 action, and was also chambered for large, powerful hunting cartridges). This new .45-70 levergun was an immediate hit with hunters who pursued big game in heavy woods. Attention must be paid to overall cartridge length in these rifles, and loads must be heavily crimped, for ammunition to function properly. However, with suitable bullets properly loaded, this gun delivers impressive performance (e.g. 400 grain bullets at 1700-1800 fps).

My first experience with the Model 1895 was indeed memorable. The rifle had just recently been introduced and Dale Harber (a family friend who would take me shooting every so often) had gotten his hands on one. I was in junior high at the time, had the physique of a tomato stake, and couldn't have weighed more than about 105 lbs, soaking wet. One Saturday morning, Dale came by and picked me up and we went out to the rifle range out at the Annex outside of town. This was a very fun morning and we shot all kinds of different guns. We finished the morning up with the Marlin .45-70 and some handloads that Dale had assembled, with (as I recall) 350 grain bullets at 1900 fps. Dale took the first few shots, to make sure the gun was properly sighted in. I recall watching him shoot that rifle, and the effect that its recoil had on him. I wasn't intimidated per se, but I'll admit I was a little apprehensive. He showed me how to tuck the butt of the rifle into the "pocket" of my shoulder, told me to grip the rifle firmly, and to squeeze the trigger. I established my best offhand position, and did all the things that Dale had told me to do. Well, sort of. Somewhere between the start of the trigger squeeze, and the final panicked yank of the trigger, I'm pretty sure my eyes closed involuntarily. I seem to recall that the sights were more or less on the target as my eyes closed, and that when they opened I was looking at the underside of the tin roof over the firing line, with the muzzle of the rifle almost vertical. I straightened back up and looked around behind me to find Dale standing there, ready to catch the rifle in case I had let go. He had a big grin on his face (I guess I did too). "That wasn't so bad, was it?", he asked. "Uhhh, no, I guess not. Did I hit the target?". We carefully scanned the target through the spotting scope and there was no evidence of my shot. "Would you like to try again?" Dale asked. "Yeah, I would." Same basic procedure, except this time my eyes were only half-closed when the Hammer of Thor roared. Dale was watching the impact area and reported that my shot fell just off the paper at 3 o'clock. Eager to prove that I could indeed hit the target, I asked for another round, which Dale gave me. This time I was focused on the target, got a little sloppy and wasn't holding the rifle as tightly as I should have been, and it smacked my bony teenaged shoulder smartly, leaving a purple bruise. My shot still fell just off the paper to the right, but I was done shooting for the day. I have since learned how to shoot rifles with this level of recoil and have grown quite fond of the big-bore Marlin leverguns, but I'll remember that first day with the .45-70 for a long time.

Along about 1983, in the interest of safety, Marlin added a cross-bolt safety to its leverguns. This elicited a large collective groan from much of the shooting community, but it's easily ignored if one doesn't care for it.

Aside from the solid top, side ejection, round bolt and spring steel extractor, there are a couple of other distinctive style features that make a Marlin 336 and 39A levergun easy to identify. First off there is the signature Marlin "bullseye" on the underside of the butt stock. Contrary to what some misinformed "know-it-alls" will tell you, this is NOT where one is supposed to screw in the sling swivel! Don't do it! This is just a small plastic plug that is put in place for decoration purposes only. Screwing a sling swivel into this little piece of plastic will ruin it, and even if the screw does manage to stay in place for a little while, a sling so mounted will not support the weight of the rifle. The sling swivel screw needs to have its threads well entrenched in hardwood, not soft plastic. The other distinctive style feature of the Marlin 336 and 39A family of leverguns is the white line spacers in the butt plate and the pistol grip cap. Some shooters find this flourish attractive, some don't care for it at all. But the bottom line is that these two features allow one to pick out the Marlin leverguns from a jumbled up pile of rifles on a gun show table, even without being able to see anything forward of the pistol grip.

In each of our lives there come special moments where inspirational figures move us to better ourselves. One such moment happened to me in a caliche creek bed in central Texas, when I was about 12 years old. Once again, I was plinking with Dale Harber, a family friend who would take me shooting every so often. We were shooting his Marlin 39A, and the targets *du jour* were pecans, placed on the far embankment of the creek, about 30 yards off. I had just run back from placing a fresh batch of targets up on the bank (there was a pecan tree nearby). Dale topped off the magazine, and handed me the Marlin. "Let me see you hit that one." he said pointing. I took the rifle and started to drop into my favored open-legged sitting position, "Offhand." he said sternly. Dale was an officer in the Army, and knew how to give an order. I remember thinking to myself, "Why bother?

Why even waste the ammo? It would be impossible to hit that pecan from here offhand!", but the challenge had been issued, and I was not going to let it go unanswered (besides, it was Dale's ammo). I levered a round home, and settled into my best offhand form. I watched the crosshairs as they danced around that pecan. I certainly wished that they would sit still! The hammer dropped and the shot fell wide by a couple of inches. Again and again I tried, each time with the same result. After 5 or 6 shots, the chosen pecan stood untouched in a wash of impact craters. Dale was working hard not to smirk. My budding young *machismo* was bruised, and I sensed his amusement, "OK, let's see YOU do it!". He took the Marlin, and never said a word. He set his feet, carefully levered a round home, and settled into his best offhand stance. He let his breath out with the discipline of a trained rifleman and started a slow, deliberate trigger squeeze. At the crack of the Marlin, that pecan simply ceased to exist. He didn't just nick it and knock it a few feet of to one side, he center-punched it, shattering it, and scattering the fragments upon the four winds. I vowed to myself, there and then, that someday I would be able to shoot like that. It's good to have strong role models. By the way, don't try to tell me that Micro-


A couple of Marlin "signatures"; the Marlin "bullseye" and white line spacers.

Groove barrels can't shoot lead bullets accurately!

Marlin has been around for 136 years (as of this writing) and they have made some of the most popular leverguns ever. Not a bad legacy for a young man from New England, setting out on his own to make a living, right after the Civil War. 26 million guns later, they continue to build on this legacy every day. For those that would like to learn more about Marlin and its history, I recommend the book "Marlin Firearms: A History of the Guns and the Company That Made Them", written by William S. Brophy and published by Stackpole Books (1989). The Marlin Collectors Association (marlin-collectors.com) is also a valuable source of information.

- Glen E. Fryxell

Marlin 1894

By: Glen E. Fryxell

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At one point, the “2 guns chambered for the same cartridge” sales pitch had some real merit. After all, a cowboy riding herd in the late 1800s needed to be completely autonomous, he needed to be armed and he probably wouldn’t get into town for at least a couple of months. His saddle bags had very limited room for “kit”, so he needed to be able to cast and load for both his scabbard-gun and his sixgun with a single set of tools. Today’s shooter may be just as independence-minded as the cowboy of long ago, but most likely leads a more modern existence, with readily available ammunition and components, and if he does reload his own ammunition, it’s probably on bench-mounted presses and not with a tong tool over a campfire to a coyote serenade. We have easy access to sporting goods stores and mail order supply houses, with a far better availability of accessories, ammunition and components with which to feed our guns than shooters did a century ago. We have a multitude of cartridges available today, with something ideally suited for whatever task a shooter may have. As a result, shooters today generally own more than one gun, and these guns are chambered for more than one cartridge. So I guess we can pretty much throw out the “combo cartridge” sales pitch. Where does that leave the value of a lever action carbine chambered for *revolver* cartridges? Second to none, because ballistically speaking these are exceptional lever-gun rounds!

Marlin 1894 carbines in .357 Magnum, .44 Magnum and .45 Colt.

I have a confession to make: I’ve always been partial to the Marlin lever action design. While some may favor it for the closed top, allowing easy scope mounting (I prefer iron sights on lever-guns), I appreciate the solidly designed receiver and the fact that the top and bottom of the action are closed and protected from “stuff”. When still-hunting on a snowy day, have you ever fired a shot from behind a tree, only to be cascaded with snow from the branches above? An action that “exposes itself” during cycling allows snow, pine needles, tree bark, cigar ashes, etc. into the guts of the action, and personally I’d rather just have oil and ammo down there. The Winchester lever-guns are clearly one of the most proven, time-honored designs in firearms history, it’s just that my favor tends to fall on the Marlin side of the fence as a result of their keeping their private parts, well, private. However, the Winchester 94 captures all the benefits of the revolver rounds just as well as the Marlin 1894.

These attributes include: *Short, light, easily handled carbines* -- valuable traits for a home defense gun or for a “workin’ gun”, i.e. one that will be there always as ranch work, farm work, or whatever work is being done and is always there when it's needed, either defensively, or for targets of opportunity.

Modest recoil -- while many won't admit it, a significant number of shooters have trouble handling the recoil of the .44 Magnum cartridge in a revolver, but in a carbine, it's comfortable to shoot.

Excellent ballistics -- these aren't long range lasers, but 125 yard thumpers with the ability to shoot through pretty much anything if properly loaded, and this range covers most targets of opportunity (and defensive situations). As a general rule of thumb, you can get about another 300 fps over what a given load will deliver from a revolver.

Magazine capacity -- before the time of high capacity magazines, the lightweight lever-action carbines created the capability "to load on Sunday and shoot all week", these guns also provided the advantage of being able to top off the magazine without opening or deactivating the action (a valuable character trait for certain law enforcement or home defense situations).

Cast bullets -- these rifles and rounds are extremely well served by cast bullets, a trait long admired by the frugal and independent-minded.

Lever-guns can be finicky about cartridge OAL and bullet profile, and so a wide variety of bullet weights, profiles and designs were run through these three Marlin carbines in order to see what works and what doesn't. All testing was done with the factory buckhorn sights, with unmodified guns right out of the box (i.e. no modifications to carrier, chamber or throat). Unless otherwise noted, all groups are 5-shots at 50 yards.

.357 Magnum:

The Marlin .357 carbine was made with a 1 in 16" twist, so heavyweights were expected to shoot just fine. This characteristic may have something to do with why the .357 Magnum fired from a lever gun has been likened to the .30-30 Winchester -- heavier bullets at the higher velocities possible from a rifle have considerably more thump than can be achieved from a revolver. I've been on this handgun kick for about a decade or so now. This little Marlin re-introduced me to how much fun a plinking rifle can be. A .30 cal ammo can full of .38 ammo and this little Marlin makes for one very fun afternoon!

The .357 seems to be a little more finicky about smooth feeding than the other two rifles. The .357 also seems to be somewhat more finicky about which loads it shoots well. It shoots (and feeds) very well indeed with the right loads, but not all loads are up to its discerning tastes. On top of this, this gun has the distinct tendency to print different loads to different points of impact.

Obvious cast bullet choices for this lever-gun are the round-nosed flat-pointed bullet popular in cowboy action shooting. Both the Lyman and the Lee Cowboy bullets cycle and feed flawlessly when loaded into .38 Special cases, and the Lee bullet also feeds very nicely when loaded into Magnum cases. The Lyman

Cowboy bullet is short enough to feed from the magazine when loaded into Magnum cases, but doesn't make the transition from carrier to chamber very smoothly at this OAL. The LBT 200 LFN likewise is short enough to make the magazine-carrier transition, but also doesn't make it cleanly into the chamber when loaded into .357 brass. The Lyman 358429 / 358439 Keith SWC and HP are simply too long to make it out of the magazine when loaded in .357 Magnum cases. The 200 grain Lyman 35875 RN-FP is also much too long for Magnum brass. The LBT 180 WFN is not only too long for the longer cartridge case, it also has too much bearing surface forward of the crimp groove to even chamber when loaded into .357 cases. However, all five of these bullets (the LBT 200 LFN, the Keith SWC and HP, the Lyman 35875 and the LBT 180 WFN) cycle, feed and chamber very smoothly when loaded into .38 Special brass.


Some of the bullets that worked well in the .357 Marlin when loaded into .38 Special cases: the Lyman 358439, the Lee 358-158-RF, the Lyman 358665, the Lyman 358429, the LBT 200 LFN and the Lyman 35875 200 grain RNFP.

The Lee cowboy bullet over 4.5 grains of Bullseye in .38 Special cases gave fine accuracy (1 1/2" 5-shot groups at 50 yards) with an average (and very consistent) velocity of 1128 fps. When loaded over 14.0 grains of 2400 in .357 Magnum brass, this bullet fed quite smoothly, and delivered an impressive 1678 fps, but could only muster 4" groups at 50 yards. In general, the PB bullets shot better at more modest velocities out of the .357 Marlin.

In contrast, the Marlin .357 carbine did very nicely with the GC 358156 HP over 14.0 grains of 2400. 5-shot groups at 50 yards ran just under 2" and average velocity was 1721 fps. Expansion of this HP at this velocity is dramatic, to say the least -- this load is a rodent buzz-saw! This constitutes a very versatile, and personal favorite, load for this gun. The 358156 GC-SWC over the same powder charge delivered 1764 fps and even better accuracy. Both of these bullets feed flawlessly in the Marlin when loaded in .357 cases.

Another excellent performer was found in the LBT 160 grain WFN-GC. Again, 14.0 grain charges of 2400 provided excellent accuracy at 1674 fps. These loads fed and chambered without the slightest hiccup. Conveniently, this load printed to the same point as the 358156 HP discussed above (the 358156 SWC was another 1 1/2" to the right at 50 yards, go figure).

In contrast, the LBT 180 grain WFN-GC is too long to chamber when loaded into magnum brass, but it cycles, feeds and chambers just fine when loaded into .38 Special cases. When paired with 12.0 grains of 2400 in the shorter cases, this bullet provided so-so accuracy (with a tendency towards vertical stringing) at 1510 fps. A little fine-tuning of this load might correct this tendency however.

When the Lyman Cowboy bullet (#358665) was tried out in .357 Magnum brass over 14.0 grains of 2400, it shot just fine, and while it was short enough to feed from the magazine, it didn't generally cycle very smoothly. Groups ran 2" at 50 yards and velocities hovered right at 1780 fps. This was the only PB bullet tested that grouped well at full-throttle magnum velocities, but rough cycling dulled the appeal of this combination (perhaps it would cycle more smoothly if cases were trimmed back another 0.010" or so). When this bullet was loaded into .38 Special cases and powered with 6.5 grains of HS-6, it cycled beautifully and printed nice round 1 1/2" groups (1100 fps).

Bullets that worked well in the .357 Marlin when loaded in .357 Magnum cases: the 358156 SWC, the 358156 HP, and the LBT 160 GC-SWC.

The Keith SWC and HP (358429 and 358439, respectively) are too long to make it out of the Marlin's magazine when loaded in Magnum cases, but if a shooter wants to use these bullets they function perfectly when loaded into .38 Special brass. For example, the 358429 SWC loaded over 12.0 grains of 2400 in .38 Special brass cycles effortlessly, and delivers 1556 fps and decent accuracy at 50 yards (this load should only be used in .357 Magnum firearms). Likewise, the Lyman 358439 154 grain HP loaded over 8.5 grains of HS-7 in .38 Special brass cycled just fine and shot beautifully. Velocities (1258 fps) were particularly consistent with this favorite load. Expansion of this bullet at this velocity is positive and dramatic when it's cast at a BHN of about 11 or so.

For whatever reason, this gun didn't seem to like the 358477, either in .38 Special or Magnum brass. In both cases it cycled just fine, it's just that accuracy wasn't quite up to snuff with this lighter plain-based bullet. In .357 cases over 14.0 grains 2400, accuracy ran about 3-4" at about 35 yards, and the HP version of same over 15.0 grains of 2400 generated 1970 fps and 3+" groups at 50 yards. The Lyman 358477 when loaded into .38 Special cases with 4.5 grains of Bullseye also gave 3+" groups at 50 yards, and 1149 fps. This short little bullet just doesn't seem to have enough bearing surface for this rifle's tastes.

Taking a look at heavier bullets, the 200 grain Lyman 35875 was called into action. This plain-based RN-FP was originally designed for the old black powder cartridges like the .38-45 Stevens (muzzle velocity of 1420 fps) and I thought that it might be right at home in the Marlin lever-gun. Because of the long nose found on this bullet, it could not be loaded into magnum brass, but it turns out that when loaded into .38 Special cases so it could be crimped in the top lube groove, the OAL is just about ideal to feed in the Marlin (1.580"). Loaded on top of 10.5 grains of 2400 and sparked with a CCI 550 primer, this bullet flew from the muzzle at 1319 fps and printed 3" groups. There were no signs of excessive pressure, but I believe that reducing this load slightly might lead to better accuracy. The LBT 200 grain LFN gave excellent accuracy on a very windy day when launched with 10.0 grains of 2400 at 1301 fps. These magnum level loads were also assembled using .38 Special cases since this bullet doesn't feed cleanly at the Magnum OAL.

As an interesting side note, .38 wadcutters feed just fine in the little Marlin. When the classic .38 wadcutter Lyman 358495 over 3.0 grains of Bullseye was test fired, it printed a 1 1/8" 5-shot group at 25 yards at 894 fps, and cycled just fine. Basically, every bullet tested in .38 Special cases fed just fine (it's only with magnum brass that things get touchy). So much for needing round-nosed bullets to feed through a lever-gun...

Loaded with suitable ammo (e.g. Cor-Bon, Federal 125s, or even the FBI .38 load) the Marlin carbine is arguably THE definitive home-defense gun. Loaded with .38 Special ammo, there is no argument about it, the Marlin 1894 .357 IS the definitive plinking gun! The best plinking bullet is the Lee cowboy bullet, and a 6-cavity mould allows the caster the ability to make a lot of plinking ammo in a hurry! The best accuracy with PB bullets was generally found at 1300 fps and under, at full throttle magnum velocities this gun shows a definite preference for GC bullets. The best all-round bullets are the Lyman 358156 SWC/HP, and the LBT 160 WFN-GC. In my gun, the 358156 HP and the LBT 160 WFN both print to the exact same spot, so that's how the sights are set. Jack rabbits anyone?

.44 Magnum:

The 1 in 38” twist that the Marlin 1894 .44 Magnum was graced with often raises questions as to how well this gun might handle heavier bullets, so a wide spectrum was evaluated. Starting with the standard weight bullets, superb accuracy was obtained with the Lyman 429244, in both SWC and HP form, over 23.5 grains of W296 for about 1724 (265 grain SWC) and 1748 fps (253 grain HP). Both bullets cycle and feed just fine. The 300 grain GC-SWC's from both RCBS and Lyman (#429650) also feed just fine in my gun. When powered with 21.5 grains of W296, these bullets leave the little Marlin at 1708 fps and deliver decent accuracy. Lots of questions get asked about how well the SWC's feed from the magazine on a lever-gun, and while some folks have reported trouble with them in the past, this particular carbine doesn't seem to mind these four bullets (the Lyman 429421 has a slightly longer nose and does not cycle quite as smoothly in this gun).

A more traditional shape for the lever-gun is the round-nose flat-point. Such an ogive is found on the solid (i.e. non-HP version) of the Lyman 429640, which weighs about 290 grains when cast with WW alloy. Not surprisingly, this bullet cycles from the magazine well, and is quite accurate when launched with 22.0 grains of W296 for 1617 fps. The HP version of the 429640 also shoots quite accurately, but the fragile mouth of the Devastator HP tends to get dented and hang up if the action is cycled vigorously. A very similar profile is found on the LBT 300 grain LFN bullet, which feeds just as smoothly as the solid 429640. The 300 grain LBT LFN delivers 1711 fps and fine accuracy when powered by 21.5 grain of W296.

A somewhat more curvaceous RNFP is made by Saeco. On this 300 grainer, the meplat is slightly smaller and the ogive somewhat more curved, so it's no surprise that this bullet glides from the magazine like an enthusiastic Lab puppy on a freshly waxed floor. Once again, 21.5 grains of W296 provides good accuracy and 1679 fps. An even more voluptuous profile is found on the LBT 280 grain WFN. Loaded on top of 22.0 grains of W296 the LBT WFN is quite accurate and generates 1683 fps, but unfortunately this fine hunting bullet feeds poorly in my gun.

The 320 grain SSK FP is too long to cycle through the Marlin's action when seated to crimp in the crimp groove (although it shoots very nicely single-loaded). The expander ball on my Dillon die set runs .4275" and I size these bullets .430"

With a bullet that has as much bearing surface as the SSK bullet, throat tension provides sufficient bullet pull to prevent recoil from shoving the bullet deeper into the case while the round is "waiting in line" in the magazine. I loaded this bullet up to an OAL of 1.638" and placed a hearty roll crimp over the forward driving band. Seating a bullet deeper into the case requires that the load be reduced accordingly. Case volume measurements revealed that case capacity had been reduced a little over 16%, so these loads were assembled using 17.5 grains of W296. This ammo cycled and fed beautifully in the little Marlin. Accuracy was excellent and velocity was 1414 fps. There were no indications of excessive pressure. This bullet is available from Lynn Halsted at Dry Creek Bullet Works.

Loads were tried with various 330, 340, 350 and 365 grain cast bullets and all were problematic. Either they would not feed smoothly, they would not chamber or they would not stabilize and were key-holing at 50 yards. The 330 grain GC version of the SSK bullet will not cycle when crimped in the crimp groove and I see no advantage to trying to seat it deeper as was done with the 320 grain PB version. The 320 will do anything the 330 GC version will do and do it better in this little gun. The Lyman 429649 340 grain RNFP feeds just fine from the magazine, but will not chamber due to the extended bearing surface on the nose of this blunt bullet. The 350s (LBT WLN and SSK) don't stabilize with the 1 in 38" twist. The take-home lesson here is that the 320 grain SSK is pretty much as heavy as you can go with the .44 Magnum Marlin.

Bullets that work well in the .44 Magnum Marlin 1894: the Lyman 429244 SWC, the Lyman 429244 HP, the Lyman 429640, the LBT 300 LFN, the Saeco 300 RNFP, the RCBS 44-300 GC-SWC and the 320 grain SSK (loaded short).

As an all-round working load for this gun, my first choice would probably be to go with the 285 grain Lyman 429640 GC-FP over 22.0 grains of W296 for (1617 fps), with a close runner-up being the 265 grain Lyman 429244 GC-SWC over 23.5 grains of W296 (1724 fps). My "hands down" first choice specifically for deer-sized game would be the 253 grain Lyman 429244 HP over 23.5 grains W296 (1748 fps). This combination is superbly accurate and hits like a sledgehammer. For larger stuff like elk, I would go with one of the heavier bullets, specifically the solid 429640, one of the 300 grainers (LBT, Lyman, RCBS, or SAECO), or the SSK 320 FP and not think twice about it.

The .44 Magnum in the Marlin 1894 is a somewhat more limited gun than is the .45 Colt, in that it seems to be choosier about which bullets it cycles cleanly with and in terms of bullets that will adequately stabilize with the lethargic 1 in 38" twist. It's an excellent little gun, and functions well with bullets in the 250 to 320 grain range.

.45 Colt:

The .45 Colt chambering of the Marlin 1894 is blessed with a 1 in 16" twist. As a result it is capable of handling a wider range of bullet weights than is its .44 caliber little brother. Also, if my gun is representative, it seems that the fatter chamber opening is more forgiving in terms which bullet profiles cycle and feed properly through the action. Virtually everything tried fed slick as a whistle (the only feeding problem encountered was with a 265 grain NEI SWC, a variation on .451-275-PB, #317, a bullet with the forward portion very similar to the 452423; a very thick forward driving band, coupled with a very short nose, a tough combination for a lever-gun).

Testing was started off with the Keith SWC (Lyman 454424) loaded over 8.0 grains of HP-38. Excellent accuracy was obtained (5 shots into 1 1/4" at 50 yards) and an average velocity of 1186 fps was recorded. In today's age of magnum pressures and magnum velocities, is load may not sound all that impressive, but it will handle most situations with ample authority. In its own quiet way, the .45 Colt continues to deliver superb performance in the field when loaded to moderate pressures, just as it has for over 130 years.

When loaded to Ruger Blackhawk pressures (25,000-30,000 psi), the .45 Colt Marlin mirrors the performance of the .44 Magnum. A favorite deer load for my Blackhawks is the Keith HP (Lyman 454424 HP) loaded over 26.0 grains of W296, sparked with a CCI 350 primer. This brisk load generates 1345 fps from a 7 1/2" Blackhawk and 1731 fps from the Marlin. Superb accuracy is delivered from both guns and expansion is positive.

Dave Scovill of Handloader magazine designed a 280 grain SWC for the .45 Colt, inspired by Elmer Keith's original design criteria. The result was the RCBS 45-270-SAA, one of the finest all-round .45 bullets ever conceived. This bullet drops from my mould blocks at 282 grains when cast with WW alloy. Loaded on top of 13.0 grains of HS-6, this bullet delivers good accuracy and 1293 fps from the Marlin carbine. It's hard to argue with a 280+ grain .45 caliber bullet at 1300 fps. As a side note, I’ve found that HS-6 performs quite nicely with heavier bullets in .45 Colt (i.e. 280-320 grains), but with lighter bullets (e.g. 250 grains) and standard primers, I've commonly obtained erratic velocities.

NEI makes a lovely 310 grain FP bullet (listed on their website as cherry #322C, the PB version of .452-325-BB) that looks as though it was made specifically to feed through a lever-gun, and feed smoothly it does. With 12.0 grains of HS-6 to provide motivation, this shapely slug works up 1215 fps and groups to about 1 1/2" at 50 yards. With 21.5 grains of W296 the groups open up slightly, and velocity climbs to 1471 fps. A very similar profile is found on the gas-checked Lyman 452629 (the bullet that Lyman made for Freedom Arms and the 454 Casull). The Lyman 452629 over 21.5 grains of W296 generates 1482 fps and also gives satisfying accuracy.

The 315 grain WFN cycles just fine from the magazine, but unfortunately this fine hunting bullet won't chamber with the factory throat in the Marlin.

NEI also makes a beautiful 330 grain Keith-style SWC (cherry # 320, .451-310-PB). In spite of its blocky appearance, this monolithic sledgehammer cycles, feeds and chambers fluidly in the Marlin. Paired with 20.5 grain doses of W296, this massive SWC delivers 1442 fps and 2" groups at 50 yards. This combination makes a very comforting companion in bear country. For those that don't cast their own, a very similar, and finely made, bullet is available from Dry Creek Bullet Works.

J.D. Jones of SSK Industries designed a series of bullets for the handgun hunter back in the 1980s (the moulds were made by NEI). These bullets are characterized by being large, heavy and blunt. They serve the lever-gun hunter just as well as they serve the sixgunner. The 335 grain SSK bullet for the .45 Colt is one of the most accurate bullets I've shot out of my 7 1/2" Ruger Bisley (NEI lists this as cherry #320A, .451-325-PB). When loaded on top of 21.0 grains of W296, this bullet leaves the Marlin carbine at 1484 fps, and accuracy is reasonable. The truncated cone ogive allows this bullet to feed flawlessly in the Marlin carbine.


Bullets that worked well in the .45 Colt Marlin 1894: the Lyman 452424, the 454424 HP, the RCBS 45-270-SAA, the Lyman 452629, the NEI 310 FP, the NEI 330 SWC, the SSK 335, and the SSK 368 (both made by NEI).

One of my favorite hunting bullets for both the .45 Colt and the 454 Casull is the 350 grain SSK FP (NEI lists this bullet design as cherry #320B, .451-345-PB). When powered by 19.0 grains of W296, the Marlin carbine spits this bone-crusher out at just over 1330 fps, with fine accuracy (2" at 50 yards). This load cycles and feeds like water through a funnel. This bullet is also available with an added bevel base to add a little more weight. With the bevel-base contour it weighs 368 grains when cast of WW alloy. This heavier version performs well loaded over 17.8 grains of W296, delivering 1276 fps and superb accuracy. The ogive and meplat are identical to the lighter 350 grain version, so it's no surprise that it cycles and feeds just as smoothly. Any of these SSK sledgehammers also make bear country a little less onerous, whether carried in sixgun or saddle gun, they are accurate, reliable, heavy and blunt -- precisely what the situation requires.

Note that the original .45-70 loads that earned it such a reputation as a “stopper” consisted of a 405 grain .45 caliber lead bullet at 1300 fps from the single-shot Trapdoor Springfield. The .45 Colt Marlin carries 10 rounds of the SSK 350 or 368 grain loads at roughly 1300 fps in a light easily handled 5 ½ lb carbine. This is a powerful and versatile combination.

The bottom-line for cast bullets that function well in the Marlin 1894 .45 Colt is that there are lots of excellent choices! They pretty much all seem to feed well and group well. For all-round usage, my first choices would likely include the NEI 310 grain RNFP, the Lyman 452629 GC-RNFP, or the RCBS 45-270-SAA. For hunting deer/antelope sized critters, I would opt for a cast hollow point, in particular the fine HP designed by Elmer Keith (454424 HP). For larger stuff like elk and moose, the choice is easy, the NEI 330 grain SWC or the SSK 350 grain FP, two of my all-time favorites.

While there may not be any *need* for the two guns/one cartridge sales pitch these days, the value of that concept is just as valid today as it was almost 110 years ago when the Marlin 1894 was drawn up, and that value is directly attributable to the outstanding performance of these cartridges. The straight case pistol cartridges employed in these light, fast-handling carbines carry a surprising amount of thump, and are very well-served by cast bullets. The .357 Magnum digests a wide variety of bullet designs when ammo is assembled using .38 Special cases, and the Lyman 358156 HP/SWC or the LBT 160 GC-WFN loaded in .357 Magnum cases deliver 1700 fps and excellent accuracy. The .357 Magnum is a fine little working gun, serving well for coyotes and other vermin, and properly loaded might make a handy little carbine for woods hunting deer. The .44 Magnum is best served by bullets in the 265-300 grain range, and cannot handle anything heavier than the 320 grain SSK bullet. While limited in terms of bullet weights, this carbine delivers bullets in the 265-300 grain weight range at 1600-1700 fps, providing the hunter excellent overall utility in the field. However, the bottom line is that the .45 Colt Marlin 1894 is a more versatile gun than is the .44 Magnum carbine; the .45 seems to smoothly feed almost any bullet you can stuff into a .45 Colt case, and the 1 in 16" twist stabilized every bullet weight tested, from 240 grains to 368 grains. Bullets lighter than about 310 grains all shot to pretty much the same point of impact at 50 yards, and the 330-350 grain bullets dropped down about 3" below that, and the 368s were about halfway in between. The .45 Colt Marlin is a remarkably egalitarian little carbine. Yup, the Marlin 1894 is a keeper, which might explain why Marlin reintroduced this Model in 1969 and has made so many since then.

- Glen E. Fryxell

Marlin's Microgroove Barrels

By: Glen E. Fryxell

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Before 1950 all Marlin barrels were made by drilling the bore, and then cutting the rifling one groove at a time on a sine-bar machine. This required multiple iterative passes of a cutting head for each groove (at first this was done with a "scrape cutter", and later a "hook cutter"). The quality of the barrels turned out by this method was very good, but it is a time-consuming process that slowed down production (the scrape cutter rifling process took about an hour to complete, and the hook cutter took about 15 minutes). Marlin likes to call this process "Ballard rifling" because this was how the barrels were cut on the Ballard target rifles that Marlin produced, which were famous for their accuracy. Most of Marlin's cut-rifled barrels from this period had 6 grooves, but Marlin also made 4-groove (some of their .30 and .32 caliber guns), 5-groove (.22 caliber) and 7-groove (.35 caliber) barrels.

For .22 caliber barrels, these grooves were generally in the range of .069-.090" wide (usually about .075"), and .0015-.003" deep (these specifications changed over time). For centerfire rifle barrels the grooves were .0785" to .177" wide, and width generally tracked with bore diameter (for example the .25-20 had grooves that were .0785" wide, while the .45-70 had grooves that were .141" wide). On the older centerfire rifles (i.e. pre-WWI), these grooves were typically cut .002-.0025" deep. However, on the post-WWII .30-30s the specifications called for grooves that were .004" deep, and for the .35 Remington's, grooves that were .005" deep.

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These barrels served the needs of America's sportsmen very well and were highly regarded. However, America was entering the "baby boom" years of the1950s, with their unprecedented growth and opportunity, and America's manufacturers were looking for ways to speed up production to keep up with demand. Remington was experimenting with a new rifling method called "button rifling" in which a hardened swedge was pulled through the barrel. In 1950 Marlin tested some of Remington's .22 barrels and studied the rifling method and found that it resulted in more uniform dimensions, better bore finish, longer tool life and much faster production time. Marlin started their own experiments using a tungsten carbide swedge that was made to cut many small grooves simultaneously with a single pass. Marlin could now rifle a barrel in 2-5 seconds, instead of 15-60 minutes. Wow!

In 1953 Marlin applied for a patent on Microgroove rifling (US Patent #3,100,358 was granted on Aug. 13, 1953). In this patent, Microgroove rifling was described as having 5 grooves for every 1/10th of an inch bore diameter, and that the driving side of each land would be "tangentially disposed" (i.e. beveled, presumably to prevent the accumulation of fouling). On July 29, 1953, Marlin introduced Microgroove rifling in their .22 rimfire barrels, with 16 grooves that were .014" wide, and nominally .0015" deep. In their 1954 catalog, they outlined numerous advantages that this new form of rifling had, including better accuracy, ease of cleaning, elimination of gas leakage, higher velocities and lower chamber pressures. They also mentioned "... a bore of greater than standard size..." in their discussion of how Microgroove rifling did not engrave (distort) a bullet jacket as deeply as conventional rifling. Hold that thought...

Marlin continued to experiment with Microgroove rifling in their centerfire barrels, primarily in the Model 322 chambered for the .222 Remington (the highest velocity round that Marlin chambered for). The results of this testing convinced the Marlin engineers that Microgroove rifling was indeed suitable for high-velocity centerfire rifles and in early 1956 Marlin announced that all of their high-powered rifles would henceforth be equipped with Microgroove rifling.

For the common centerfire calibers, the initial specifications (circa 1956) for Microgroove barrels were as follows:

- .22 centerfire -- 16 grooves, .015" wide, .001" deep
- .30 caliber -- 16 grooves, .030" wide and .002" deep (this would be changed in 1958 to 22 grooves .024" wide, and .002" deep; and then again in 1968 to 12 grooves, .040" wide, .0028" deep)
- .32 caliber -- 16 grooves, .035" wide, and .0015" deep
- .35 caliber -- 16 grooves, .040" wide, and .002" deep (this would be changed in 1968 to 12 grooves, .055" wide, .0028" deep)

Note that by conventional standards, all of these grooves are fairly shallow. Microgroove rifling makes up for this by having many lands/grooves to grip and spin the bullet.

In 1968, the .444 Marlin was introduced, and of course it had Microgroove rifling. It was given a 1 in 38" twist appropriate for the short, stumpy, high velocity bullet that factory ammo was loaded with. There were 12 grooves, .056" wide and .0045" deep. It is worth noting that the factory specifications called for the .444

Marlin to have a groove diameter of .433" (and a bore diameter of .424"), indicating that oversized bullets would be necessary for best accuracy when shooting cast bullets.

Also in the 1960s, Marlin introduced the .44 Magnum to the Model 336. This rifle was fitted with Microgroove barrels, containing 12 grooves that were .062" wide and .0043" deep. Factory specs for the .44 Magnum barrels also called for a 1 in 38" twist, but that this time nominal groove diameter was to be held to .4315", and a bore diameter of .4230", so oversized cast bullets are once again called for. It is interesting to note that given the difference in groove width, groove diameter and bore diameter, suggesting that the .44 Magnum barrels were produced using a separate process and tooling than were the .444 Marlin barrels.

In 1969 the .44 Magnum was used to re-introduce the Model 1894. Ten years later the .357 Magnum was added to the 1894 line. This easy-handling carbine was also made with Microgroove rifling. In this case it had 12 grooves, each of which was .055" wide and .003" deep, and had a 1 in 16" twist. The groove diameter specification was listed as .3577", so .358" cast bullets generally shoot just fine. Later (in 1987) the .41 Magnum was added to the Model 1894. The .41 Magnums had 12 grooves that were .072" wide and .0035" deep, with a 1 in 20" twist. Factory specifications for groove diameter is listed at .4107", but these barrels sometimes run a little bit larger than this.

In 1972, Marlin introduced the Model 1895 chambered in .45-70. Initially, these rifles were made with 8-groove Microgroove barrels, with grooves that were .060" wide and .003" deep. The next year this was changed to a 12-groove barrel, with the other specs remaining the same. Again, groove diameter is spec-ed out at .4587", so oversized cast bullets are called for in these guns. All of these .45-70 Microgroove barrels had a 1 in 20-" twist.

There has been a great deal of concern over the years about whether or not Microgroove rifling would shoot cast bullets well. One group of folks says that Microgroove rifles can't hit a barn from the inside with cast bullets, one group says that Microgroove barrels shoot cast just fine just so long as velocities are kept below 1600 fps, and one groups says that Microgroove barrels shoot cast just fine at full throttle. The key to success with cast bullets in a Marlin with Microgroove rifling is to keep in mind that these barrels tend to have oversized groove diameters, and that the grooves/lands are shallow. Therefore, in order to get proper engraving (and minimize "slippage" of the cast bullet as it enters the shallow rifling), it is necessary that the bullet completely fill up the groove diameter of the barrel, and engage the maximum amount of the driving surface of the lands. Since Microgroove barrels are commonly oversized, this means that the cast bullet must also be oversized to effectively "fill up" the grooves. Other factors that also contribute to good accuracy with cast bullet in Microgroove barrels are the use of a GC bullet (which helps to provide a better grip and seal), and making sure that bullet are cast hard enough for the application (generally a BHN of 12 or more). It is also worth remembering that throats in modern rifles are almost always cut larger than groove diameter of the barrel (to insure that ammunition can chamber easily), and that best cast bullet accuracy is obtained by fitting the bullet to the throat, hence reinforcing the need for oversized cast bullets in Microgroove barrels (for example, the throats on my .30-30s run almost .311", so I size cast bullets to .310" for these guns).

Examples of Microgroove barrels shooting cast bullets accurately are easy to find. For example, I have a Marlin 1894 in .41 Magnum that was made in the first production run about 20 years ago. I don't know the throat diameter on this gun, but it shoots it's best with .412" bullets. Bullets sized .410" don't shoot well at all, and while .411" bullets group so-so, they have a really annoying habit of throwing flyers wide of the group by a notable margin. In this levergun the NEI .410-260-GC (#215F) is the key to success. I cast these bullets to a BHN of 13, size them .412" and lube them with homemade Moly lube. Loaded over 19.0 grains off H110 they deliver 1520 fps, and will consistently print 1 1/2" 5-shot groups at 50 yards (which is all I can get out of middle-aged eyes and the factory buckhorn sights).

Another example is found in the .35 Remington shooting the Lyman 358315 GC-HP (which weighs 206 grains as it drops from the blocks, when cast to a BHN of 13). Sized .359", checked with a Hornady crimp-on GC, and lubed with Moly lube, a very accurate load is obtained by seating these bullets over 36.0 grains of H4895. This combination generates right at 2000 fps, and will routinely group 5 shots into an inch at 50 yards from a Microgroove Marlin 336. The cast HP expands violently at 2000 fps.

Other examples can be found in the .30-30, .32 Special, .444 Marlin, etc., but you get the point. Microgroove rifles can shoot cast bullets just fine -- just keep them oversized, GC-ed and hard enough.

Back in the late 1990s, with the rising popularity of cowboy action shooting and its emphasis on historical accuracy, a whole new group of shooters started picking up Marlin leverguns. Because of their desire to load cast bullets in them, and because of the on-going, nagging (and inaccurate) rumors of poor accuracy from Microgroove barrels, Marlin eventually caved in and dropped Microgroove rifling for a number of their leverguns in the late 1990s. Sales of the cowboy guns have been brisk (especially those chambered for period correct cartridges, like the .45 Colt and .45-70). Marlin helps to feed this nostalgia by referring to these guns as "Ballard rifled".

As of fall of 2007, Marlin still makes a number of guns that have Microgroove barrels on them (according to the 2007 Marlin catalog posted on their website; Marlin.com). All of their .22 LR and .22 Magnum rifles still have Microgroove barrels. The 336s in .30-30 and .35 Remington are still made with Microgroove barrels, however the stainless 336XLR in .30-30 and .35 Remington have Ballard rifled barrels. All of the big-bore Marlin leverguns (e.g. 444, 1895, etc.) are now fitted with Ballard rifled barrels (both blued and stainless guns), as are the 1894 and 1895 Cowboy models. Interestingly, in the 1894 series, the.44 Magnum and .357 Magnum guns are Ballard rifled, but the .32-

20 1894CL and .41 Magnum 1894 FG are both fitted with Microgroove barrels.

Microgroove rifling is a fascinating, and misunderstood, innovation by one of America's leading arms makers. It speeds up production time and significantly extends the service life of the tooling (thereby holding production costs down). It provides very uniform bore dimensions and a very smooth bore finish. And the bottom line is, as generations of American hunters can testify to, Microgroove rifling provides fine accuracy in the hunting fields. Because of the specifications adopted by Marlin, Microgroove barrels tend to have oversized groove diameters, and as a result, Microgroove barrels early on earned a reputation for not shooting cast bullets well. In fact, when loaded with bullets that are the appropriate size for the barrel (and cast to a suitable hardness and wearing a GC), these guns are capable of fine accuracy with cast bullets. Some of my favorite cast bullet rifles wear Microgroove barrels.

The historical data used in this article was taken in large part from William S. Brophy's book "Marlin Firearms: A History of the Guns and the Company That Made Them". For more information on Marlin firearms, this extraordinary book is highly recommended.

- Glen E. Fryxell

The .444 Marlin

By: Glen E. Fryxell

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Large caliber, rimmed, straight-tapered cases have long had an appeal to the American shooter. So have lever-action rifles. It's kind of like pot roast and mashed potatoes and gravy, they just sort of belong together. This is the story of how one such combination came to be, and how the handloader can make it even better.

Starting in 1872, the Ordnance Department started conducting a series of tests in which they were evaluating a variety of centerfire black powder cartridges for possible adoption as the new military rifle round. Basically they were comparing straight-tapered cases to bottle-necked cases, in calibers from .40 through .45, with lead bullets weighing from 290 to 484 grains. A tremendous amount of shooting was performed, mapping the various trajectories, group sizes, penetration and wind drift out past 1000 yards. This work was summarized in the "Report of a Board of Ordnance Officers Convened Under Special Orders No. 107, Dated Adjutant General's Office, May 7, 1872, For the Purpose of Determining the Proper Caliber for Small Arms" (how's that for a title?), published in 1873. Ultimately, this research led to the adoption of the .45-70 as the standard cartridge for the 1873 Trapdoor Springfield rifle. However, it's interesting to note that as a part of this evaluation, the Ordnance Officers developed a cartridge (test fired in "Gun Number 15") with a straight-tapered 2.3" rimmed case, with a .430" diameter 365 grain bullet, that bore a remarkable resemblance to what would later be called the ".444 Marlin", differing only a few thousandths in certain key dimensions. While some have described the .444 Marlin as "a modern .45-70", the historical record shows that the basic concept behind the case design actually predates the adoption of the .45-70 as the official military cartridge!

This concept was revisited in 1882 with the Maynard single-shot rifle and the .40-70 Maynard cartridge, loaded with a 430 grain lead bullet at just over 1300 fps. This was a rimmed, straight .451" diameter case, 2.45" long that shot a .422" diameter bullet. This is slightly longer and narrower than the .444 Marlin's 2.225" tapered case, but would have had very similar capacity. The .40-70 Maynard was viewed as both a target and a hunting cartridge.

While smokeless powders, high pressure loads, muzzle velocities over 2000 fps and modern heat treated steels were still well in the future, the precedent for a rimmed, straight 2 1/4" .43 caliber cartridge case was established in the 1870s and 1880s.
During the 1950s, high pressures, high velocities and the art of wildcatting were all the rage. Seating tinier bullets on top of bigger, belted cases consumed lots of printer's ink, surplus powder and barrel steel. But wildcatters by their very nature are an independent thinking lot, and not all were focused on bolt-guns and blistering velocities. The concept of a rimmed, straight 2" case with a .430" bullet surfaced once again in Phoenix, Arizona around 1960 with the 44 Van Houten Super, a wildcat

cartridge made by necking up the .30-40 Krag case up to .44 caliber and cutting the case to 2". This cartridge was designed specifically for lever-action rifles, heavy timber and big critters.

In 1964 Marlin distilled all this history and all these features down into a new cartridge for their New Model 336 lever-action rifle. The .44 Magnum was enjoying lots of press and good sales at this time, and Marlin chose to conceptually stretch the Magnum case into a full-length rifle cartridge for a heavy-hitting black timber rifle. The .444 Marlin was the result.


The Marlin Model 444S, fitted with a Lyman 66 peep sight.

Factory ammo was loaded with the same 240 grain SP bullet that had proven so popular in the .44 Magnum, it's just that now it was stoked to an impressive 2300+ fps. This makes a fast-expanding, hard-hitting deer load. The .444 Marlin has a great deal of big-game potential, but a 240 grain soft-point bullet is not necessarily the best bullet to fully realize that potential. For an idea of what can be done, harken back to the .40-70 Maynard with its 430 grain lead bullet at 1330 fps for an idea of what can be done with a case this size, and then "modernize" those ballistics with smokeless powder and stronger, modern steels. 430 grain .430" diameter bullets are difficult to find these days, but 300 grainers are no problem. For an expanding bullet, a 265-300 grain JSP offers better sectional density and penetration than the standard 240 grain bullet, and for a deeply penetrating solid a 300 grain (or more) hard-cast bullet would be just the ticket. While the factory 240 grain load is a fine deer/black bear load (and quite accurate to boot), to realize the full potential of the .444 Marlin cartridge handloading is called for.

Remington-Peters has made .444 Marlin ammo and brass since its inception in 1964. Originally, this ammo was loaded with 240 grain bullet, then a 265 grain load was added (and later dropped). More recently, Hornady has added a 265 grain load to their light magnum line of ammo. Brass is quite uniform, with no wide variations in case capacity, brass hardness, or case length, as is sometimes encountered with other cartridges. It's a strong, modern, well-made case that lasts through many loadings, it's readily available and affordable. Of the many thousands of rounds of .444 ammo that I've shot over the years, I have yet to have a single case split or fail in any way (well, aside from that one that I accidentally stepped on and crushed...).

A few observations have come sharply into focus in my 10+ years of loading for the .444 Marlin in the Contender (re-chambered from a .44 Magnum Super 14 barrel, with a 1 in 20" twist). For bullets weighing 240-270 grains, 4198 and Re 7 are the powders to beat, even H322 is too slow for these lighter bullets in the shorter barrel. H322 really shines with 300 grain bullets, and does fine with heavier bullets as well. Once one gets above 300 grains, then slower powders like 2520 and BL-C(2) excel, and 4198 and Re 7 are too fast (375 grain spitzers are nicely stabilized by the Contender's 1 in 20" twist). When working with the Contender, consistent ignition of a large dose of powder in a short barrel is aided by using a magnum primer, even when using an easy to light powder like 4198. I was curious to see if these trends would still hold true in the longer barrel of the .444 rifle. Ken Waters reported in Pet Loads that magnum primers were of value with the slower burning powders in the Marlin .444, but that they were not necessary with 4198 and Re 7.

Jacketed Bullets:

The Hornady 265 grain FP was specifically designed for the .444 Marlin in 1967, and it's a dandy. It's very accurate, cycles perfectly, and by all accounts expands beautifully. The 300 XTP is another excellent bullet for the .444 Marlin, and offers a real elk-sized wallop. For the non-caster, these two bullets offer superb performance in the .444 Marlin cartridge.

For the jacketed bullets, I started off with a couple of favorite loads for my Contender: the 265 grain Hornady over 44.0 grains of Re 7, and the Hornady 300 grain XTP over 40.0 grains of Re 7, both with the Fed 215 primer. These loads were found to deliver 1971 and 1834 fps, respectively, from the Marlin. Interestingly, these velocities are virtually identical to those obtained with these loads from the much shorter barreled Contender (a re-chambered 14" Hunter barrel, so about 12 3/4" barrel). Both of these loads are particularly accurate in the Marlin, although slower than desired. Working up, it was found that 47.0 grains Re 7 with the 265 grain Hornady upped the velocity slightly to 2008 fps, and put 5 shots into one ragged hole at 50 yards. For the Hornady 265, 46.0 grains of H4198 also gave good accuracy at 1973 fps. In my rifle, these loads are considerably slower than the velocities reported in the Hornady and Hodgdon loading manuals for these charges with the Hornady 265 grain bullet.

45.0 grains of Re 7 with the 300 XTP generated a very useful 2013 fps, but with only so-so accuracy in my rifle. 43.0 grains of H4198 gave good accuracy with the 300 XTP, but at less than top velocity. For whatever reason, I have had trouble matching published velocities with jacketed bullets and the faster powders, but both of these bullets deliver excellent accuracy and function flawlessly in the levergun. These faster powders provide optimum performance in the shorter barreled Contender, but seem to be a little lacking in the longer Marlin.

Perhaps a slower powder is needed for the longer barrel? Perusing the Hodgdon loading manual shows the highest velocity load for the 300 grain bullets being 57.0 grains of H335 (about 2150 fps). Attempts to load the 300 grain Hornady XTP over 55.5 grains of H335 resulted in heavily compressed charges and damaged cases. I tried a number of different loading techniques, but I just couldn't make it work, so this combination was dropped from consideration. I went back to good ol' H322. 52.0 grains of H322 with the Hornady 265 grain FP (sparked with the WLR primer) was found to give 2210 fps and excellent accuracy. 49.0 grains of H322 was the most accurate load tested with the 300 XTP (once again with the WLR primer), giving right at 2100 fps, and arguably forming the best overall jacketed load tested in the .444 Marlin levergun. H322 seems to vary somewhat lot to lot, and in contrast to the faster powders discussed above, it seems that I have a somewhat faster lot of H322 than the powder used to develop the loads in the Hodgdon manual (but very similar to that used in the Hornady manual). The bottom line is that H322 works very nicely in the .444 Marlin, and gives an excellent combination of velocity and accuracy, within acceptable pressures.

Cast Bullets:

The Hornady 265 grain FP was made specifically for the .444 Marlin. The 300 grain XTP is also very good in the .444.

Originally, the .444 Marlin rifle was fitted with a Micro-Groove barrel, with a 1 in 38" twist (Micro-Groove rifling was introduced in the mid-1950s). Ken Waters reported in 1970 that this twist would not handle anything heavier than 310 grains, and made the excellent suggestion that the factory should load a toughly constructed bullet weighing between 275 and 290 grains for deep penetration to compliment the rapid expansion of the 240 grain SP load. The classic Greenhill Formula (i.e. using 150 as the constant): twist = 150 x $(\text{diameter})^2$/length) suggests that the maximum length bullet that can be stabilized in .444's 1 in 38" twist is a mere 0.730" long. This is a rather dubious prediction since the Hornady 265 grain FP, which was designed explicitly for this gun, and shoots very well indeed, is .806" long. This form of the Greenhill Formula is generally accepted as being appropriate for more moderate velocities below 1500 fps (it was derived from 19th century black powder artillery after all). For more typical rifle velocities (e.g. 2000 fps), a value of 180 has been suggested for this constant, leading to a prediction of .876" as the maximum bullet length that this barrel will accurately deliver. This prediction still seems somewhat conservative since the SSK 320 is about .930" long and shoots just fine in the .44 Magnum 1984 Carbine with the same 1 in 38" twist. It will prove enlightening to find out exactly what is appropriate for both the gun and the formula.

The question has also been raised about how well Micro-Groove rifling can handle cast bullets. The gun used in these tests was made in 1980, with Micro-Groove rifling, and was fitted with a Lyman 66LA peep sight. Marlin now makes this gun with cut Ballard rifling, 6 grooves, 1 in 20" twist (switching over sometime around 1997), so while the earlier guns may have some limitations based on the slow twist and shallow rifling, the newer guns should be very well suited to everything the older guns can handle, and possibly more.

Since Ken Waters reviewed the cartridge back in 1970, a whole herd of cast bullet designs have come available for the .44 Magnum that can also potentially be used in the .444 Marlin. A number of these are heavyweights that can take advantage of the added case capacity of the larger case, but only if the lazy 1 in 38" twist of the Marlin rifle will stabilize them. Previously, I worked with this twist rate in the Marlin 1894 .44 Magnum and found that the SSK 320 grain bullet was the heaviest that it would stabilize (but that was "Ballard-cut" rifling, not Micro-Groove). It's important to recognize that the .444 Marlin lever-gun is going to run even the heaviest .44 cast bullets pretty fast, so I started off casting these bullets with either straight linotype alloy (BHN = 21), or water quenched wheel-weight alloy (BHN = 16-18) (as I found out later, this wasn't necessary, as alloys with BHN of about 13 work just fine). The bullets I started off with were the plain-based LBT 430-300-LFN, and the gas-checked 280 grain Lyman 429640, Saeco 300 grain RNFP, RCBS 300 grain SWC, LBT 430-350-WLN, and NEI 429-330-GC (see Figure 3).

It quickly became apparent that the Saeco 300 grain GC-RNFP (#433) bullet was a very accurate projectile in the .444 Marlin. Indeed, it's been responsible for some of the smallest groups ever produced by this rifle, with any bullet, cast or jacketed.

Some of the bullets tested in the 444 Marlin. (l-r: LBT 430-300-LFN, 280 grain Lyman 429640, Saeco 300 grain RNFP, LBT 430-350-WLN, and NEI 429-330-GC).

So much for Micro-Groove rifling not shooting cast bullets well! Loaded to an OAL of 2.54" and lightly roll-crimped over the ogive, it cycled, fed and chambered very smoothly. Using the Winchester Large Rifle primer, 43.0 grains H4198 with the Saeco 300 gave very good accuracy at 2003 fps.

Working with H322, I started at 46.0 grains, and was treated with very good accuracy and 1907 fps. Working up to 49.0 grains of H322 gave right at 2100 fps, and 50 yard 5-shot groups hovered right at 1" all the way. This is a compressed load with the Saeco bullet and since the crimp groove is in the wrong place a light roll-crimp was placed over the ogive of the bullet to hold the bullet in place. This is a very accurate combination -- H322, the Saeco 300 grain RNFP-GC and the .444 Marlin.

Just for the record, the various lengths of the bullets used in these tests are:

Hornady 265	.806"
Hornady 300 XTP	.865"
Saeco 300	.835"
RCBS 300 GC-SWC	.892"
SSK PB 320	.930"
NEI 330 GC (SSK)	.990"
LBT 350 WLN	.983"

All of these cast bullets were designed for the .44 Magnum, and have their crimp grooves located appropriately for use in revolvers, not for the Marlin lever-gun. For these tests, I ignored the crimp groove and seated these bullets to an OAL of 2.540" and crimped over the ogive. I used a .426" expander ball and sized all of these cast bullets .431" and lubed everything with my homemade Moly lube (equal parts by weight beeswax and Moly grease). With bullets as long as these, this combination provides sufficient throat tension to prevent bullets being more deeply seated under recoil while in the magazine.

It was felt that the 300 grain RCBS GC-SWC (not pictured) might also be a good bullet for this cartridge/gun combo, with its radiused ogive, GC, weight and length. In this case, it would be necessary to seat the bullet deeply, and crimp over the forward driving band. Seated thusly, it cycles a little roughly, but not to the point of being a problem. It chambers just fine, there's just an extra rattle or two along the way. These tests were started off with 46.0 grains of H322 with the WLR primer. This load provided very good accuracy (5 shots into an inch at 50 yards), and very uniform velocities 1979 +/-7 fps. Working up to 48.0 grains of H322 gave very good accuracy and 2044 fps, and while 49.0 grains once again gave velocities right around 2100 fps, accuracy suffered markedly with this bullet. For whatever reason, in my rifle, it's best to stop at 48.0 grains of H322 with the RCBS 300 grains GC-SWC, but this is a fine load.

Even the plain-based LBT 300 grain LFN made a good showing for itself in the .444 Marlin levergun. When loaded on top of 42.0 grains of H322 and sparked with a Fed 215 primer, it delivered 1915 fps and decent accuracy. Similarly loaded, the Lyman 429640 GC-FP (the predecessor to the Devastator HP) delivered 1953 fps and fine accuracy. While these last two loads are not maximum loads (based on pressure), they would nonetheless do a fine job in the hunting fields.

Heavyweights:

How heavy a bullet will the .444 Marlin Microgroove barrel stabilize? For these tests, I started off with one of my favorite heavyweight cast bullet loads for my Contender -- 42.0 grains of H322, sparked with a Federal 215 primer, underneath the SSK 340 grain GC-FP (330 grains the listed linotype weight, this bullet weighs 340 grains when cast of water-quenched WW alloy). This mould was made by NEI and is listed as the NEI 429-330-GC (#266). This load delivers about 1650 fps from a 14” Contender, and groups quite nicely with its 1 in 20” twist. Peak pressures of this load are estimated to be less than or equal to that of factory ammunition, based on case expansion. For the Marlin levergun, I seated the bullet slightly deeper (OAL = 2.54”) and roll-crimped over the forward driving band. Loaded thusly, the ammo fed and chambered very smoothly indeed, just as one would expect with the truncated cone ogive. Chronographing this load revealed a velocity of 1851 fps from the 22” Marlin. Accuracy was very good. Repeating these tests with the SSK bullet with 42.0/H322, this time using Winchester Large Rifle primers, gave 1855 fps and 1” 5-shot groups at 50 yards. While the Federal 215 primer is needed for top accuracy in the short barreled Contender, both standard and magnum primers seem to give good velocity uniformity and accuracy in the longer Marlin levergun. Magnum primers don't seem to provide any advantage in the rifle with H322.

Similar tests were carried out with the LBT 350 grain WLN-GC (356 grains when cast of water quenched WW alloy). This ammo was once again assembled with 42.0 grains of H322, the Federal 215 primer and seated to an OAL = 2.540". Ammo loaded in this manner cycled just fine, but the Marlin rifle wasn't designed with meplat this large loaded to this OAL, and this ammo just barely fed in through the loading port into the magazine, and probably should be just a touch shorter. I ignored the crimp groove, seated the bullet deep and placed a light roll-crimp over the ogive. Test firing this ammo revealed two things -- signs of excessive pressure, and velocities of 1886 fps. Repeating these tests using the Winchester Large Rifle primer gave acceptable pressures (based on case expansion), 1833 fps and 2" 5-shot groups at 50 yards. Magnum primers appear to push this load "over the edge" in terms of acceptable pressures.

I took both of these heavyweight cast bullets and the .444 out to a remote, basalt lined BLM canyon to do some plinking, and the SSK bullet had very a consistent point of impact out to 150-200 yards (as far as I could shoot in this canyon), indicating good, stable flight. The heavier LBT bullet was not as consistent in terms of its point of impact, although it still delivered reasonable long range accuracy. This is in stark contrast to these two heavyweights in the .44 Magnum Marlin with the same lethargic twist, where they didn't group well at all, and commonly key-holed at 50 yards. The additional velocity of the .444 Marlin seems to be providing enough additional spin to these bullets for them to stabilize -- more than enough for the SSK, and just marginally enough for the heavier LBT. These data would suggest that the constant in the Greenhill formula for this velocity range might need to be adjusted upwards to 190-200.

Mountain Molds Custom Mould designed specifically for the .444 Marlin:

So much for Micro-Groove barrels not shooting cast bullets well! BUT the bottom line is that none of the cast bullets currently available is properly designed for the .444 Marlin, so I had one made up. Mountain Molds offers the service of custom made bullet moulds to the customer's specs. I designed a bullet specifically for the .444 Marlin levergun, with the following attributes:

1> Properly located crimp groove.
2> Proper nose length/configuration (.315"), ogival round nose flat point for smooth cycling.
3> 0.425" X 0.060" front band for optimum fit to the factory throat (to be engraved/supported by the rifling).
4> Large 73% meplat for optimum hunting performance.
5> 300 grain bullet weight (WW alloy).
6> Acceptable length for twist rate (.805", the blunt profile of this bullet actually leaves this 300 grain bullet the same length as the 265 grain Hornady).
7> GC design.
8> Large Keith-inspired grease groove.
9> Wide driving bands (provides more metal for the shallow Micro-Groove rifling to "bite").

I filled in Dan's worksheet, printed it out and mailed it in with a check. 8 weeks to the day, the mould showed up at my door. Bullets dropped from the mould oversized (as I had intended) at 0.433+" and (just like all of the moulds I've gotten from Dan) the bullets were actually ROUND. They weighed 290 grains when cast with 2 parts range scrap and 1 part linotype (this 2:1 alloy has a BHN of about 13), 295 grains when checked and lubed. This is pretty much spot on to what I ordered since I had designed the finished bullet to be 300 grains with WW alloy, which is slightly more dense than the alloy I was using. I designed the original version of this bullet with a full diameter forward driving band, which turned out to be a bad idea as it took too much force to engrave upon chambering in the Marlin's short throat (it shot very well, but would not be practical as a hunting bullet as chambering took too much effort). So, I had Dan make a modified version of this mould in which the forward driving band was somewhat reduced in diameter (.425") to facilitate chambering, but still allow it to center itself by being engraved lightly upon chambering. The second mould Dan made for me showed up a month later and was perfect. Sized .431", this bullet printed 5-shot groups at 50 yards (iron sights) of 1" to 1 1/4" when loaded on top of 48.0 grains of H322 (WLR primers) with velocities averaging a little over 2070 fps. Upping the charge to 49.0 grains of H322 increases the velocities to 2095 fps and group sizes stayed right at 1" to 1 1/4". The modified design cast, fed, cycled, chambered and shot beautifully. This is the best cast bullet I've shot in the .444 Marlin. Mountain Molds (www.mountainmolds.com) can make the same mould for you, if you want.

Conclusions:

OK, let's put this into perspective. A Marlin 1894 .44 Magnum carbine can drive the 300 grain cast bullets quite nicely at 1700 fps, but can't handle anything much heavier due to the limitations of the 1 in 38" twist and the OAL needed to feed from the magazine through the short action. The .444 Marlin can provide an additional 400 fps with the 300 grain bullets, which makes this gun suitable for pretty much anything in North America.

When assembling loads for the .444 Marlin, H322 seems to be the powder to beat, and standard primers work just fine in the rifle (although magnum primers provide better accuracy in the shorter barreled Contender).

.444 Marlin round loaded with the Mountain Molds 300 grain GC-FP, and the lubed and checked bullet.

Turning to jacketed bullet selection, both the Hornady 265 FP and 300 XTP are very accurate bullets, and by all accounts expand well when fired from the .444 Marlin. In selecting a cast bullet for the .444 Marlin, the SAECO 300 grain RNFP-GC bullet is an accurate choice, as is the RCBS 300 grain SWC-GC. The best overall cast bullet for the .444 Marlin is the Mountain Molds 300 grain RNFP-GC, the only cast bullet designed specifically for this cartridge and gun. It was found to be a very accurate bullet, that fed and cycled from the magazine very smoothly, and it has a large meplat for hunting. In terms of heavyweights, the .444 Marlin levergun is capable of driving the NEI (SSK) 340 grain bullet at 1850 fps with very good accuracy for those that want the additional thump of a heavier bullet (penetration of the SSK bullet should be exceptional). These cast bullet loads very nicely compliment the expansion behavior of factory ammo and jacketed handloads. The 350 grain LBT LFN-GC is right on the edge of being stabilized at 1800 fps with the 1 in 38" twist. Short range accuracy is good with this bullet, but groups open up as the range increases (and marginal stabilization can lead to erratic wound channels upon impact). Based on years of experience with the .444 Marlin in re-chambered Contenders, I am confident that the newer guns that Marlin is making, with their 1 in 20" twist, will handle heavyweight cast bullets just fine.

So where does the .444 Marlin fit in, in terms of big-game lever-gun cartridges? Well, let's start with the .30-30 family of cartridges that are easy to find, easy to shoot and have been reliably killing deer and black bear for many, many decades. This power level is typified by 170 grain bullets at about 2150 fps. While the .30-30 certainly *can* kill elk and moose, most hunters opt for something a little more powerful for these beasts to drop them as quickly as possible and avoid losing the animal. The next step up in power is found in the .33, .348, .35 and .356 Winchester group of cartridges. With these rounds we are generally talking about 200-250 grains bullets at 2200-2400 fps. They have established themselves over the years as reliable black timber elk rounds. The next step up the power ladder, we find the .444 Marlin loaded with 300 grain bullets at 2100 fps (cast or jacketed), providing the hunter with a great deal of power and versatility. This level of performance is riding hard on the heels of the revered .405 Winchester (300 grains at 2200 fps), with a better (i.e. less abusive) stock design, easy to find strong brass, and out of a levergun that won't crush the family budget. This power level will handle anything in North America, and would not be out of place in Africa. Yup, the .444 Marlin is a keeper. You might even call it modern-day *big medicine*...

- Glen E. Fryxell

Headlong into the Hornet's Nest

Custom Ruger 25 Hornet Old Model Blackhawk

By: Glen E. Fryxell

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Like the acorn that eventually gives rise to the mighty oak, even the best ideas take a little while to take root and grow to their full potential. They need the right season, the right amount of rainfall, the right amount of warmth, the right amount of *time*. Such was certainly the case with the ideas that spawned this project.

Years ago, Gil Sengel wrote up an article about a couple of rifles he built that were chambered for one of the oldest wildcat cartridges, the .25 Hornet. I first encountered Gil's write-up in the compilation "Wildcats" put out by Wolfe Press. Right after that article is a piece by Al Miller on a similar wildcat he called the .257 Magnum, that was shortened slightly so as to fit in a S&W K-frame cylinder. Well-thought out wildcat cartridges fascinate me. These .25 caliber rounds took advantage of the selection of .25-20 bullets (both cast and jacketed) that were of appropriate weight for the case capacity, the very nearly straight-case design is ideally suited for use in revolvers, brass is easy to come by, and it occupies a ballistic niche for which there are no commercially available revolvers. Varmint hunting with revolvers is one of my favorite summer pastimes. I wanted to put something like this into a revolver, but the thought of cutting all those cases back tarnished the project's appeal. The seed was planted, but was as yet dormant.

It didn't sprout and take root for a while. Several years ago, Rob and Marilyn Applegate were about to come up for a visit. Rob and I were talking on the phone, discussing his K-frame 22 K-Hornet project and I mentioned that I'd had a few thoughts about doing something similar in .25 caliber. "Oh yeah? You need a barrel?" It turned out that he had a take-off barrel from a Ruger .25-06 that had been sitting in his shop for years that he wanted to see get cut up (someone had drilled and tapped it much too deep and it was unsafe to use in its current condition). It even had the 1 in 10" twist that Gil Sengel had found worked best in his guns. Spring rains were falling, the days were getting longer and warmer, and the seed was about to sprout.

Rob delivered the barrel a few weeks later during their visit. Some quick dimensions were taken and a chunk of barrel was extracted from the Ruger take-off and turned to rough diameter. At this point the project sat idle for several months. One day I walked into a pawn shop and stumbled across an OM .357 Blackhawk that was in pretty nice shape (but not quite collector grade). It had a very friendly price-tag on it, and followed me home. Originally, I was going to keep this .357 intact, as a shooter, but I soon found that even with the rear sight bottomed out it wouldn't shoot anything but the 125's anywhere near point of aim, and all the heavier bullets (that I favor) printed much higher. I measured the OM Blackhawk's cylinder, it was just exactly the right length to house the full length .25 Hornet, with just enough room to spare. The Old Model's fate was sealed.

Now that I had a revolver and a barrel, it was time to get the ball rolling. I called Hamilton Bowen (Bowen Classic Arms, Box 67 Louisville, TN 37777, (865) 984-3583, www.bowenclassicarms.com, bcacorp@nxs.net) and ordered one of his OM Ruger Blackhawk cylinders with .218" pilot holes where the chambers should be (oh yeah, and since this conversation was taking place about a month after his book "Custom Handguns" came out, I ordered a copy). During our pleasant conversation I learned that the cylinders were out of stock, but the next shipment was due in shortly (that's OK, that gave me plenty of time to ogle the spectacular photography in his book until the cylinder arrived).

Next I called RCBS (800-533-5000, www.rcbs.com, 605 Oro Dam Blvd., Oroville, CA 95965) to ask about dies. Eventually, my call was routed back to the custom shop where I learned that they do indeed make dies for the .25 Hornet, but they have two different versions and they wanted to know who was making the reamer and wanted to see the spec sheet to make sure that they made the right set for me. OK, put the dies on hold for the moment…

There are several possible sources of reamers for the .25 Hornet (JGS, Clymer, Pacific Precision, etc.). To make my choice a little easier, I figured Rob Applegate, a man who has made his living turning cherries and cutting moulds would know a thing or two about reamers and reamer-makers, and so I sought his opinion. His response was simple and to the point, "Dave Manson is a good man and he makes perfect tools." Anybody who knows Rob (aka "Persnickety") and the exceptional of his quality of work, knows that "perfect" is not a concept that he takes lightly. A phone call to Dave Manson (Dave Manson Precision Reamers, 8200 Embury Road, Grand Blanc, MI 48439, USA, Phone: 810-953-0732, Fax: 810-953-0735, web address www.mansonreamers.com, david@mansonreamers.com and I knew the choice was the right one. He was very helpful in lining things out and telling me what he needed to give me exactly the reamer that I wanted. He would even handle the arrangements with RCBS to expedite production of the dies. Ever notice how so many people in the shooting sports are just flat *nice folks*?

In the meantime, I bought 500 R-P .22 Hornet cases, and ran 3 of them over a .256" expander ball. These cases miked .2935" at the case head, and .2725" at the neck (no bullet seated), and .274" with a Lyman 257420 (sized .2575") seated in place. These dimensions were e-mailed to Manson for reference in cutting the reamer, along with the request for .003"-.0035" clearances on all chamber dimensions and a .2575" throat. The reamer arrived a couple of months later. There were no surprises, it was simply exactly what I had ordered in every detail. A few of the pertinent dimensions include .297" at the case head, a .277" diameter neck that is .400" long and a .2575" throat. Chambers were hand-cut in the Bowen cylinder, and the Manson reamer cut smoothly and cleanly. The dummy rounds fit the freshly cut chambers like a hand slips into a custom-tailored buckskin glove. Perfect indeed.

The Bowen cylinder was fit to the frame without any problems. The barrel was then threaded and cut to fit the frame and cylinder. The fitting of the ejector rod housing and Bowen front sight was performed (as a birthday present) by my good friend (and expert pistol smith) Dave Ewer. The ejector rod was slimmed down until it would slide into the skinny throats of the .25 Hornet cylinder and eject empties. The gun was now ready to shoot.

The dies showed up a couple of weeks after the reamer, or rather I should say 2 of them did. There had been a mix up back at RCBS and the flaring die had somehow gotten overlooked. A phone call and a follow-up e-mail corrected the situation and a month or so later the flaring die showed up. After I started loading ammo for this project, I discovered a minor problem with the sizer die. A phone call to RCBS got me forwarded back to Stan in the custom shop. He told me to send in the die in question with 5 fire-formed cases. A month later I had a new sizer die, made to exactly match my chambers, and it works to perfection. Mistakes do occasionally happen (we're all human), but the mark of a good business is borne by how they make right on their mistakes. Thanks RCBS! That's good customer service.

Fire-form loads were assembled using the 85 grain cast FP from Western Bullet Co. (the Ideal 257283) , loaded over 3.0 grains of Red Dot, sparked with a CCI 500 primer. Accuracy was good with these light loads, and with formed cases in hand the loading project was underway. Test loads were assembled using the Lyman 257420 GC-SWC over 10.0 grains of H110, a CCI 450 (small rifle magnum) primer, Hornady crimp-on gas-checks and homemade Moly lube (equal parts by weight beeswax and moly grease). Initial tests with this ammo resulted in poor accuracy, with groups running about 4" at 25 yards. Velocities averaged about 1530 fps, and varied considerably. Point of impact was about 14-16" below point of aim, indicating that the Bowen front sight needed to be cut down significantly. Further testing revealed the groups were getting progressively smaller, finally settling in at around an inch, so apparently the first groups were just a case of the gun getting broken in, de-burring itself and conditioning the bore. It was unsettling to note that the firing pin indents were off-center. The barrel and firing pin appear to be lined up, suggesting that perhaps the cylinder might be slightly out of alignment. However, a .250" range rod will go through the barrel and into the throats without contacting the throats, so alignment is within .0035". What's more there were no asymmetric lead deposits in the forcing cone to indicate off-center entry of the bullet into the bore. The bottom line is that the gun groups very well, and mechanically everything seems to be in order, so I chose to ignore the off-center indents.

The gun was stripped down, the front sight ground down to proper height and the face of the front sight serrated. The metal was next prepared for bluing.

All surface prep work and polishing was done by hand. Working up through the grits, it was taken to a high polish with 600 grit SiC and then "softened" with #00 steel wool to produce a satin finish. The gun was hot blued using a concentrated solution of sodium hydroxide and potassium nitrate at 300°F to produce a very satisfying deep satin black finish, similar in color to that used by Ruger *(don't try this at home unless you thoroughly understand the hazards associated with handling* *these chemicals under these conditions, I'm a chemist by trade and took the appropriate precautions -- boiling lye is not something to take lightly).*

A little reference data is appropriate at this point. P. O. Ackley reported load data for the .25 Hornet in his *Handbook for Shooters and Reloaders*. His test arm was a rifle, so his velocities are higher than can be expected from a 7 1/2" revolver. Ackley reported the use of 11 grains of 2400 with a 60 grain bullet for 2035 fps, or 10 grains of 2400 with an 86 grain bullet for 1675 fps. In his piece on the .25 Hornet, Gil Sengel reported that 9.0 grains of 2400 with 75 grain bullets generated 2000 fps (once again, in a rifle), while 10.0 grains of 296 produced 2180 fps. A mild load of 4.0 grains of Unique with a 72 grain cast bullet delivered very nice accuracy and 1475 fps. I was guessing that revolver loads were going to run about 400 fps slower than these numbers. Time to start working up loads.

Bullets were cast of WW alloy, sweetened with 1-2% added tin, sized .2575" (to exactly match this revolver's throats) and were lubed with my homemade moly lube (equal parts by weight beeswax and Moly grease). Bullets used included the Lyman 257420 GC-SWC (70 grains), the 257420 GC-HP (also 70 grains, interestingly), the Lyman 25727 HP (83 grains), the Lyman 25720 (86 grains), the similar Winchester .25-20 Single-Shot bullet (86 grains), and the H&G #54 (88 grain GC-FP) and the H&G #32 (67 grain GC-FP). Since the primary reason for this revolver is for varmint hunting, I was especially interested in finding good working loads for the cast HP's (the 257420 HP and the 25727 HP). Initially, bullets were sized .2575" in a worn (read "scratchy") .257" sizer. Acceptable accuracy was obtained, but nothing that really lived up to the capabilities of a hand-fitted revolver. Using a new RCBS .258" sizer produced much better accuracy and was used for all subsequent loading.

In general the GC bullets seemed to shoot better than the plain-based bullets, which is not surprising at these velocities and pressures. No leading with either GC or PB bullets at these speeds, but the GC bullets did tend to produce smaller groups. Most of the loads tried would put 5 shots into 1 1/2" to 2" at 25 yards. A load was considered accurate if it would put 5 shots into less than 1 1/2", and very accurate if they went into 1" or less.

While the slower magnum pistol powders commonly turned in the higher velocities (no surprise there), the best accuracy was generally turned in by HS-6 and HS-7. The slower powders generally produced better accuracy with the heavier bullets (80 grains). As an interesting aside, this revolver tends to shoot different weight bullets to the same point of impact. Presumably, this is due to the combination of light recoil and high velocity.

As this is going to be a revolver that I hunt with a lot in hot, sweaty weather, I decided to put some Hogue imitation ivory (polymer) grips on it. I was pleasantly surprised with how good these grips look on the gun. I took this revolver to our annual Pacific Northwest Sixgunner Rendezvous and it was a big hit with the other shooters. They really liked the combination of high velocity and low recoil.

Some preliminary field results with cast bullets on rodents: the 257420 at 1550

fps proved itself to be a flat-shooting ground squirrel load that smacked the little rodents with authority on well-centered hits, but left a little to be desired with hits "around the edges". The HP version of this little GC-ed bullet was likewise tested and found to be just as flat-shooting, but notably more effective at anchoring rodents upon impact, with any kind of hit. This dainty little HP is not as explosive as the Keith HP (the Lyman 358439), but it expands readily and does a fine job in the field. The .25 Hornet should be adequate for critters up to about coyotes in size. When I'm handling this gun, I just can't seem to keep thoughts of Javelina out of my brain!

This has been a fun, and educational, project. While I don't expect that there's a huge market demand for revolvers chambered for the .25 Hornet cartridge, it does occupy a unique, and useful niche, and one that some handgun hunters will likely appreciate. It's easy to load, easy to shoot and exceptionally accurate. It should also be right at home in the Contender. Excuse me while I go load some more ammo...

- Glen E. Fryxell

Loading data for the .25 Hornet OM Blackhawk

Fire formed R-P cases

CCI small pistol magnum primers (unless otherwise noted)

Velocities are from a 7 1/2" Ruger Blackhawk

Lyman 257420 GC-FP (70 grains)				**Lyman 257420 GC-HP (70 grains)**			
Powder	Charge	Velocity	Comments	Powder	Charge	Velocity	Comments
HS-6	6.0 gr.	1524 fps	Accurate	HS-6	6.0 gr.	1546 fps	**Most accurate load tested**
HS-7	7.0 gr.	1503 fps	**Very accurate**	HS-7	7.0 gr.	1568 fps	**Excellent!**
AA # 9	8.2 gr.	1569 fps	Accurate	AA # 7	7.0 gr.	about 1600	Shows promise
H110	10.0 gr.	1530 fps	**Reduce 1/2 gr.**	AA # 9	8.5 gr.	1732 fps	Poor-vertical string
				2400	8.5 gr.	1754 fps	Poor-vertical string
				H110	9.5 gr.	1822 fps	Poor-vertical string

Loading data for the .25 Hornet OMBH (Cont.)

Lyman 25727 PB-HP (83 grains)

Powder	Charge	Velocity	Comments
HS-7	6.5 gr.	1511 fps	**reduce 1/2 grain**
AA # 7	6.4 gr.	1519 fps	
AA # 9	8.1 gr.	1412 fps	
2400	8.0 gr.	1420 fps	so-so
H110	9.0 gr.	1525 fps	poor

Lyman 257283 PB-FP (85 grains this bullet is available from Western Bullet Co.)

Powder	Charge	Velocity	Comments
HS-6	5.4 gr.	1586 fps	accurate
HS-7	6.1 gr.	1424 fps	accurate
AA # 7	6.0 gr.	1490 fps	shows promise

Ideal 257464 Loverin GC-HP (87 grains)

Powder	Charge	Velocity	Comments
HS-6	5.1 gr.	1264 fps	shows promise
AA # 7	5.7 gr.	1290 fps	**very accurate**
AA # 9	7.5 gr.	1402 fps	
2400	7.5 gr.	1352 fps	shows promise
H110	8.5 gr.	1355 fps	

Hensley and Gibbs #54 GC (88 grains)

Powder	Charge	Velocity	Comments
HS-6	5.0 gr.	1392 fps	
HS-7	5.9 gr.	1454 fps	
AA # 7	6.0 gr.	1348 fps	vertical stringing
AA # 9	7.7 gr.	1425 fps	accurate
2400	7.0 gr.	1321 fps	accurate
H110	8.5 gr.	1455 fps	poor

Warning: All technical data mentioned, especially handloading, wildcatting and bullet casting, reflect the limited experience of individuals using specific tools, products, equipment and components under specific conditions and circumstances not necessarily reported in the article or on this web site and over which The Los Angeles Silhouette Club (LASC), this web site or the author has no control. The above has no control over the condition of your firearms or your methods, components, tools, techniques or circumstances and disclaims all and any responsibility for any person using any data mentioned. **Always consult recognized reloading manuals.**

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Glen E. Fryxell Article Index

The .35 Remington: America's "Other Levergun"

By: Glen E. Fryxell

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You put the terms "deer rifle" and "levergun" in the same sentence and most folks will immediately think of the Winchester 94 in .30-30. Sure, there will be some Savage fans shouting about their pet Model 99s in .250 or .300 Savage, and with good reason; and there will be some folks ballyhooing their light, short-action .44 Magnums; and let's not overlook those nostalgic souls who speak so lovingly of their .348s, but the bottom-line is that most folks still think of the .30-30 Winchester as America's levergun. Then there's that "other levergun", the one that folks don't talk much about; an awkward, almost judgmental, knowing silence, similar to that heard in years gone by when a young single woman had to leave town because she was "in a family way". You know, we just don't talk about "that one". Well, there's nothing shameful about the .35 Remington, and while the popular gun press doesn't generally say much about the cartridge or the rifle, Marlin has been making, and steadily selling, them for over half a century now. Let's pull the curtain back and take a closer look at the "other levergun".

The .35 Remington cartridge was introduced in 1906. Interestingly, it didn't have a rifle chambered for it for 2 years until the Remington Model 8 semi-automatic rifle was chambered for the .35 Remington in 1908. This combination quickly established itself as a hard-hitting hunting team, and was featured in many of the Remington-Peters advertising posters and tins of the day (these are classic!). Today, a century later, this rifle and cartridge remains a favorite with hunters who work the heavy timber, like my good friend Rob Applegate, who absolutely dotes on his .35 Remington's, and has an impressive pile of antlers in his garage as testimony to his personal history with the .35. Later, Remington chambered several pump action rifles (e.g. Models 14 and 141) in .35 Remington, and subsequently a number of other manufacturers made rifles chambered rifles for it as well.

In 1949, Marlin upgraded the Model 36 to include a better bolt, receiver and extraction system, and renamed the rifle the Model 336. The .35 Remington chambering was added in 1950, and they've been making them ever since. In the mid-1950s, Marlin went to a new form of rifling, which replaced 6 deeply cut grooves (in which each groove was individually cut by multiple passes of a single cutting head) with Micro-Groove rifling, in which 16 (or more, in some cases) much smaller, and shallower, grooves were cut simultaneously by a single pass of a more complex cutting tool (Micro-Groove rifling was original introduced in rimfire rifles in 1953, and then added to the centerfire line of rifles in 1955-6). The claim was made that these smaller grooves resulted in less distortion of the bullet, resulting in more stable, hence accurate, flight (I suspect another reason behind the change was to reduce production time and costs). The shooting community has always been reluctant to accept new ideas, and this one was no exception, but the bottom line is that these Micro-Groove barrels shot well, killed deer and were ultimately accepted as trustworthy hunter partners.

The Marlin 336 - the rest shown in the picture is one of the best I've ever used, and easy to make, I used three 12" pieces of 2x6, one cut in half at 45°, and some scrap carpet).

When viewed from the levergun cartridge perspective, the .35 Remington is kind of an anachronism for the cartridges of its time. It isn't slender, highly tapered, or rimmed. It doesn't have long skinny bullets or a gently sloping shoulder. It's a rimless case (it was designed for semi-automatic rifles after all) with a small, abrupt shoulder. It's short, squat and stout; and it's widely over-looked. But there are certain geographical pockets in which the .35 Remington enjoys some measure of popularity -- in the deep southeast, where black bear and hog hunters get into the swamps and thickets deep in the heart of Dixie. The cold, snowy woods of Maine have some big-bodied whitetails (not to mention fat black bear and the occasional moose). These are areas where hard-core hunters work the woods for tough, smart animals, and need a quick-handling, reliable, medium-bore thumper to anchor them quickly.

.35 Remington factory ammo is good stuff, and is available from Remington-Peters, Winchester, Federal, etc. Today, this is almost invariably a 200 grain RN bullet, at about 2100 fps (Remington also lists a 150 grain load, but I haven't seen a box of that stuff on the shelf in years, and don't know if it's really still available). A 200 grain, .35 caliber, round-nosed bullet at 2100 fps offers a very useful combination of hard-hitting "thump", and deep penetration, from a fast handling rifle, without abusive levels of recoil. Factory ammo is accurate, affordable and available in just about every country store that sells ammunition. The glossy gun rags might not talk about the .35 Remington much, but country boys sure seem to (why else would the country stores stock all that ammo?).

Today, the .35 Remington is most commonly encountered in Marlin 336 levergun (it's also available in the Remington Model 7 and the Thompson Center Contender). The Marlin 336 has a Micro-Groove barrel, and while some people claim that Micro-Groove barrels won't shoot cast bullets very well, my 1964 vintage (i.e. a 40 year old bore) Marlin 336 in .35 Remington hasn't given me any grief in this regard. It's not that I systematically worked up a specially tweaked load that finally "clicked", it's just that the various cast bullet loads I've assembled have shot fine for me, so I didn't bother to figure out why. My friend (and fellow cast bullet gun-crank) Charles Graff has studied the cast bullet/Micro-Groove barrel interface in more detail than anybody I know, and he has deciphered what it takes to make this combination shoot. His insights have taught me why my loads worked. In addition to having shallow lands/grooves, it seems that Micro-Groove barrels tend to be a little over-sized in their groove diameters. Thus, for a cast bullet to get good traction in Micro-Groove rifling, the bullet needs to be 1) oversized, 2) of sufficient hardness, and 3) wear a GC. These were things that I was doing out of habit anyway, and so it turned out that my cast bullet loads shot just fine. With hardcast GC bullets, sized .359" this rifle will put 5 shots into less than 2" at 50 yards all day long, which is about all that can be asked from the factory buckhorn sights that this rifle wears (especially with middle-aged eyes). A scope would probably help, but I'm partial to iron sights on leverguns.

In terms of powder selection for the .35 Remington, those that seem to work best are the rifle powders in the medium to fast end of the burning rate spectrum (e.g. 3031, H322, 4895, 2520, etc.). In terms of primer selection, standard primers have worked just fine for me, when I'm shooting the .35 Remington from a rifle. When shooting a .35 Remington in the shorter barrels of the T/C Contender, the best results I've gotten have been built around the Federal 215 primer and H322 powder.

Jacketed Bullets:

180 Speer: This bullet has an excellent reputation for killing deer, expanding well and punching right on through. There is a handsome Oregon blacktail buck mounted in Rob Applegate's living room that found his way there courtesy of this bullet over a snootful of 4895. Rob has used this powder/bullet combination to kill several other deer; all one shot kills. To say that Rob likes this bullet is an understatement! And it's dandy; I have tried it over 38.5 grains of H4895 and 38.0 grains of H335, both of which delivered right at 2150 fps from the Marlin. The H335 load was somewhat more accurate in my rifle, but either load was more than adequate in terms of accuracy.

The 180 Speer FP, the 200 Sierra RN and the 220 Speer FP.

200 Round Nose: Both the Sierra and Hornady 200 grain RN bullets are fine hunting bullets, and each has a small, but fervent following. Just as with factory ammo, these are good all-round hunting bullets. The Sierra bullet has delivered consistently excellent accuracy for me (I must confess that I haven't worked with the Hornady bullet yet, but I would expect fine results from it as well). For folks who want to duplicate factory ammo, 38.5 grains of IMR 4064 is very accurate and delivers the 200 grains Sierra at 2087 fps, with very uniform velocities. The Accurate Arms loading manual reports that 39.0 grains of 2520 underneath this bullet develops only 27,800 psi peak pressure. This combination is very accurate in my rifle and delivers an impressive 2205 fps, with remarkably consistent velocities (+/- 5 fps). Acc. Arms 2520 is an excellent powder for the .35 Remington.

220 Speer FP: The Speer 220 grain flat point is the bullet to choose for those times that a little extra penetration is needed (black bear, wild boar, elk, etc.). 36.0 grains of H4895 underneath this bullet delivered very good accuracy and 2008 fps. This load makes me think of big, smelly, wild boar, and smile to myself...

Cast Bullets:

The .35 Remington is well-suited for bullet weighing 180 grains and up. Because of the pressures/velocities that the cartridge operates at, and because this is a Micro-Groove barrel, a GC is called for to make sure the bullet gets the best "grip" possible on those small lands and grooves. The bullets need to be flat-pointed, or bluntly round-nosed, to function safely in a tubular magazine. And they need to fall from the mould blocks slightly oversized so that they can be sized .359". Four were chosen for use in the .35 Remington levergun; two from LBT (the 180 WFN and 200 LFN), the RCBS 35-200-GCFP and the Saeco #352 (their 245 grain GCFP). Crimp-on Hornady gas-checks were used throughout.


The cast bullets used in the .35 Remington- the LBT 358-180-WFN, the LBT 358-200-LFN, the RCBS 35-200-FP, and the Saeco #352 (245 grain FPGC).

The LBT .358 180 WFN was originally designed as a revolver bullet, and is one of my favorites for the .357 Maximum. Loaded somewhat unconventionally, I thought it might also be suitable for the .35 Remington. When crimped in the crimp groove, this bullet will cycle just fine from the magazine, but will not chamber due to the extended bearing surface that this bullet has forward of the crimp groove (and the short throat of the Marlin). Ignoring the location of the crimp groove (and filling it with lube), and seating the bullet deep enough to crimp the case mouth lightly over the ogive (OAL = 2.170"), results in a cartridge profile that feeds just fine from the magazine when single loaded, but if multiple rounds were loaded in the magazine, there were problems with jamming (OAL was too short). Loaded on top of 40.0 grains of H335, this bullet delivered respectable accuracy, and a remarkable 2288 fps! But the feeding problems preclude this from being a useful hunting load in the Marlin levergun (although it might be a real peach in the Contender).

The LBT .358 200 LFN has much the same problem as the 180 WFN -- crimped in the crimp groove it will cycle, but not chamber. Seated deeper (OAL = 2.325") and crimped over the ogive, it chambers and cycles just fine (both singly and multiply loaded -- no jamming problems experienced). Seated thusly, only the crimp-on Hornady GC is below the bottom of the case neck. A case full of powder will prevent the bullet from being seated deeper by recoil while waiting in line in the tubular magazine. 38.0 grains of H335 delivered excellent accuracy at 2154 fps, and cycled just fine. A more modest load was 41.0 grains of H414 with this bullet (similarly loaded), which gave 1776 fps and good accuracy.

The folks at RCBS clearly had the .35 Remington in mind when they designed their 35-200-FP. When crimped in the crimp groove, the base of the GC come down even with the base of the neck. The OAL is 2.410" (maximum allowable OAL for the .35 Remington is 2.525"), and as a result, it cycles perfectly in the levergun. When loaded over 38.0 grains of H335, this fine bullet left the Marlin at an impressive 2184 fps and gave excellent accuracy (5 shots into an inch at 50 yards with buckhorn sights). This is an excellent all-round load for the .35 Remington. This load could easily turn into a personal favorite for the .35 Remington levergun.

The 1-16" twist of the Marlin should be able to easily handle bullets heavier than 200 grains. Saeco was also clearly thinking of the .35 Remington when the #352 (their 245 grain GCFP) bullet was on the drawing board. The OAL of the cartridge when loaded with this bullet is 2.510", meaning that it just sneaks in under the maximum allowable length of 2.525". As a result, it cycles and chambers just fine crimped in the crimp groove (which leaves only the GC exposed below the bottom of the case neck). Bullets drop out of my mould blocks at about .360", making them an excellent fit for a slightly oversized bore. The DuPont Handbook lists 31.0 grains of IMR 3031 as being a maximum load for a 250 grain jacketed bullet when loaded into the .35 Remington, so this was chosen as my starting point for the Saeco bullet (which weighs 241 grains checked and lubed when cast with WW alloy). This combination gave fine accuracy and 1906 fps. Similar excellent performance was turned in by 32.0 grains of Acc. Arms 2520 (1897 fps). These last loads are also candidates for personal favorite in the .35 levergun. I know I sure had fun spending a sunny afternoon bustin' basalt at 100-200 yards with them.

The bottom line is that while many powders work well in the .35 Remington, H335 and Acc. Arms 2520 are worth trying first; they're both winners.

Hunting with the .35 Remington:

The break-action single-shot T/C Contender allows the use of spitzer bullets. Also in the shorter barrels of the Contender, it's hard to beat H322 sparked with a Fed 215 primer, both in terms of velocity and accuracy, so these are my "go to" parameters for hunting loads with the T/C. The first deer I shot with the .35 Remington was a 3-point (western count) mule deer buck over in the basalt canyons lining the Snake River. I was hunting with the 200 grain Hornady spire point, loaded over 36.0 grains of H322. I don't recall the exact velocity, but it was a little over 1900 fps, and would group into about 1 1/2" at 100 yards. Anyway, I got a broadside shot opportunity at this buck, as he stood in the stubble of a harvested wheat field, about 50 yards from my position. The crosshairs dropped onto his left shoulder and the 200 grain Hornady sped across the stubble and hammered him. He went down hard, and it was clear that he was dying, but nonetheless he was struggling to regain his feet. A finisher in the neck was called for and applied. The 200 grain Hornady had broken both shoulders, center-punched both lungs, and just clipped the top of his heart. The damage through the lungs amounted to a .35 caliber hole through them, with a total of about 1 1/2" of bloodshot tissue. The exit wound in the far shoulder was almost an inch in diameter. It was pretty clear from examination of the wound channel that this bullet hadn't expanded much at all until it hit the bone of the far shoulder, by which point there were no more vital organs for it to work on. This bullet really was designed for higher velocities and seems to be just a little too hard for the .35 Remington. A softer bullet was called for.

Just such a bullet was released by Hornady a little while later, their 180 grain Single-Shot Pistol (SSP) bullet, made specifically for the .35 Remington Contender. A little load development revealed that this fine bullet loaded on top of 39.5 grains of H322 (and sparked with a Fed 215 primer) delivered 2100 fps and good accuracy. That next year, I was hunting those same canyons on the Snake River with this load. As I worked my way through the rimrock, I spooked a big-bodied 3x3 mulie buck up out of his hiding place, along with his harem of 4 girlfriends. As they stood up and started to trot away from me, down the hill towards the protection of a nearby brushy thicket, I planted the Hornady SSP high into his right side, just behind the last rib, angling forward and down. He simply hunched up, fell over and slid about 20 feet downhill. He very feebly kicked twice, and died. Examination of the wound channel revealed that the Hornady 180 SSP had expanded very nicely indeed. The liver was absolutely shredded, the left lung raked and bloodshot for most of its length, and the quarter-sized exit wound was found in the center of the left shoulder. The liver damage folded this guy up pretty quickly, his blood pressure went to zero almost instantly. Since that day on the Snake River, I have seen other mule deer bucks killed with the Hornady 180 SSP bullet and I continue to be impressed with its performance.


Author with Snake River mule deer buck taken with the .35 Remington.

I've heard the .35 denigrated for having a muzzle velocity of "only 2100 fps" and lots of bullet drop/drift at 300-400 yards. Usually, this criticism comes from some bright-eyed over-zealous newbie, citing chapter and verse from the latest ballistic tables, showcasing whatever golly-gee-whizbang magnum came out that week (eventually these kids usually learn that its more fun to learn how to hunt than it is to sit around a recite ballistics tables). The gun shop graybeards, you know, the ones whose hunting knives are worn down from years of gutting and re-sharpening, tend not to worry over such stuff. Experience taught them long ago that most hunting opportunities come inside of 150 yards and that success often depends on being able to respond quickly, accurately and forcefully. At 75-100 yards, wind drift and bullet drop can pretty much be ignored. What matters is marksmanship, shot selection, and bullet construction (mass, diameter and expansion behavior). These are things that don't tend to be found in ballistics tables. While the tabulated numbers tend to get overshadowed by the latest magnum du jour, the .35 Remington gives the hunter exactly the tools needed for the job. The rest is up to the hands holding the gun.

Glen E. Fryxell

The Varmint Revolver

By Glen E. Fryxell

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Mention varmint hunting, and likely the first tools that come to mind are heavy-barreled, scope-sighted rifles, chambered in some fast-stepping .22 centerfire. These thoughts are probably followed by images of sunburned prairie-dog towns shimmering in dusty mirage, or frost-breathing coyotes crunching through a late-winter snow. Some of you may be thinking of long-barreled shotguns, loaded with heavy charges of #4s, and the explosion of glossy black feathers as an incoming crow meets and ounce and half, airmailed special delivery. Others will think of their pet AR-15s, tracking the long floppy ears of a black-tailed jack rabbit as he shifts into overdrive, cutting a jagged path through the sage. Varmint hunting has many faces, and they are all enjoyable.

One of my favorite kinds of varmint hunting revolves around iron-sighted sixguns. The limitations of the sixgun and iron sights force me to still-hunt quietly and deliberately, in that special state of a hunter's heightened awareness, then to plan my stalk carefully to get within revolver range of yon sharp-eyed rodent. The revolver puts the adrenaline back into varmint hunting for me.

Much of my varmint hunting is done in the mountains of the Pacific Northwest, in pursuit of the Columbian ground squirrel (aka "greydigger"). These rotund little sun-worshippers move in behind the clear-cutting logging operations, and take over the stump fields, digging holes virtually everywhere there's soft dirt and green grass. They stand about 10" tall, and are easily identified due to their rusty orange feet and tail. They have a characteristic high-pitched bark (it's really more of a chirp), and after you've hunted them for a while, you get to where you get some feel for their mood just by the volume, pitch and frequency of their bark. They breed like, well, rodents; and within a couple of years even the largest stump fields will literally be covered with mounds, burrows and freshly excavated dirt.

Cartridges suitable for hunting greydiggers include virtually anything that goes "Bang!". While the timeless .22 Long Rifle has certainly claimed its fair share of these rodents, I don't generally use a .22 for the simple reason that at the distances greydiggers are typically taken (50-100 yards) the typical .22 revolver doesn't have a whole lot of "pop" left, and I've had too many wounded rodents have disappear down their holes. If the hunter is willing to stick with hyper-velocity HP's and restrict his shots to inside of 35-40 yards, then the .22 can make a decent showing for itself. The King of the Hill is for varmint hunting is the .357 Magnum -- velocity, accuracy, expansion, the .357 has it all. Other personal favorite include the .30 Carbine, .32 H&R, .38 Special, and of course the .44's and .45's.

Which sixguns work best for varmint hunting? Believe it or not, I've had some of my most fun varmint hunting with various 3" belly guns (this is a great way to develop real confidence with your carry gun), but not surprisingly longer barrels are a more effective hunting strategy. While the longer barrels do give higher velocity, they're still just revolvers (a long, long way behind the .22-250s and .220 Swifts); the real advantage of longer barreled sixguns is their longer sight radius relative to the shorter guns. Rodents are small targets, and precision sight alignment is critical if your shot is to find the mark (or should I say "find the bark"?). What follows is a short list of a few favorite varmint revolvers.

If there was ever a revolver that was made explicitly for the pursuit and perforation of rodents, it has to be the S&W Model 16. In 1989 S&W re-introduced their K-32, this time chambered for the .32 H&R Magnum cartridge instead of the .32 S&W Long, complete with a full-lug barrel and a Partridge front sight. The 6" and 8 3/8" version had target trigger and target hammer, while the 4" model had the semi-target hammer and the smooth combat trigger. Unfortunately, poor sales led the Model 16 to be dropped from the S&W line in 1992 (people just didn't realize how much fun these guns are!). I found a 6" Model 16 on the used market right after they were dropped from the S&W catalog and I've been absolutely tickled with it. It was very, very easy to name it "Sweet 16". Federal's factory ammo isn't terribly inspiring in terms of either accuracy or velocity, but boy does this gun ever take to handloads, especially cast bullet handloads! Any number of combinations provide very good results in this gun with jacketed, commercial hard-cast and homegrown cast bullets, but my favorite load is easily the Ideal 31133 HP (102 grain HP version of the classic 3118) over 6.5 grains of AA #7 for 1100 fps. This bullet expands nicely at this velocity is surprisingly flat-shooting and hit's a rodent like a baseball bat. Yes, the .32 H&R can be hot-rodded to more impressive ballistics, but in the end you've still got a pip-squeak rodent round, so why bother?


Ruger Old Model Blackhawk, 30 Carbine.

The Ruger .30 Carbine Blackhawk is another sixgun ideally suited to reach out and touch rodents. Ruger originally came out with this gun back in the late 1960s so the plinkers of the world could burn cheap GI surplus ammo in their dogged pursuit of the wily tin can. But what they really made was a near-perfect varmint revolver. Accurate, and flat-shooting in the extreme, with HP ammo in the 1500-1600 fps range this gun will flip rodents at surprising distances. Once again, my pet load for these guns involves a cast HP, this time the 313316 GC-SWC-HP (109 grains checked and lubed) over 13.0 grains of AA #9 for 1570 fps. This load is challenging the .357 for its title of King of the Hill, and performance-wise it is nothing short of incredible. The limiting factor in terms of range with this gun is the shooter's eyes and how well he can align the sights on a distant rodent; if you can get a good, clean sight picture, that rodent is toast!

The S&W K-38 Masterpiece is one of the classic revolvers of all time. Production of the K-38 started in 1899 with the .38 Long Colt, and the .38 Special round came along in 1902, giving the most reloaded cartridge in the United States over a century of service. In 1957 S&W re-named this gun the Model 14 (but I like the Masterpiece name better!). Virtually every permutation of this revolver has been built at one time or another, with various sight packages, barrel lengths ranging from 2" to 12", different grip styles, hammers, triggers, etc. I have done an awful lot of varmint and small game hunting with various 6" K-38's (and they remain my favorite all-round field plinking guns), but an 8 3/8" Model 14 followed me home from a gun-show one day, and has been given the specific job of ventilating vermin. Not surprisingly, this K-38 is quite accurate with most every reasonable load it gets fed (typical for the K-38 clan), and I've settled on the Lyman 358477 HP (140 grain HP) over 4.6 grains of Bullseye for a little over 1000 fps. To get good expansion from this bullet at this velocity, it needs to be cast from 20-1 alloy, but it makes a dandy rodent load, and is surprisingly flat-shooting for the "lowly" .38 Special.


Smith & Wesson Model 14.

The Top Gun in my assorted varmint revolvers is an 8 3/8" S&W 586 that was worked over by some mysterious gunsmith (but I think I know who it was Dave…). This gun is almost spooky in terms of its ability to acquire and hit rodential targets. This 586 gets fed several different pet loads while we're out in the varmint fields (and handles them all quite nicely) but my personal favorite is the Ideal 358439 (Elmer's first hollow point) over 14.0 grains of 2400 for 1350 fps. This load is exceptionally accurate and expansion of Elmer's HP is explosive to say the least! Varmint hunting with the .357 doesn't really require bullet expansion (an expanding bullet just adds spectacle) and the .357 does a dandy job even without it. Any good hardcast 150-160 grain bullet at 1300+ fps will peel a rodent off of his stump with alacrity. In this category, an excellent load is the 150 grain Lyman 358477 SWC over 14.5 grains of 2400, for just over 1500 fps. Remote rodent removal, reduced to a fine art!

Friend John Taffin likes to call the .44 Special a connoisseur's cartridge and I have to agree (even if I do have to look up how to spell it each time I quote him). I have had a fondness for The Special for many years now, and in large part this is due to the countless sunny afternoons that I've spent varmint hunting with one or another .44 Special in my hands. Over the years there have been several, and I've enjoyed shooting them all, but there is one that is particularly special to me; it was made for me by my good friend Dave Ewer; a stainless New Model Blackhawk, fitted with 7 ½" barrel, .430" throats, oversized front sight and a honey-suckle sweet action job. Dave has built several guns for me, but this was the one that really cemented our friendship. Oh, and by the way, did I mention that this ruggedly handsome .44 Special really shoots? I gave up doing any load development for this gun, because pretty much everything shoots well. For varmint hunting my favorite load is the 429421 HP (cast of 20:1 alloy) over 10.5 grains HS-6 for 1050 fps. When cast this soft (BHN about 8), expansion is positive at this velocity, and there's enough bullet mass to shoot through branches, roots, etc. to get to that wily rodent who thought he was hiding safely behind them. Another .44 Special load that I've been having fun with lately is the Saeco 200 grain truncated cone, loaded over 8.0 grains of Unique, for about 1000 fps from the long-barreled guns. This is one of my favorite field loads for the little S&W 696 3" .44 Special (about 925 fps). The .357 Magnum may be King of the Hill when it comes to varmint hunting, but the .44 Special owns the Hill.

The Granddaddy of the revolver rounds is, of course, the .45 Colt. The .45 Colt was swatting rodents in 1875 when my great-grandfather took the boat from Sweden to come to the United States, and it has been doing it ever since. In the velocity-crazed world of the modern shooting sports, the paper ballistics of the .45 Colt don't look to be all that impressive at first glance, but the Keith SWC at 1000 fps is perhaps the single most useful handgun round in existence. It combines adequate velocity with adequate bullet weight, and a whole bunch of meplat, and the end result is deadly all out of proportion with the neat little rows of tabulated energy figures. Performance in the varmint fields is exceptional. While the lead round nose bullets, or even the traditional round-nose flat-point bullet aren't the best killers in the world, the .45 caliber Keith SWC is one of the best varmint hunting bullets, period. I came across an 8 3/8" S&W Model 25-3 that I picked up specifically for summer varmint hunting. This gun also gets fed a wide variety of loads out in the field, but the one it shoots most is the H&G #501 (the re-creation of the original Keith SWC) over 8.5 grains of HP-38 for 990 fps and very satisfying accuracy. This is simply as good as varmint hunting gets with a non-expanding bullet.

Varmint hunting with a revolver is a challenging and most enjoyable way to spend a sunny, summer afternoon. Pretty much any caliber of sixgun can be put to work in the varmint fields, but the hunter is generally best served with the center fires and velocities of 1000 fps or better. The "well-dressed" varmint revolver usually has a long-barrel, providing additional velocity, but more importantly it gives the hunter a longer sight radius. In terms of cartridges, the .357 Magnum is a landmark against which all others are judged, but many other cartridges serve well in this capacity, most notably the .30 Carbine and the .32 H&R Magnum. If you get into an active rodent town, varmint hunting can entail LOTS of shooting, so cast bullets are an excellent way to go since they are both cheaper and gentler on barrel steel, and better yet, cast HP's are virtually perfect. The varmint revolver puts the adrenaline back in varmint hunting!

- Glen E. Fryxell

The .480 Ruger, in Perspective

By: Glen E. Fryxell

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The story goes that a grizzled old gunfighter of the Old West carried a Colt Single Action Army chambered in .45 Colt "'Cause Sam Colt didn't make a .46!". Well, the Ruger clan decided to go one better and made a .47 for us. In the spring of 2001 Sturm Ruger and Co. unveiled a new proprietary cartridge for their Super Redhawk Revolver. It was a slightly shortened version of the .475 Linebaugh, and was christened the .480 Ruger. A great deal of consternation immediately erupted around this cartridge. Many wondered why Ruger didn't go with a 5-shot cylinder, and others wanted lighter, faster bullets and some wanted a .50 caliber cartridge. Generally, the criticism came down to somebody always wanting more, whether pressure, velocity, or bullet diameter. The American mindset, it seems, is if 27 is good then 37 is better, no matter what the units, context or desired goals. Evaluation of a tool based on its own merits and unique abilities commonly gets overlooked, it's always "how does A compare to B?", which one is bigger, faster, or more powerful? (Never mind how the tenuous issue of "power" might be measured). Just load it to the red-line and go make a lot of noise about it.

480 Ruger Super Redhawk 7.5"

There were those that criticized the .480 Ruger as being nothing more than a over-blown, over-priced, over-hyped .44 Magnum since factory ammo delivered a 325 grain bullet at 1325 fps, something .44 Magnums have been doing since SSK introduced their sledgehammer cast bullets back in the 1980s. Arguments were raised that the .480 is of little value since the 454 Casull generates much higher velocities, and hence shoots flatter and hits with more kinetic energy than does the .480. Some wondered why, if Ruger was going to legitimize a new revolver round, why not just go with the known and respected .475 Linebaugh? And some defended the workman-like .45 Colt, which has been delivering a similar level of performance for years in strong, modern guns. Just like Disraeli's view of statistics, it's a question of how you choose to look at the issue. It's a question of perspective.

First, let's look at the gun. The barrel cylinder gap on mine measures between .003" and .004". Factory ammo starts off .502" in diameter and once fired cases come out of my gun at .509", revealing the working tolerances that Ruger has built into the chambers of this revolver. Throats are very uniform and measure .477", well-suited for .476" cast bullets. External cylinder walls are nice and thick at .100", with the locking notches offset so as not to create a weak spot in the chamber. In between the chambers the walls are only .040", clearly revealing that Ruger has worked out some very nifty new metallurgy to make this design work. Specifically, Ruger turned to Custom 465 stainless from Carpenter Technology, a premium-melted, martensitic, age-hardenable alloy, that was originally developed for aerospace components. This alloy, when appropriately heat-treated and peak aged is capable of 260,000 psi ultimate tensile strength, as well as high fracture toughness and excellent resistance to stress corrosion cracking. In short, this steel and heat treatment make the .480 Ruger possible in the Super Redhawk frame with a 6-shot cylinder. Continuing our examination of the gun, the grey non-reflective finish, though plain and somewhat homely, is a rugged and highly functional finish for big-game hunting. Let's get one thing straight, aesthetically I think the Super Redhawk is an ugly gun, always have, always will. It has all the grace and lines of a tire iron, but "pretty is as pretty shoots", and this revolver shoots very nicely indeed. After all, a tool should be evaluated based on it's performance, not how shiny and pretty it looks laying in its toolbox. The grips and grip frame are excellent, and distribute recoil very well. The .480 Ruger SRH is fitted with high visibility RR-WO sights. The DA trigger pull is heavy, but smooth (I would guess about 11 lbs). The SA trigger pull is typical for a factory gun at about 4 ½ lbs, but breaks with reasonable crispness. All in all, a solidly built, accurate sixgun, made with the big-game hunter in mind.

OK, now let's look at the round: the .480 Ruger has a magnum length case of 1.29" (i.e. the same as the .44 , .41 and .357 Magnums), with a nominal diameter of .504". Ruger, Hornady and SAAMI settled on a peak operating pressure of 48,000 psi. Factory ammo is loaded with a 325 grain .475" diameter bullet leaving a 7 ½" barrel at 1350 fps. At first blush, this bullet might seem a little on the light side for the .475 bore since we're used to thinking in terms of 420-440 grain slugs in the .475 Linebaugh, but keep in mind the standard bullet weight for the .44 is 240 grains, and standard weight for the .45 Colt is 255 grains, so following that progression would lead to a standard weight of 270 grains for the .480. The choice of 325 grains is a compromise weight to keep recoil manageable, while still providing big game capability. A lot of American handgunners have developed a certain level of comfort/mastery with the .44 Magnum, and so Ruger chose to keep factory ammo at roughly the same recoil level.

A lot of the criticism of the .480 Ruger cartridge seems to be aimed at the fact that it's not as powerful as the .475 Linebaugh. It's not, nor was it ever intended to be, nor does it really need to be. I think of this cartridge in a little different light. I view the .480 Ruger as being the .416 Rigby of the revolver world -- a large case, well-suited to moderate pressures, heavy bullets, and moderate velocities; not the absolute maximum that can be squeezed out of a holstered handgun, but rather a highly reliable big-bore sledgehammer. Coupled with 400 grain blunt-nosed bullets, this makes a hunter of the first water. Sure, in strong modern guns the .416 Rigby can be loaded up to modern pressure levels to make a .416 Weatherby, but the .416 Rigby can kill anything on this planet cleanly and it was intentionally loaded to moderate pressures to insure absolute reliability in the heat of the hunt. Likewise, the load data published by Hodgdon indicates that the .480 can be loaded up to a peak pressure of 48,000 psi to drive 405 grain cast bullets at nearly 1350 fps (http://www.hodgdon.com). But just like the .416 Rigby, the .480 Ruger is a formidable (and reliable) hunting weapon with 400 grain bullets loaded to more moderate pressures (35,000-40,000 psi). The value of moderate pressures for big game hunting loads has not diminished over the years, it's just that we don't hear much about it in this velocity-obsessed age of belted magnum mania.

The importance of bullet weight to penetration was demonstrated by John Linebaugh as a part of his Linebaugh Seminar held in Cody, Wyoming (http://www.sixgunner.com/linebaugh/penetration_test.htm **Editors Note: This link is currently unavailable**). In a nutshell, Linebaugh's results demonstrated once again that penetration of a non-expanding hard-cast bullet is a primarily a function of bullet momentum, which is the product of velocity times mass. In John Linebaugh's own words, "Velocity is constantly diminishing variable. Bullet weight is constant.", meaning for the hunter, penetration is a function of bullet weight first, and velocity second. This is a very simple and very valuable lesson when hunting large game with a revolver (the hunter of medium sized game, like deer and antelope, is probably better served with expanding bullets). Due to the space constraints imposed by a typical revolver's cylinder and the limited case capacity of revolver rounds, the heaviest bullets that can be effectively used in revolver hunting cartridges runs something like this:

44 Magnum	325 grains
45 Colt	350 grains
454 Casull	360 grains

Therefore, in order to keep bullet length short enough to comfortably fit inside a standard length revolver cylinder, and still leave enough room for powder to operate at reasonable pressure levels, it is necessary to go to bullet diameters larger than .45 to get over 400 grains of bullet metal comfortably into a revolver cartridge.

As is apparent from the Linebaugh data, a 400 grain .475" bullet at 1100 fps should provide very similar penetration to the heaviest 454 Casull load (360 grains), and considerably more than the popular high velocity 300 grain 454 Casull loads. Weight (more accurately momentum) contributes penetration depth, while the nature of the wound channel is a function of the meplat. The LBT .475 400 WFN, RCBS 475 400 grain SWC, Lee 475 400 grain FP, and NEI 475 TC (a shortened version of #357 with only 2 grease grooves, very reminiscent of the SSK designs), mould designs all combine these attributes very effectively.


Variety of cast bullets for the 480 Ruger

Hodgdon's loading data for the .480 Ruger (http://www.hodgdon.com) indicates that 405 grain cast bullets can achieve velocities in excess of 1300 fps from a 7 1/2" SRH and still stay within SAAMI pressure guidelines. I believe that the test gun used by Hodgdon was a "fast gun" as I haven't been able to reproduce their velocities with any given powder charge.

Discussions with Taffin and several other .480 shooters suggest that my revolver is typical, and falls in line with their experiences. Load From a Disc calculations suggest that a 400 grain bullet at 1100 fps corresponds to a peak pressure of about 35,000 psi when paired with an "ideal" powder, and is in agreement that a 325 grain at 1325 fps corresponds to Hodgdon's measured peak pressure. Thus, I chose to target 400 grain cast bullets at 1100 fps for routine use in the .480 Ruger. In my gun, factory ammo provides case expansion of .509" and somewhat sticky extraction, the 1100 fps loads listed below give .508" case expansion (or less) and eject effortlessly, providing some element of corroboration to the theoretical predictions.

I started out by sighting the Super Redhawk in with Hornady factory ammo. Accuracy was good and the velocities were right up to the advertised numbers. Temperatures were in the upper 90s and extraction was sticky, as might be expected for 48,000 psi loads with .007" chamber clearances. After the sights were lined up, the remainder of the factory stuff was burned up in a geomorphologic fracture analysis on the native basalt phases of eastern Washington. Let me tell you what, the .480 Ruger is a rock-buster extraordinaire! Several chunks of basalt the size of a big Idaho spud simply vanished in a cloud of dust. Larger pieces didn't stay that way long. Good stuff!

Bullets were cast from WW alloy with 2% added tin, they were air-cooled for a hardness of about 11-12 BHN. These bullets were all around 400 grains as cast (ranging from 392 to 409 grains depending on design). They were sized .476" and lubed with homemade Moly lube (1:1 Moly grease and beeswax). Accuracy tests were also performed using bullets that were water-quenched with this same alloy (BHN 16-18), but there was no advantage gained by doing this and so water quenching was dropped. No problems with leading were encountered with any of the loads tested.

Load evaluation started off with the LBT 400 grain WFN over 20.0 grains of IMR 4227 and a CCI 350 primer. Recoil was surprisingly mild and accuracy was good. Somewhat surprisingly, this load shot to the same point of impact as the 325 grain factory ammo at 25 yards. It was also quite flat shooting, hitting point of aim at approximately 125 yards when sighted in for 25. Velocity was just under 1000 fps. Loads were worked up from there, monitoring case expansion and extraction. Extraction was effortless with all loads listed. Most of the loads listed below delivered 5-shot groups in the 1 1/2" to 2" range at 25 yards.

Winchester 296 turned in its usual stellar performance, as did its cousin H110. IMR 4227 is also an excellent powder for the .480 Ruger. AA 1680 turned in a surprisingly poor performance. I expected AA 1680 would be nearly ideal when paired with 400 grain bullets, but for whatever reason this wasn't the case. As charges were increased, velocities came up to about 1000 fps and then leveled off. Accuracy was generally marginal, until charges reached about 25.0 grains (where groups tightened considerably), but then velocities started going back down. The most accurate load tested was the Lee FP over 21.0 grains of Winchester 296, and for these 400 grain cast bullets in general, 21.0 grains of W296 was the most accurate powder charge.

For those who don't cast their own, both the Lee and RCBS 400 grain cast bullets are available from Western Bullet Co. Other cast bullets suitable for the .480 Ruger are also available from Beartooth Bullets (http://beartoothbullets.com/index.htm), Cast Performance Bullet Co. (http://www.castperformance.com), Hunters Supply (http://www.hunters-supply.com), Liberty Shooting Supplies (http://www.libertyshootingsupplies.com) and TrueShot Bullets from Oregon Trail Bullet Co.

Loading data for the .480 Ruger
7.5 Inch Ruger Redhawk
CCI 350 Primer
Starline Brass

NEI 475-370-PB (#357) - 392 grain WW + 2% tin
meplat = .310", crimp to meplat = .450"

Powder	Charge	Velocity	Comments
H110	21.0	1103	Accurate
W296	21.0	1089	Accurate
IMR 4227	22.0	1045	Accurate
AA 1680	25.0	974	Accurate

400 Lee FP - 398 grain WW + 2% tin
meplat = .340", crimp to meplat = .390"

Powder	Charge	Velocity	Comments
H110	21.0	1108	Accurate
W296	21.0	1114	Very Accurate
IMR 4227	22.0	1009	Accurate
AA 1680	24.5	1001	mediocre

400 LBT WFN - 406 grain WW +2% tin
meplat = .380", crimp to meplat = .380"

Powder	Charge	Velocity	Comments
H110	21.0	1103	Accurate
W296	21.0	1126	Accurate
IMR 4227	22.0	1075	Good load
AA 1680	25.0	1042	Mild Pressures

400 RCBS SWC - 409 grain WW + 2% tin
meplat = .325", crimp to meplat = .430"

Powder	Charge	Velocity	Comments
H110	21.0	1109	Accurate
W296	21.0	1112	Accurate
IMR 4227	22.0	1090	Accurate
AA 1680	24.5	1029	OK

I took the LBT 400 grain WFN load elk hunting in the high country of central Utah. The tag in my pocket allowed me to take a spike bull. We were camped out on the flats at about 6,500 feet elevation, and climbed up to about 10,000 feet to hunt -- first half with the trucks, second half with our legs. I got "up close and personal" with elk on the second day of the hunt. I had worked my way to the edge of some heavy timber overlooking a bowl that was lined with the brilliant yellows and whites of an aspen thicket. A herd of about 25 elk busted noisily out of the thick stuff above me and to my right, slowed to a walk upon entering the bowl, and walked single file in front of me, at about 25 yards; an absolute textbook opportunity for a hunter with an iron-sighted revolver! The only problem was, there wasn't a single antler in the entire bunch! All cows and calves. The only spike we saw came two days later when he did a remarkable impersonation of an antelope, sprinting full-tilt with a herd of about a dozen cows or so, a half mile out across the sage flats, heading towards a really nasty bunch of virtually inaccessible canyons. We found elk every day, it's just that everything else we saw were either branch-antlered bulls, cows or calves. That's why they call it "hunting".

Loaded with 400 grain bullets at 1100 fps and 35,000 PSI, the .480 Ruger can provide all of the penetration that a handgun hunter is likely to ever need, and in fact it can match or surpass the optimum heavyweight performance of the vaunted 454 Casull. This hardly qualifies the .480 Ruger as "just another .44 Mag". However, just because SAAMI decided on a 48,000 PSI ceiling doesn't mean I have to spend my time dangling from it, especially not with cylinder walls that are only .040" thick (even if they are some golly-gee-whiz-bang new alloy). For non-dangerous game applications, there is no need for the .480 Ruger to be loaded to 48,000 PSI, it just needs to be loaded with the right bullet to deliver all that it is capable of. A 400 grain flat-pointed cast bullet is just such a bullet, and the four bullets tested herein will all serve admirably. No, recoil is no longer in the .44 Magnum class, but it's far from punishing. Penetration does not come without recoil. If this maxim offends your sensibilities, get over it.

To my way of thinking, THIS is the niche for the .480 Ruger -- a mass-production revolver that provides superior penetration, similar to the custom revolver heavy hitters (like the .475 Linebaugh) at moderate pressures, with bullet weights that the .44 Magnum and 454 Casull simply cannot handle. While it's understandable why the factory chose a 325 grain bullet, it is noteworthy that the component manufacturers (Hornady, Speer, RCBS, Lee, etc.) quickly tooled up to provide 400 grain bullets for .480 shooters. That the factories have chosen to limit .480 Ruger factory ammo with a 325 grain bullet concerns me not in the least, as I probably won't hunt with factory ammo in this gun. Not that there's one thing wrong with the factory offering, it's fine ammo, it's just that if I want to hunt with 325 grain bullets, I'm more likely to grab a .44 or a .45. My interest in the .480 centers around heavier bullets. This revolver was destined to shoot 400 grain cast bullet handloads from the very beginning. Just as the .44 Magnum has been described as being the .30-06 of the handgun world, so the .480 Ruger finds its niche as the .416 Rigby of the revolver world.

- Glen E. Fryxell

The Preacher's Gun

Smith & Wesson 32-20 M&P

By: Glen E. Fryxell

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Make no mistake, the Preacher's little fixed sight revolver is one sweet little sixshooter. It may be 70+ years old, but it's been well cared for and well-oiled, without a trace of rust or pitting. The chambers, throats and bore are as shiny as the day it left Springfield back in the 1930s. The grips are in fine condition and the case colors on the hammer and trigger are still bright. From a different time, this 5" S&W Model 1905 (4th change) chambered in .32-20 is a gentleman's sixgun. It's the Preacher's gun.

It belonged to a minister down in Texas who spent his time sharing his love of the Bible and his love of handgun hunting throughout the course of his long life. Eventually, the time came when it was necessary for him to start selling off his guns, and I happened to hear about the sale early on. Having enjoyed Hal Swiggett's gun-writing for decades, and appreciating his simple, honest, folksy style, I felt that this would be a way of preserving a little piece of his legacy, as well as adding something very special to my gun safe. There was no hesitation, the purchase was made.

The Preachers Gun - Glen's (Hal Swigget's) 5" 32-20 Smith & Wesson Military & Police (M&P)

Besides, there's something special about a vintage (blued) S&W with a 5" barrel, it just looks, well, *special*.

The revolver showed up at my local gun-shop, well-wrapped and in the condition promised. While waiting for the gun to be shipped from Texas, I had picked up brass and dies, and cast up some bullets for testing/load development. At some point in the past, some unknown gunsmith had done an "action job" on this gun and had taken just a touch too much metal off the double-action sear (fly), so the trigger would hang up halfway through the double-action cycle (as the trigger transferred from the fly to the hammer). A little judicious welding and re-shaping of the double-action fly by my good friend Dave Ewer cured this little problem. Single-action operation of the revolver was fine.

The S&W .32-20 Hand Ejector Model of 1905 (4th change) was made from 1915-1940, with almost 79,000 guns made. Heat treating of the cylinders began with serial number 81287 (sometime around 1920). They were available with 4", 5" and 6" barrels. An adjustable sight target version was also offered. This gun is in the 137,xxx serial number range, putting production sometime in the mid-1930s. The serial numbers on the butt of the grip frame, the cylinder and the barrel all match, just as they should.

Loading this fine old revolver with anything other than cast bullets would just give me the heebie-jeebies. And while it does have a heat treated cylinder, it still seems prudent to keep pressures at or below 16,000 CUP and velocities at or below 1000 fps. If I want to push these bullets faster, then I'll grab a Ruger Blackhawk in .30 Carbine and make these little lead pills really scream. The Preacher's gun is intended for a more relaxed kind of shooting. Like the kind where folks used to gather at the gravel pit on the edge of town for some Sunday afternoon plinking before they headed back to Church for a pot-luck dinner. The kind where friendly challenges were placed by neighbors and business associates as to who would be the first to hit yonder tin can. The kind where young boys were amazed by the shooting prowess of the town's men-folk, and would vow that one day they would grow up to be men that could shoot like that. Shooting as a wholesome, social, Sunday afternoon activity. The kind of shooting that helped to knit strong communities that in turn made America strong. We are losing this flavor of shooting today. The shooting sports are getting pushed out of the mainstream and forced out of sight, into cramped indoor shooting ranges. The only way that we're going to get this flavor of shooting back is to make it happen ourselves -- invite some of the members of your congregation to go plinking after church this Sunday. Or take a break from mowing the lawn and challenge your neighbor to a friendly bullseye match some Saturday afternoon. Or recruit a co-worker to go play "roll the can" after work. Let's make shooting a social activity again. That's the kind of shooting that the Preacher's gun is ideal for.

Bullets:

The 311008 is both the logical and historically correct place to start for the .32-20 cartridge, along with the Ideal 31133 HP, and the gas-checked Lyman 311316 SWC and HP. One of my favorite .32 revolver bullets is the Cramer #52D, a very accurate 93 grain SWC with a wide, flat meplat. Also in the line-up was a Cramer #52F, a pointier 93 grain SWC, a custom 100 grain .32 Keith-style SWC made by Mountain Molds, along with an LBT 85-grain .32 SFN (short, flat nose). RCBS rounds out the line up with their fine little 85 grain Cowboy bullet and their utilitarian 98 grain SWC.

Powders suitable for the .32-20 include the medium to fast pistol powders (HS-7 to Red Dot). I'm a big fan of HS-6 for revolver loads in the 900-1000 fps range, so that was my starting point. SR 7625 has been singled out as an excellent powder for the .32-20, and of course "Old Reliable" Unique was also tested, as were Red Dot, HP-38, Bullseye and HS-7. Long story short -- with these bullets sized .312", these various loads ALL shot well above point of aim (6-8"), and ALL grouped VERY poorly. While there was no serious leading observed in the barrel, there were clear indications of bullet yaw in the targets, and occasional keyholes. Clearly, something just wasn't right...

.314" Bullets:

It was then that I actually bothered to make some measurements. There was no major leading observed when using the .312" bullets (a little around the forcing cone, but nothing serious), so my initial read on the situation was that the bullets weren‘t grossly undersized for the bore. The throats were a different story however. Measuring the throats revealed diameters over .314" and as much as .315". The poor accuracy and key-holing seems to be due to .312" bullets getting misaligned in a .314-.315” throat prior to entering the forcing cone. A .314" sizer die was ordered forthwith. Next, the various bullets were measured in their as-cast condition, and it was found that the Lyman 311008 fell from the blocks at .312” and therefore was probably not going to work in this particular revolver (sad, because this is the proper bullet for the .32-20, historically speaking). The Cramer #52D (93 grain SWC), RCBS Cowboy bullet, LBT 85 grain SFN and the Lyman 311316 GC-SWC were found to drop bullets that were .314” or larger, and therefore were suitable for these subsequent tests. Unfortunately, my 31133 HP and 311316 HP moulds were found to make bullets in the .312-.313” range, so they had to be put on the back burner for a while (’tis a pity, because the older Ideal Handbooks show some very interesting handgun loads for the 31133 HP in the .32-20 revolver).

Accuracy tests were repeated with .314” bullets, starting with the 93 grain Cramer SWC (#52D) and 6.5 HS-6, along with 4.5 grains of SR 7625 (this time sparked with a CCI 550 primer), and 4.0 grains of HP-38 (Fed 100). The HS-6 load was first. The first shot from a clean barrel fell about 1” below point of aim, and the next 4 shots grouped into 1”, about an inch to the right of point of aim. Velocities averaged 1001 fps (it is interesting to note that the velocity was similar to this load with the .312" bullets, but the point of impact was notably different). The SR 7625 (944 fps) and HP-38 (929 fps) loads also printed just to the right of the point of aim, and grouped much better than the .312” loads had, but not quite as tightly as the HS-6 load. All of these bullet holes were nice and round (no more keyholes!). This is what the Preacher's gun wants!

The Cramer #52D was also loaded over 4.5 grains of Unique and gave 961 fps, but with marginal accuracy (3”). This result surprised me as this bullet worked well with HS-6, and Unique is such a reliable performer in moderate pressure revolver loads.

Accuracy tests were repeated with the various other cast bullets sized to .314“. The Lyman 311316 GC-SWC loaded over 6.5 grains HS-6 (CCI 550) was too warm and gave sticky extraction. It was necessary to reduce this load to 6.0 grains for regular use, where it settled in and grouped well. Loads with other powders that delivered less than 900 fps with this bullet gave poor accuracy.

The 85 grain RCBS Cowboy bullet (which drops from my mould at almost .316”) was loaded over 4.0 grains of HP-38 and 4.5 grains of Unique (Fed 100). The HP-38 load (872 fps) showed some real promise, but tended to throw flyers up high (these flyers were the low velocity rounds). 4.5 grains of Unique produced 898 fps showed the same tendency to throw vertical flyers. Increasing these loads slightly to get velocities up around 950 fps or so may well tighten things up.

The 85 grain LBT SFN (short, flat nose) was loaded over 4.0 grains of HP-38. This load produced 882 fps and also produced poor accuracy. To be fair, this short bullet was intended for use in the .32 ACP and wasn’t really designed for a revolver with oversized throats and a relatively large capacity case.

The way things are shaping up, HS-6 seems to be the powder to beat for the 93 grain and 115 grain bullets. The lighter, oversized RCBS cowboy bullet looks to have some promise as well with faster powders.

.315" bullets:

Given the marked improvement of the .314" bullets over the .312" bullets, I decided to try .315" bullets to see if they were any better. So, I got another .314" sizer die and polished it out to .315". I was lucky enough to find a 3-cavity Cramer 52F mould for a 93 grain SWC that dropped bullets right at .315". These bullets were used for these tests, as well as a few of the larger bullets mentioned above. Bottom line? .315" bullets didn't shoot any more accurately than .314" bullets, and in fact, they were generally much worse (at least the holes were all round this time, no keyholes).

The recipe for success for this fine old S&W is: cast bullets, sized .314", loaded over a suitable charge of HS-6 (6.5 grains for the lighter bullets, 6.0 grains for the heavier), sparked with a small pistol magnum primer, with velocities of at least 900 fps and no more than 1000 fps. So loaded, this fine old revolver groups well, and shoots to the sights. Thus endeth today's lesson.

I got the opportunity to take the Preacher’s Gun out varmint hunting with my good friend Rob Applegate. I was using cast bullets loads as described above and was pleased with how accurate the little gun was, and pleasantly surprised with how flat it shot out to extended ranges (I took shots out to 100 yards or so). Both the Cramer 52D and the Lyman 311316 made a good showing for themselves on these skittish little rodents. We spent a sunny summer morning walking through the mountains stalking, shooting, laughing and just generally having a good time with some fine old Smith & Wesson's and cast bullets. Folks, it doesn’t get much better than that!

We just had the latest of our Pacific Northwest Sixgunner gatherings this last weekend, in which 15 or 20 of us got together for a weekend camping trip in the Ochocos Mountains of central Oregon. This is a gathering of friends from around the Pacific Northwest that gets together each summer for a weekend of friends, family, shooting and lots of food (wild pork sausage and eggs, buffalo burgers, black-tail venison chops, homemade salsa and chips, some top-notch sirloins, and more -- yum!)! This gathering is a fine example of plinking as a social activity, and has become an annual tradition that we‘ve had going for a number of years now (inspired by Taffin‘s writings of his Shootists‘ Holiday). This year we had a number of very interesting guns show up (S&W #3 .44 Russian, a Registered Magnum, a pre-war .38/.44 Outdoorsman, as well as more modern and various custom guns), and we spent a lot of time plinking at pine cones up close, and rocks out on yonder hillside. The Preacher’s gun was shared with the other shooters, and each appreciated this little gun, it‘s history, condition, and how well it shot.

Vaya con Dios Padre. Thank you for all the lessons you’ve taught me over the years. I have really enjoyed your writing. I’m going to invite some more friends to go plinking this weekend. We're going to take your lovely old M&P out again and go burn a little HS-6...

- Glen E. Fryxell

Herter's .401 PowerMag

By: Glen E. Fryxell
Photography by Glen E. Fryxell

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America has had an on-again, off-again fondness for the .40 caliber handgun. Every so often there has been a surge in popularity of a given .40 caliber cartridge or gun, then the surge subsides. A while later, there is another .40 caliber surge, which eventually tapers off once again. The .22, .38, .44 and .45 calibers hold steady appeal, day in, day out, but the .40 seems to come and go like the changing tides. This is the story of one such handgun; one very useful handgun cartridge, housed in one homely handgun.

The sixgun arrived at my local gun shop, well-wrapped and nicely oiled. Well, nicely oiled on the *outside*, the inside of this particular revolver hadn't seen a cleaning brush, cleaning solvent or lubrication in quite some time. After filling out the obligatory paperwork, I took it home and cleaned the gobs of powder fouling out of the ratchet and cylinder, and then brushed out heavy streaks of lead from the bore. The ammo that came with this Herter's .401 PowerMag revolver was loaded with cast bullets loaded on top of stiff charges of Unique. Hmmm, maybe this was a clue as to where those lead deposits came from (Unique is a wonderful cast bullet powder for loads in the 15,000-18,000 psi range, but not so good for magnum level pressures, especially with plain-based cast bullets).

While this revolver had been in transit, I had done a little sleuthing and found several boxes of factory new .401 brass, reloading dies and a suitable holster. I already had the moulds. OK, time for a little confession: the reason I "needed" to buy a .401 Herter's Powermag revolver was because some time ago I had bought an Ideal 40388 HP mould, and it needed a straight-cased .40 caliber magnum revolver to serve it up properly. Other moulds for the 10mm, .40-50 Sharps Straight and Gordon Boser's Ideal #401452 would also serve nicely. The stage was set.

The obvious ballistic origins of the .401 Herter's Powermag can be traced back to 1873 and the .38-40 Winchester (prior to this the only handgun cartridge with a bullet of similar diameter was the anemic .41 Rimfire, which had a reputation for bouncing off anything harder than the soft underbelly of a cheating card-sharp). The .38-40 was loaded with 200 grain .403" diameter lead flat nose bullets to around 1000 fps. However, with the introduction of smokeless powders, all of the .38-40's case capacity wasn't needed and that delicate, bottle-necked case (and its poor fit in the loosely cut chambers of the early black powder guns) was starting to be seen as a real detriment. However, the ballistics delivered by the .38-40 cartridge were widely heralded as superb. What was needed was a stronger straight case that would fit snugly in precisely cut straight chambers, and deliver the same 200 grain bullet at the same, or better, velocities. The underpowered .41 Long Colt (1877) didn't cut it as a result of accuracy problems stemming from its undersized heel bullet. In 1924, Joplin, Missouri gunsmith "Pop" Eimer cut down some .401

Winchester Self-Loading cases to 1.25" for use in a Colt Single-Action Army (some reports say the case was based on the .30-40 Krag, but the net result is basically the same). He fit his revolver with a .403" .38-40 barrel and manufactured a custom cylinder for his wildcat. This round became known as the .40 Eimer Special (but one also occasionally finds it referred to as the .400 Eimer, or the .401 Eimer). Now keep in mind that this was before slow pistol powders were introduced (2400 didn't come out until 1933), and so the combination of faster powders and 1920s vintage steels meant that velocities were limited to about 1100 fps. Later, in the 1930s, Gordon C. Boser (of Springville, NY) revisited this concept with a very similar project based on the .401 WSL case cut to similar length, thereby creating the Boser .401 Special. Boser's project came about *after* the introduction of 2400 (and the revelations of Elmer Keith's and Phil Sharpe's high pressure loads), and he made good use of it. Boser's goal was to get more power out of the Colt SAA than could be safely done with the .44 Special (smaller cartridge diameter meant thicker cylinder walls, which could safely contain higher pressures). While the .401 Special could be comfortably (and functionally) loaded in the 1000 fps ballpark, the slow progressive burning curve of 2400 gave it the horsepower needed to deliver 1400 fps safely. Boser's work with the .401 Special ultimately led him to design the 195 grain Lyman/Ideal 401452 SWC for his wildcat, and his favorite load was reported to be 17.5 grains of 2400 for 1400+ fps. As we shall see, this combination is still a good one.

With the introduction of the .44 Magnum in the 1950s, America's case of "Magnumitis", festering since the late 1930s, suddenly erupted. Elmer Keith and Bill Jordan were asking the manufacturers to come out with a .40 caliber service revolver that was capable of reproducing the original .38-40 ballistics, except with a strong, modern, straight-case design. George Herter saw an opportunity for a wildcat that he had been playing with since the before the War, and in 1961 (3 years before the .41 Magnum was unveiled) he introduced the "Herter's Famous Custom Grade Super .401 PowerMag Revolver". The cartridge was a .40 caliber magnum, housed in a 1.275" case, loaded to magnum level ballistics.

The stock Herter's .401 Powermag revolver.

Herter's did not actually manufacture the .401 Powermag revolver; rather they contracted with J. P. Sauer & Sohn to make it for them (using the same basic pattern as the adjustable sight Hawes Chief Marshall). The precision of German engineering is world renowned, and that reputation is supported in this well-made revolver. Features on this gun include: recessed cylinder chambers, frame-mounted firing pin, no hammer block, a 6.5" barrel, a very crisp trigger, tight cylinder lock-up, a lower (and checkered) hammer spur for easier cocking, and a cylinder gap that is both square and tight (.0035"). The bore slugs out at .403", and the rifling makes just under half a turn in 6.5" of barrel, so the twist is somewhere around 1 in 14". Loaded ammo mics .424" and fired cases come out of the gun at .431", revealing chamber tolerances of around .007" (not unusual for a production revolver). Alongside the proof markings on the side of the barrel is the number "65", and since this gun was only made from about 1961 to 1971, this is presumably the year of manufacture. Aesthetically, the gun itself is homely, with the oversized grip frame, cheap black plastic grips and unusually high sights (the extra tall front sight can make it difficult to fit this gun in a holster), but mechanically it's a well-made gun.

The .401 Herter's PowerMag seems to have elicited a collective yawn from the popular gun press upon its introduction in 1961, as there was no mention of either the gun or the cartridge in Gun Digest or the American Rifleman during the early 1960s. There was a lot of ink spread over the .256 Winchester, .22 Remington Jet and the .41 Magnum during this timeframe, but the black sheep .401 Powermag was cut from the herd and left to forage on its own. This is rather odd, given that the cartridge was basically what Elmer Keith and Bill Jordan were pestering the manufacturers for. It seems that Herter's was *corporata non grata* in the mainstream gun press at the time (later, Herter's Powermag revolvers were briefly listed in Gun Digest from 1969-1971).

This silence, however, was countered by the classic, "over-the-top" ad copy in the Herter's catalog...

> *"The fabulous .401 Powermag... is the ideal large caliber revolver cartridge. Will kill any animal on the face of the earth, or shoot through the cylinder block of any automobile. It will flatten any human, no matter where you hit him... This is the finest big game or law enforcement revolver... With this revolver you can hunt deer, and all North American and African game...".*

Wow! How could one possibly say no to a revolver/cartridge like that? Especially for only $47?

A Field Test in the March 1966 issue of *Gun World* entitled "Herter's .401 PowerMag" (which was excerpted in the 1968 Herter's catalog), reported, "As for the Herter's Famous Custom Grade Super .401 Powermag Revolver, it represents a rare money's worth in terms of ruggedness of construction and in sheer power per dollar invested.

In the May 1968 issue of ***Guns** and Hunting* Larry Sterett was impressed with the .401 Herter's Powermag, and reported, "I doubt that you can buy a more rugged or better-made Magnum at anywhere near $47." He went on to praise the design, the tight tolerances, the hand polished finish and crisp trigger. Good accuracy, and velocities of 1400-1500 fps, were obtained with choice handloads. Sterett also published a piece on handloading the .401 Powermag in the 4th edition of *Handloader's Digest.*

The Gun Control Act of 1968 put a serious crimp on Herter's mail-order firearms business, and this praise amounted to "too little, too late" to save Herter's handgun sales. The .401 Powermag revolver was dropped from production around 1971.

Outside of Sterett's 1968 piece in the 4th edition of *Handloader's Digest*, there's not a whole lot of loading data out there for the .401 Powermag, and aside from Boser's pet load of Ideal #401452 over 17.5 grains of 2400, what one does find tends to focus on faster powers like Unique to obtain magnum level velocities. The loading data published in George Herter's "Professional Loading of Rifle Pistol and Shotgun Cartridges" only gives data for Unique, 5066 and Bullseye, with claimed peak pressures of about 27,000-30,000 CUP (the pressure data in the Herter's manual for the most part appears to be reasonable, but in places it is decidedly questionable, and seems to be tailored to promote Herter's products over their competition; for example in the .357 Magnum, loads with light charges of fast pistol powders using 135-158 grain bullets in the 520 to 850 fps range are listed as generating pressures from 22,000 CUP to over 43,000 CUP, which is clearly ridiculous; the same loads in .38 Special cases are shown as generating 11,000-13,000 CUP; I believe that the .357 Magnum was denigrated in an effort to showcase the .401 Powermag, the pressures reported for the .401 may be on the low side for similar reasons). I prefer to use slower powders for magnum level pressures, but loading data for the .401 Powermag using some of today's slower powders is lacking. So it was time to start working up loading data.

Dummy rounds were prepared by loading up the 40388 HP (165 grains) into an empty .401 Herter's Powermag case. Weighing it empty, then filling it with water from a syringe (through the flash hole) and re-weighing revealed a case capacity of 22.8 grains of water. A similar exercise with a 208 grain cast bullet revealed a case capacity of 21.3 grains of water. Choosing a pressure ceiling of 35,000 psi (typical for magnum revolvers) and ignoring the suggested powder charges, "Load From a Disc" calculations suggested that the 165 grain bullet could be driven to about 1600 fps at 35,000 psi, while the 208 grain bullet can be driven 1400 fps. A similar exercise with the 240 grain Lyman 403169 suggested that 1200 was a reasonable velocity goal. Likewise with the 270 grain Rapine bullet suggested that a little over 1100 fps should be achievable within these pressure limits. Not surprisingly, this is similar to the level of performance of the .41Magnum with similar weight bullets and suitable powders in long barreled revolvers.

Previous experience has shown that load density in magnum revolver rounds can be correlated to water capacity. Since Winchester 296 has a bulk density of 0.955, and since W296 performs at its best in case-filling loads, a sensible starting point for working up loads in a magnum revolver round such as this (i.e. a 1.28" case operating at 30,000+ psi, this analysis does not apply to longer, or bottlenecked, cases!) is at 95% of the water case capacity to fill the case to the bottom of the bullet (remember, we are admonished not to use W296 in reduced loads; also keep in mind that experience has shown that maximum loads for W296 are commonly as much as 105% of water capacity, making the 95% approach suitably conservative). This analysis suggests starting with 21.7 grains of W296 for the 165 grain HP and working up. Similarly for the 208 grain cast bullet, a suggested starting point of 20.2 grains of W296 is arrived at. Cross-checking these suggested starting loads by comparison with published load data for the dimensionally similar .41 Magnum reveals that 170 grain jacketed bullets have maximums at about 24.0 grains of W296, while the 210 grain bullets have maximums at 21.0-22.6 grains of W296. Thus, these suggested starting points were deemed appropriate, and loads were worked up from there. None of the loads reported herein showed any signs of excessive pressure.

Bullets were cast from WW alloy, sweetened with about 1-2% tin. Given the fact that the throats on this revolver measure about .405" and the groove diameter slugs out at .403", and since most of these bullets fell from the blocks between .403" and .405", bullets were lubed in a .405" sizer die, leaving them essentially unsized and giving them the best possible fit to the throats. Homemade Moly lube (equal parts by weight beeswax and Stay-Lube Extreme Pressure Moly-Graf grease) was used throughout.

5 cast pistol bullets used in these tests.

5 cast rifle bullets used in these tests.

401 dies and the 10mm carbide dies.

Reloading dies for the .401 Powermag cartridge are available from C-H/4D Tool and Die Co. (http://www.ch4d.com). I got a set (new, but definitely old stock) from Vega Tool Co. (http://www.vegatool.com/index.html). This die set turned out to be from the original run of .401 Herter's carbide dies, made by C-H/4D, to Herter's specs. In this original run of carbide dies the carbide sizer ring was spec'd out too small by Herter's and seriously damaged the cartridge case during sizing. I contacted C-H/4D about this, and the nice folks there very promptly returned my e-mail (well after midnight, no less!) and offered to replace the defective Herter's sizer die with a tool steel die made to proper dimensions. A short time later, I had beautiful new .401 Herter's sizer die made to the proper dimensions (even though the original had been made to their customer's specs). I'm not sure when this set of dies was originally made, but seeing as the oil on them had long since hardened into a varnish, it was likely a LONG time ago (quite conceivably 40+ years ago). Now that's good customer service! Thanks C-H/4D!

I also tried some experiments using my .40 S&W/10mm dies to reload the .401 Powermag. The carbide sizing die and flaring die worked like a charm, however seating could be a bit of a problem with oversized cast bullets. The 10mm dies were designed for .400-.401" bullets, and the larger bullets sometimes got hung up in the taper crimp portion of the die, causing difficulties in the seating operation. There were no problems with the Lyman TC in the 10mm dies (and taper crimping was found to be sufficient to prevent this bullet from inching forward during recoil).

The Ideal 40388 HP was the reason that I got into this project in the first place, and it didn't disappoint. This 165 grain HP-SWC was able to comfortably reach 1600 fps from the .401 Powermag, and do so with superb accuracy (5-shot groups of 1" at 25 yards). In fact, this bullet consistently produced the smallest groups of all of the bullets tested in the .401 Powermag. The barrel stayed clean when this plain-based bullet was lubed with Moly lube; yes, even at 1600 fps. This is a combination that I am looking forward to using to hunt pronghorn antelope. To get this load to shoot to the sights, I had to grind off about .040" off the front sight.

The 40398 RNFP (the classic .38/40 bullet) is easier to come by (this mould is still in production), and will comfortably shoot just as fast as the 40388 HP in the .401 Powermag. In general, this bullet was not as accurate as the 40388 HP, but accuracy was nonetheless acceptable.

The Ideal 401452 is Gordon Boser's SWC that he designed for his .401 wildcat. I would have been remiss not to include it in these tests! In contrast to his 429360 (which has a forward driving band diameter of .423"), the forward driving band on the 401452 is full groove diameter. I have shot the 410452 (sized .401") in my S&W 610 revolvers with poor results, but in the .401 Herter's Powermag (sized .405") it shoots just fine at 1400 fps. The Boser SWC can be a little cantankerous in terms of delivering top-notch accuracy, but with the right loads and sized to the right diameter, this bullet shoots reasonably well and provides a unique historical perspective on the whole issue of .40 caliber magnum handguns.

The Mountain Moulds SWC is an example of the custom mould tailoring that Dan offers. I went to his website (http://www.mountainmolds.com/) and input the data I wanted into his spreadsheet (Keith-style SWC, 73% meplat, .100" first driving band, .400" nose length, 55 degree bevels, 200 grains, etc.) and ordered the mould. A little over 3 weeks later the mould arrived in the mail. The spec sheet that accompanied it indicated an as-cast diameter of about .404" and a weight of about 203 grains (when cast with WW alloy). The mould itself is well made, and the bullets that drop from it are smooth and round, weighing 198 grains with my alloy (WW + 2% tin) and are .404" diameter. This bullet captures the philosophy of Elmer Keith in a form very well-suited for the .401 Powermag. This bullet was able to comfortably able to reach 1400 fps in the .401, and in general it gave mediocre accuracy. However, when paired with 18.0 grains of Accurate Arms #9, it shot very nicely. It also shot very well when paired with 10.0 grains of HS-6 for a 1000 fps utility load (and very similar to what Keith and Jordan were asking for back in the early 1960s as a service revolver duty load). The MM Keith-style SWC at 1400 fps is an excellent all-round hunting load for the .401 Powermag (and one of which I think Elmer would heartily approve...).

I believe that this NEI bullet is their design #208 (.406-260-GC) with the GC shank left off. It is a plain-based bullet that's a little bit RNFP, and a little bit SWC. It drops from the mould oversized (about .409") and weighs 233 grains. I sized it .405" with no headaches. 1250+ fps was no problem with this good-looking bullet, and it was very accurate, consistently turning in 5 shot groups of 1 1/4" or less. This is another excellent all-round bullet for the .401 Powermag, and one that should penetrate very deeply.

The Lyman 403168, 403169 and Rapine 270 FP were all designed for .40 caliber rifles, but they are also of the right diameter and weight to be useful in the .401 revolver as well. The full-length cylinder of the Herter's revolver leaves plenty of room for heavier than normal bullets to be seated long. For example, even the long 270 grain Rapine bullet can be thought of as a SWC and crimped in the upper grease groove for an OAL of 1.727", and still have over .050" clearance to the front of the cylinder. The relatively fast (1 in 14") twist of the .401 Powermag stabilizes these longer bullets just fine.

I chose to try the Ideal 403168 because the weight (207 grains) and diameter were right for this revolver. 1400 fps was easily attained, but this bullet has a long nose and short bearing surface, a poor combination for top accuracy. There are better bullets for the .401 Powermag.

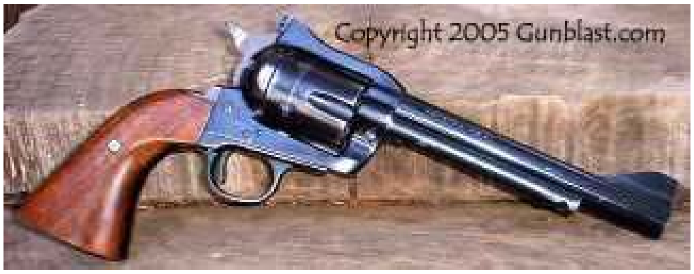
The 245 grain Lyman/Ideal 403169 FP (and its 239 grain HP kid brother) are another story. More than ample bearing surface leads to more concentric engraving, and hence very good accuracy. These bullets can be driven at 1200-1250 fps and deliver fine accuracy from the .401 Powermag (5-shot groups of 1 1/2" at 25 yards). The simplest way to load these bullets is to use the top lube groove as a crimp groove, but they can also be loaded to taper crimp onto the ogive. The 403169 is still available, and while the HP mould is no longer made, those who want the HP to hunt with can use the Forster HP tool and drill HP cavities into their ammo loaded with the 403169 FP. This pair constitutes two more excellent hunting bullets for the .401 Powermag.

The Rapine .406250 weighs 270 grains when cast of WW alloy. Sized .405" it can be seated to use the top grease groove as a crimp groove and still leave plenty of room in the .401's cylinder. This bullet has plenty of sectional density, and can be comfortably launched at 1100+ fps from the .401 Powermag. Accuracy is good with 2400, and there is ample adjustment in the sights to get this heavyweight to print to point of aim. This bullet just seems to have "big pig" written all over it...

2400, AA #9, H110 and W296 were able to reach the targeted velocity levels comfortably. Likewise, all powders delivered good accuracy, but overall I would say that 2400 and Acc. Arms #9 were the slight leaders in this category. In this cartridge, H110 showed a sensitivity to sub-freezing temperatures, with velocities dropping as much as 100 fps below those seen at moderate temps. 2400 did not display this tendency -- velocities when the temperatures were in the mid-20s were virtually identical to those measured in the mid-70s. The best accuracy was delivered by the 40388 HP, followed by the NEI RNFP, the Mountain Molds Keith SWC and the 403169 (both FP and HP).

A set of walnut grips were made for this gun (I had to get those awful black plastic grips off the gun!). Also, the front sight was ground down by about .040" to get point of aim and bullet impact (for the lighter bullets) to line up. This puts the gun spot on with the lighter bullets when the rear sight was fully elevated, and still leaves plenty of front sight adjustment for the heavy bullets.

I was impressed enough with the performance of this revolver that when a second one happened along a little while later, in very nice condition, and at a



The revolver with the walnut grips in place.

friendly price, it was also added to the safe. This second .401 was made in 1966, also has .405" throats, and has a cylinder gap of .005". At some point, someone did a very nice trigger job on this revolver. It shoots just as nicely as the first one, and also needs to have the front sight shortened.

Loaded with suitable expanding bullets, like the Ideal 40388 HP, the .401 Powermag revolver is just about ideally suited for larger vermin (e.g. coyotes, feral dogs, badgers, porcupines, etc.) and light medium game (up to about 150 pounds, such as pronghorn antelope). Loaded with the 403169 HP, or a non-expanding flat-point bullet, like the fine Mountain Moulds 200 grain Keith-style SWC, the NEI 233 grain RNFP, or the Lyman 403169, big mule deer and black bear are reasonable prey. I will be hunting with these revolvers in the near future.

From the perspective of today's craze with .40 caliber handguns, the .401 Powermag is a case of Herter's being decades ahead of the market (so, clearly, were the visionary efforts of "Pop" Eimer and Gordon Boser). The sinusoidal market appeal of the .40 magnum, first born in 1924, revisited just before WW II, again in 1961, and in the mid-1980s (with the **Bren Ten**) may be coming into phase again. Wouldn't a **Freedom Arms** five gun in .401 Magnum make a spectacular deer/antelope gun? "The .401 Freedom Arms" has a nice sounding ring to it, dontcha think? And the cartridge small enough to fit in the FA 97 platform! The .401 is a fine hunting cartridge and one whose time may have come (again).

- Glen E. Fryxell

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Loading data for the .401 Herter's PowerMag

.401 Herter's cases (made by Norma)
CCI 350 primers
All bullets cast of WW alloy + 2% tin
Homemade Moly lube (equal parts by weight beeswax and Moly grease)

Bullet	Powder	Charge	Velocity (FPS)	Comments
Lyman 40388 HP (165 grains)	AA #9	20.0	1608	Very accurate
Lyman 40388 HP (165 grains)	2400	19.5	1608	Very Accurate
Lyman 40388 HP (165 grains)	H110	24.0	1590	Very accurate
Lyman 401043 (174 grains)	AA #9	20.0	1570	
Lyman 401043 (174 grains)	2400	19.5	1615	
Lyman 401043 (174 grains)	H110	24.0	1600	So-so
Ideal #401452 Boser's SWC (199 grains)	AA #9	18.0	1427	
Ideal #401452 Boser's SWC (199 grains)	2400	17.5	1442	2" groups
Ideal #401452 Boser's SWC (199 grains)	H110	21.0	1408	
MM 200 Keith SWC (198 grains)	AA #9	18.0	1405	Accurate
MM 200 Keith SWC (198 grains)	2400	17.5	1408	
MM 200 Keith SWC (198 grains)	H110	20.5	1396	
MM 200 Keith SWC (198 grains)	HS-6	10.0	1031	Very accurate
Lyman 403168 (207 grains)	AA #9	18.0	1421	
Lyman 403168 (207 grains)	2400	17.5	1401	
Lyman 200 TC (210 grains)	AA #9	17.0	1307	Taper crimp, very consistent
Lyman 200 TC (210 grains)	2400	17.5	1401	
225 grain NEI FP (233 grains) (#208 w/o the GC shank)	AA #9	16.0	1247	Very accurate
225 grain NEI FP (233 grains) (#208 w/o the GC shank)	2400	15.0	1258	Very accurate
225 grain NEI FP (233 grains) (#208 w/o the GC shank)	H110	19.0	1294	Very accurate
225 grain NEI FP (233 grains) (#208 w/o the GC shank)	HS-6	10.0	1014	Accurate
Lyman 403169 HP (239 grains)	AA #9	15.5	1213	Very accurate
Lyman 403169 HP (239 grains)	2400	14.5	1244	Accurate
Lyman 403169 HP (239 grains)	H110	18.4	1220	Mediocre
Lyman 403169 (245 grains)	AA #9	15.0	1197	Accurate
Lyman 403169 (245 grains)	2400	14.2	1204	
Rapine 403250 FP (270 grains)	AA #9	15.0	1148	
Rapine 403250 FP (270 grains)	2400	14.0	1129	Accurate

In Praise of the .38 S&W Special

By: Glen E. Fryxell

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The S&W K-frame Military & Police was introduced in 1899. This revolver was an extension of their Hand Ejector product line that had been started in 1896 with the smaller .32 Hand Ejector. The K-frame M&P was originally designed around the .38 Long Colt cartridge, and would ultimately become the icon by which S&W would be known world-wide. But in the guise of the .38 Long Colt, the icon was as yet incomplete. As reported in "History of Smith and Wesson" by Roy G. Jinks (p. 159).

> "*The revolver was originally designed to fire .38 United States Service cartridge (.38 Long Colt) but this cartridge had developed a reputation for lack of power. D. B. Wesson suggested the cartridge case be lengthened to allow the powder charge to be increased from 18 grains of black powder to 21 1/2 grains. The bullet weight was changed from 150 grains to 158 grains, this new cartridge was called the .38 S&W Special and the factory literature showed the improved cartridge had a penetration of eight and one-half pine boards, each seven-eights inch thick, a penetration two inches greater than that of the U.S. Service load.*"

The quote from S&W Historian Jinks cements several very important things in place -- that the .38 Special started off life as a black powder load (even though it was designed after smokeless powder had gained acceptance), that the original bullet weight was 158 grains, and that the .38 Special clearly out-performed the old .38 Long Colt. With the introduction of the .38 S&W Special the destiny of the K-frame M&P had been fulfilled.


The Model 1899, aka .38 Military & Police First Model. The first .38 Special. Note the lack of a lug on the bottom of the barrel.

The first gun that the .38 S&W Special was chambered in was the Model 1899 (aka .38 Military & Police First Model), which is readily identified by the lack of any attachment lug underneath the barrel for the ejector (they are also notable for the extremely fine sights, which are almost impossible for my middle-aged eyes to see). Some sources say that the M&P wasn't chambered for the .38 Special until 1902, but Jinks presents compelling data to show that the .38 Special was indeed chambered in the M&P in 1899, and when Roy Jinks (the official S&W Historian) speaks, I listen.

The .38 Long Colt's poor combat reputation came as a result of its 150 grain lead round-nosed bullet at a nominal velocity of about 750 fps. The .38 S&W Special could launch a similar 150 grain bullet at almost 900 fps, but the primary load that the .38 Special would become known for was a 158 grain bullet at about 850 fps. Not a huge improvement over the .38 Long Colt when viewed in the light of today's magnum cartridges and guns, but an improvement nonetheless. However, the main advantage that the .38 Special offered over the old .38 Long Colt was the much greater accuracy afforded by the newer guns and cartridge.

The K-38 has undergone a few mechanical changes over the years, but in many ways is still recognizable as the S&W icon from 1899. The name has changed a few times as well -- the Military & Police and the M&P Target had the tapered round barrel, and fixed sights and adjustable sights, respectively. After World War II, S&W changed the lock-work and hammer profile, and added a rib to the barrel and the K-38 Target Masterpiece (adj. sight, 6" barrel) and the K-38 Combat Masterpiece (adj. sight, 4" barrel) were born (the fixed sight guns were still called the M&P). The guns produced after 1905 and up through mid-1955 are affectionately known as "5-screws" because there are 5 screws holding the side plate and yoke in place. In 1955, the "bug-screw" just underneath the rear sight was dropped, and the guns produced from mid-'55 up through 1961 are known as "4-screws". The screw in front of the trigger guard was dropped in 1961, and the guns produced after this date are referred to as "3-screws". Partway through the 4-screw tenure (in 1957), those wonderful descriptive model names were dropped and the numerical designations were stamped into the frames, giving rise to the Model 10 (formerly the M&P), Model 14 (formerly the K-38 Target Masterpiece) and Model 15 (formerly the K-38 Combat Masterpiece) (there were other variations as well, but these are the ones you see most often). Stainless steel was added to the K-38 line in 1970 with the Model 64 (a stainless version of the M&P) and the Model 67 (a stainless version of the K-38 Target Masterpiece).

A family of 5-screw K-38s: the .38 M&P Model 1905 (1st change) (circa 1908); a K-38 Target Masterpiece (circa 1954); and a K-38 Combat Masterpiece (circa 1953)

The .38 Special was also a vital component of the J-frame and N-frame lines was well. When somebody says "snubnose", it is generally assumed that the topic under discussion is a .38 Special revolver. ".38 Snubbies" have short barrels (generally 2-3"), and have been made of blued steel (e.g. Model 36), stainless steel (e.g. Model 60), and aluminum alloy (e.g. Model 637 Air weight). S&W got their start making pocket revolvers way back in the 1850s, and they have made a LOT of snubbies in the century and a half that they've been in business.

And there 's the very important historical role that the .38 Heavy Duty (and Outdoorsman) played in the development of the .357 Magnum round. The added strength of the N-frame made magnum handguns possible, and it all started with the .38 Special.

The .38 Special has long been recognized as a very accurate cartridge, and one that is easily mastered by new shooters. Recoil is easily tolerated, and with suitable hearing protection, muzzle blast is no problem. It should also be pointed out that the

.38 Special is also easily mastered by new handloaders (some of my first handloads were .38 Specials), and over the last century it has become one of the most widely reloaded cartridges in the world.

The perennially popular .38 snub nose (in this case the S&W Model 637 Air weight.)

The .38 Special is a perennial favorite when it comes to instruction of new shooters and for personal protection. Oh yeah, the gun rags like to print lots of stories about the latest "X vs. Y Shoot-Out!" and "The Magical Miracle Tactical X" and such (and in the process tend to denigrate classics like the .38 Special), but while all that ink is getting spread (and all those color glossy ads being sold) another batch of .38 Special revolvers were quietly sold to law-abiding citizens to help insure their safety, as well as the safety of their loved ones. There is nothing magical about reliability. Quite simply, the .38 Special was born to serve.

Elmer Keith used the N-frame .38 Special to develop the .38/.44 loads that ultimately led to the .357 Magnum. This is the .38 Heavy Duty (circa 1950).

A .38 Special is an excellent way to introduce new shooters to the handgun.

It is easy to shoot, it is accurate, it is cheap to feed, it is fun to shoot, and it gives me the chance to introduce the new shooter to both double-action revolvers (e.g. a S&W K-38) and single-action revolvers (e.g. a Ruger Blackhawk), so they can learn first-hand the differences involved in loading and shooting these very different guns. On a somewhat more subtle level, it also gives me an excellent way to teach new shooters about the performance of different bullet types (LRN, SWC, WC, HP, etc.) in a very simple and dramatic way. First, I have the student shoot these various different bullet types through paper to show how the different bullet shapes go through a target. Next, I have them shoot the same kinds of ammo through a few water bottles. The .38 Special is a modestly powered handgun round, so an inefficient bullet design (like the lead round nose) doesn't make much of a splash when it hits a plastic bottle filled with water. On the other hand, when a .38 +P cast HP hits the water-bottle at 1000 fps, sprays water all over the place and leaves a gaping hole in the far side, the concept of terminal performance gels much more quickly for a new shooter than having an instructor recite tables full of kinetic energy numbers. A similar demonstration was given to me when I was 11, and I remember it like it was yesterday. A big splash makes a big impression on a new shooter.

One of the exercises that I like to set up for our NRA Women & Guns courses is, after they have completed the standard training course of fire, I lay out a series of .38 revolvers, starting with a 2" alloy air weight snubbie and moving up to a 8 3/8" full-lugged S&W 586 (typically a 2" S&W 637 Air weight, 3" S&W Model 60, 3" Ruger SP-101, 4" S&W Model 15, 6" S&W Model 14, 6" S&W Model 686 and a 8 3/8" S&W

586). I ask the ladies which gun (s) appeal to them and why? Almost invariably, they tend to favor the S&W 637, "Because it's little. It would fit into my purse so easily."

Then I lay out ammunition at each station and have each shooter load and fire one round through each revolver, then move on to the next heavier gun and repeat the exercise. After they're all done, I remind them that all of the ammunition used in this test was identical, and then I ask them what their impression of the recoil was like from each gun. I usually get various statements of disbelief at this point ("You put different loads at the different guns!"), but pretty quickly everybody gets the message that handgun weight helps to moderate recoil. I ask the question again, which gun (s) appeal to them, and why. The answers are generally far more diverse the second time around! (and the 3" SP-101 is commonly very popular, both for its added weight, and also for its grip frame which works very well for many sizes of hands) I use this experience as a teaching tool, "This is why it's important to test-fire any gun that you're thinking about buying for personal protection or home defense. You can tell how well a grip frame fits your hand by just picking it up in the gun shop, but you can't tell how that gun is going to move in recoil until you shoot it. Regular practice is very important for good marksmanship skills, but if practice is unpleasant, you won't do it. It's that simple. A snubby that "bites" will intimidate a new shooter, and not get shot. And if you're not shooting, then you won't be generating the familiarity and confidence that can be so critically important in a moment of need. Buy a gun that will serve your needs, but buy one that is fun to shoot so you'll get that valuable practice in."

In one class a number of years ago, after I finished saying my piece after this demonstration, I had one gal blurt out, "I'm gonna need to get a bigger purse!" -- she really liked that 8 3/8" S&W 586 and wanted to buy it from me on the spot!

One of my favorite things to do is to strap on a K-38 with a suitable supply of ammo, and go for a summer hike in the mountains. Sometimes I'm hunting for varmints, sometimes I'm just out for a hike and some lazy summertime plinking. The .38 Special is pretty much a definitive plinker's round, and I have burnt an untold number of .38 rounds in pursuit of the wily pine cone (they're dangerous you know, you can never tell when those sneaky rascals are going to charge!). When plinking, pretty much anything that goes "bang!" works, but generally you'll find me shooting cast SWC's at 900+ fps during these forays, simply because that's what I have loaded for various other activities. When I'm out varmint hunting, I prefer to hunt with cast HP's for maximum effect. When shooting cast HP's in a .38 Special at standard (16,000 CUP) or +P (20,000 CUP) pressures, the cast HP's need to be cast fairly soft (BHN of 8 or less) in order to expand at these speeds (900-1000 fps). I generally used recycled range scrap to cast HPs for loads like this, but one can also use a 50/50 mixture of WW alloy and pure lead to get a mix suitable for these speeds. When I'm hunting for edible small game like cotton-tails, then my K-38 will be loaded with cast SWC's, which kill cleanly, without ruining a lot of meat (the cast HP's are just too destructive).

I have shot many, many different loads through the venerable old .38 Special. It is a very easy gun to load for, and there are a wide variety of excellent loads that can be assembled for it. I see no reason to load jacketed bullets in a gun that rarely breaks 1000 fps, so all of my .38 Special loads feature cast bullets. This is particularly important for the older pre-WWI guns with soft barrel steel that would be more quickly eroded with jacketed bullets. For these older guns, I keep velocities down below 900 fps. This recipe generally involves something along the lines of 3.5 grains of Bullseye and 150-158 grain cast bullets for around 800 fps. These loads keep these old sixguns shooting just fine, and keep this sixgunner happy.

For my post WWII .38 Specials, I am willing to step the loads up a bit -- the cylinders have been heat-treated and the quality of the barrel steel is better. For general plinking and field use, my favorite .38 Special load is a 150 grain SWC over 5.4 grains of Unique for about 950 fps (6"). My preferred version of this load is built around the old 150 grain version of 358477 (the newer version of the 358477 weighs 158 grains and should have this powder charge reduced to 5.0 grains of Unique). The older 150 grain version of the 358477 isn't found all that often these days, but the RCBS 150 SWC shoots every bit as well as the old 150 grain 358477 and is much easier to find. This load is nicely accurate out of snubbies as well (although velocities will be down in the mid-to-low 800s).

When varmint hunting with the .38 Special, my favorite load is the Keith HP (Lyman/Ideal 358439) over 8.5 grains of HS-7. This load generates about 1050 fps out of a 6" revolver, and according to the Hodgdon Reloading Manual this combination operates at less than 19,000 CUP peak pressure (and so should be safe in any revolver rated for +P loads). I cast these 358439s nice and soft (BHN about 8) and they mushroom beautifully at this speed. I have used this load to take ground squirrels, prairie dogs and jack rabbits, from southern Arizona, up to Wyoming and Montana, and over through the Pacific Northwest. It is a fine, fine varmint load, and gives the sixgunner everything that can be reasonably expected from the .38 Special. This load also shoots well out of snubbies, but the HP's need to be cast very soft (e.g. 40-to-1, or softer) to expand much at snubby velocities.

The .38 Special has been serving society for well over a century -- teachers, trainers, law enforcement, competitive target shooters, informal plinkers, security guards, and private citizens of all shapes, sizes and colors have called upon the timeless .38 Special to serve their needs. Yes, I am a fan of the .38 Special. One of millions.

- Glen E. Fryxell

Cast bullets in the .25-20 Winchester

- Glen E. Fryxell

The .25-20 (or .25 WCF for “Winchester Centerfire“) has long interested me for its value as a small game and varmint round, and as a neat little cast bullet cartridge. Modest case capacity, moderate pressures, long neck (to protect the lube grooves) and a cast bullet friendly twist rate (twist rate is listed as either a 1 in 14”, or 1 in 16” twist, depending on the manufacturer, both are very friendly twists for cast bullets) form the core of its appeal. The .25-20 was introduced in the mid-1890s in the Winchester Model 92, and amounted to nothing more than the .32-20 necked down to accept a .25 caliber bullet (Winchester wanted to capture the ballistics of the .25-20 Single-Shot, but in a cartridge that was short enough to function in the 92). In the days before the .22 Hornet, the .25-20 was THE flat-shooting long range varmint cartridge of the day. The factory 60 grain jacketed flat-point at 2250 fps was reported to be very effective on vermin out to about 150 yards or so. The 86 grain factory load at a more sedate 1460 fps was better suited for edible small game, but hits got harder out beyond about 75 yards or so due to the curvaceous trajectory. Traditionally, the .25-20 has been held to a pressure spec of about 28,000 CUP, and the maximum product average for factory ammunition is not to exceed 31,200 CUP. Staying within this pressure range, the 86 grain bullets can be launched at over 1700 fps. All in all, these pressures and velocities are very comfortable for cast bullets, hence my interest.

A variety of guns have been manufactured in .25-20 over the years, but the one that caught my eye was the sleek little Remington Model 25. Remington made a total of almost 32,000 of these dainty little 5 ½ lb pump-action rifles between 1923 and 1936. A good friend of mine made me a deal I couldn’t refuse on one of these sweet little rifles (24“ barrel), and a casting/loading project was under way.


Remington Model 25, a 5 1/2 pound pump action .25-20

The plain-based flat-point bullets that I would be using for this project include the Ideal 25720 (86 grains) and the Ideal 257283 (85 grains). The gas-checked flat-points that I would be shooting were the Lyman 257420 (70 grains) and H&G #54 (86 grains). I would then wrap things up with some hollow-point bullets, namely the plain-based Ideal 25727 (83 grains), the gas-checked Ideal 257312 HP (converted by my friend Erik Ohlen, 88 grains) and the gas-checked Lyman 257420 HP (67 grains). Of these, only the Lyman 257420 is still offered commercially, but there are other moulds that are suitable for the .25-20 that are still commercially available. For example, NEI still offers 3 moulds that are suitable for the .25-20 -- copies of the 257420 (#17, 257-75-GC), the 257283 (#17A, 257-85-PB, also offered in a 100 grain GC version), and the 257312 (#19, 257-89-GC).

In terms of powder selection, there is load data out there for the .25-20 for powders ranging from about Red Dot on the fast side, up to Acc. Arms 2015 BR on the slow side, with 4227 appearing to be just about optimum(and 4227 has been a historical favorite in the .25-20). Generally speaking, for a cast bullet project, I like to work with powders on the slow side for the application as slower pressure rise early on allows the bullets to be engraved “gently”, which usually leads to better accuracy with cast bullets, especially with plain-based cast bullets. Thus, I chose to primarily look at powders like 4227 and slower. A philosophical aside -- there’s no real reason to try to hot-rod the little .25-20, because no matter how hot you load it, it’s still a small game cartridge, so it makes sense to stay within the SAAMI guidelines. A little extra velocity may be helpful (but not necessary) in that it flattens out the trajectory and gives a little added range, but it won’t promote the cartridge up to being a good deer cartridge. Bottom-line -- the .25-20 is good for shooting bunnies, skunks, porcupines, coyotes, etc. out to about 150 yards. Whether the intended quarry is intended for the dinner table or simple extermination, will dictate the nature of the bullet/load. The beauty of the .25-20 is that it can handle both of these tasks with ease.

Cast bullets used in this loading project; (l-r) Lyman 257420 HP, 257420 solid, Ideal 257283, H&G #54, Ideal 257312 HP, Ideal 25720, and Ideal 25727 HP.

Ken Waters, in his excellent write up on the .25-20 in Pet Loads, only reported on one cast bullet load, but he liked it -- 9.0 grains of 4227 with 70 grain cast bullets for about 1650 fps. I also asked my friend and long-time cast bullet shooter Charles Graff for his thoughts on cast loads for the .25-20, and that is also what he recommended, so that’s where I started. I loaded up the Lyman 257420 FP and HP over 9.0 grains of 4227 and I got 1665 fps with the solid and 1705 fps with the HP. Accuracy was decent with both loads, but I wanted to see if I could do better, so I started on this loading project.

For reference, the Lyman Handbook of Cast Bullets (published in 1958) reports loading data for the 70 grain Lyman 257420 with 9.0 grains of 4227 for 1700, and a max load of 12.0 grains of 4227 for 2100 fps. For the 85 grain gas-checked 257312, it lists a maximum load of 10.7 grains of 4227 producing 1750 fps.

Bullets were cast (BHN ~12), sized .258” and lubed with home-made Moly lube. Test loads were assembled using R-P brass and Winchester small rifle primers. Case mouths were flared using a .25 caliber flaring die (from a .25 Hornet die set). Most of these test loads were assembled using H4198, 4227, AA 1680, and Re7, but I also used some faster powders like Unique and HS-6, as well as old favorite 2400. Initial screening/chronographing was carried out at 25 yards, and then promising loads were subsequently tested at 50 yards. All shooting was done using the factory original open (buckhorn) sights. Two things became apparent during the course of these tests -- 1) my 24” Model 25 seems to be faster than the guns used to develop much of the published data, and 2) that some of the published loads are warmer than I would care to shoot on a regular basis. Instead of going through all the details, load by load, I will just touch on a few of the highlights.

Plain-based bullets:

Gas checks hadn't been invented yet when the .25-20 WCF came into being, so it only seems appropriate to start the discussion off with some plain-based (PB) cast bullets, especially period-correct PB bullets like the 25720 and the 257283 SWC. My focus here was on loads for hunting edible small game, so I was generally interested in good accuracy with velocities in the range of 1600-1700 fps (higher velocities are better suited for non-edible vermin and will be addressed later with GC bullets, especially HPs).

Ideal 25720 PB FP:

The Ideal 25720 is the original design for the .25-20 Single-Shot (different cartridge case) from the 1880s and it made the transition to the .25-20 WCF (repeater) when that cartridge came along in the 1890s. The Ideal 25720 was available in several different weights, ranging from 46 to 96 grains, with the "standard" weights being 77 and 86 grains. I have two versions of this mould, but for this project I used the 86 grain version since that was the original bullet weight for the .25-20 WCF. This mould design was last cataloged in 1957. This particular mould is kind of cranky about letting go of its bullets, but it does make a nice-looking bullet once you manage to shake it loose.

Test loads ranged from very good (9.5 grains of AA 1680, 1745 fps), to decent (8.0 grains of 4227, 1645 fps), to downright awful (7.4 grains of 2400, 1766 fps, key holing at 25 yards). This old bullet made it clear to me that slower powders have a beneficial impact on accuracy with PB cast bullets in the little .25-20.

Winchester also made a .25-20 bullet moulds very similar to this basic design (the Winchester design has slightly wider grease grooves and a shorter nose). That particular mould is really cantankerous to cast with due to the grease groove design, so I only cast a few of these up for comparison. The bottom-line is that this mould drops bullets that are nice and round, .257" in diameter, and weigh 86 grains when cast with an alloy similar to WW alloy. This undersized bullet was not nearly as accurate as the Ideal version (which cast at ~.259" and sized down to .258" very nicely). Loaded over 8.0 grains of 4227, the Winchester bullet produced 1641 fps, and decent accuracy. However, over 7.4 grains of 2400, it gave 1750 fps and absolutely terrible groups (6-7" at 25 yards with key-holing).

Ideal 257283 PB SWC:

The Ideal 257283 is an 85 grain plain-based (PB) bullet, designed right at the turn of the century for the .25-20. Today we would call this a semi-wadcutter (SWC), but that name wasn't in common usage at that time. It has 2 large grease grooves and a beveled crimp groove. The base band is MUCH thicker (.125") than those on the 25720 and the Winchester bullet (a thicker base band helps to seal the gases behind the bullet). This is a fine bullet for hunting small game. It was last cataloged in 1964. Testing showed that this bullet design seems to be more accurate than the earlier designs (the design of the lube grooves also makes this bullet MUCH easier to cast). The best load tested was 8.0 grains of 4227, which produced 1680 fps with excellent accuracy. Without question, this is my preferred small game hunting load for this gun. Faster powders like Unique and HS-6 were not as accurate.

.25-20 loaded with the Ideal 257283 and the same bullet sized and lubed and as-cast.

Gas Check bullets:

Gas checks (GC) were invented, and patented, in 1906 by John Barlow, the head honcho of Ideal Manufacturing Co. This little copper cup on the bottom of the bullet protects the base and helps to seal the gases behind bullet, limiting the amount of gas-cutting that takes place on the bearing surface of the bullet. It also serves to scrape clean any fouling left behind from previous shots. Thus, the GC allows cast bullets to be pushed at higher velocities than typical PB bullets (commonly 2000 fps or more). For the .25-20, this means that GC bullets can be pushed at full throttle (if so desired).

Lyman 257420 FP (70 grains):

In 1929, Lyman introduced the 70 grain 257420 GC-SWC (an interesting piece of historical trivia -- note that the cherry number on this mould places it immediately before the landmark Keith SWC, the Ideal 429421). Before this, the .25-20 was loaded with primarily 60 grain and 86 grain bullets. The 70-grain 2567420 offered a very useful compromise in terms of velocity and bullet weight. Lyman still offers the 257420 commercially. The first load tested was 12.0 grains of 4227. This load gave good accuracy, but is hotter than I would want to shoot on a regular basis in this little gun. I wasn't getting flattened primers or sticky extraction, but the cases were hinting at higher than normal pressures and there were a couple of split necks. Velocities averaged 2215 fps (not the 2100 fps reported in the Lyman handbook), so it seems that my lot of 4227 is a little faster than that used by Lyman back in the 1950s. If I were going to shoot the 257420 with 4227 on a regular basis, I would reduce this charge somewhat.

The next load I tested was 13.0 grains of Accurate Arms 1680 with the 257420. This load gave very good accuracy, normal pressure signs and velocities averaged 2117 fps. This is an excellent all-round load for the .25-20.

4198 is reported to give very good accuracy in the .25-20 with some bullet weights. Both 4198 and Re 7 (in 12.9 grain charges) delivered mediocre accuracy with the Lyman 257420, and velocities just under 2000 fps.

Hensley & Gibbs #54 (86 grain GC):

The Ideal 257312 is one of the very early gas-check (GC) designs dating from 1906. The H&G #54 is basically a gas-checked version of the 257283, and shares some attributes of the Ideal 257312 86 grain GC-FP (i.e. GC, 2 grease grooves, crimp groove, FP). All in all, the H&G #54 is a truly beautiful bullet, and one very much at home in the .25-20. The best load tried with the 86 grain H&G #54 was 10.0 grains of 4227. Accuracy was good and velocities averaged a surprising 1901 fps. Other powders tested with this bullet weren't quite as accurate.

Hollow-point bullets:

Vermin eradication is well-served by hollow-pointed (HP) bullets as the bullet expansion provides a more humane kill for "hits around the edges". Cast HPs make excellent varmint bullets, as they are cheap, easy to produce and offer explosive expansion at velocities above ~1600 fps (which the .25-20 can easily deliver). At these velocities cast HPs are too destructive for edible small game, but are very effective for vermin control. A cast HP makes the .25-20 a little gun that's capable of landing a big punch!

25727 HP PB:

The Ideal 25727 is the Express (i.e. a lighter weight hollow point) version of the 86 grain Ideal 25720, and is listed at a nominal weight of 75 grains. It was cataloged from the 1890's up through 1939. When I bought this mould, it was missing the HP pin. The original design called for a HP pin that extended approximately 90% of the length of the bullet (which had to make casting "keepers" difficult). When I made a replacement pin for this mould, I chose a more conservative HP cavity of approximately .500" (approximately 65% of the bullet's length), and bullets drop from the blocks averaging about .260" in diameter, and weighing a little over 83 grains when cast from alloy similar to WW alloy. OK, I'll be honest with you, going into this project I figured that this fine old bullet was probably going to be limited to about 1400 fps in terms of best accuracy. Well, I was wrong. 10.4 grains of 4198 was found to deliver very good accuracy and 1725 fps! Wow!!! A good back-up load was found to be 8.0 grains of 4227, which also gave good accuracy and delivered 1651 fps.

Ideal 247312 HP:

The Ideal 257312 is one of the very early gas-check (GC) designs dating from 1906. This mould design made high velocity bullet loads possible for the .25-20. This 85 grain flat-point (FP) has 2 grease grooves and was cataloged through 1970. I found a single-cavity mould for this bullet design and sent it off to my good friend Erik Ohlen for conversion to make HP bullets, with a .075" diameter HP pin, that protruded .325" into the bullet, was tapered and had a rounded tip. Bullets dropped from the modified mould at 88 grains, and were .260" and round (a mixture of range scrap and linotype, similar to WW alloy). Unfortunately, my chronograph was on the blink that day, so I didn't get any velocities, but the best load tested was 10.5 grains of Acc. Arms 1680 (I would guess this load is running about 1600-1700 fps). Also good was 8.1 grains of 4227 (probably about 1650 fps), but 9.5 grains of 4227 wasn't nearly as accurate.

The Ideal 257312 mould after Erik Ohlen converted it to make HP bullets.

Lyman 257420 HP:

The Lyman 257420 was also offered in HP form, and I was fortunate enough to stumble across one of these fine moulds. They weigh about 67 grains when cast of an alloy composed of 3 parts range scrap 1 part linotype (similar to WW alloy). Two loads were tried and both gave excellent accuracy. The first was 13.0 grains of Acc. Arms 1680. This powder charge produced a little over 2100 fps with the solid version of the 257420, so the velocity should be similar for this HP load. 11.0 grains of 4227 was also very accurate with the 67 grain HP. Both of these loads would make explosive vermin eradication loads for ground squirrels, prairie dogs and jackrabbits.

Conclusions:

The most accurate load tested was 13.0 grains of Acc. Arms 1680 with either the 257420 GC-FP or GC-HP. Both of these bullets delivered 5-shot groups at 50 yards of right at an inch with this powder charge (open sights). I have some experience with both of these bullets at a little over 1500 fps from my .25 Hornet Ruger Blackhawk revolver (a fine little varmint gun), and the extra 600 fps will surely add spectacle to next summer's varmint hunting!

8.0 grains of 4227 was consistently accurate with all of the 85-86 grains cast bullets (PB and GC), and generally delivered 1650-1700 fps with them. The plain-based 257283 with this powder charge (1680 fps) is now my preferred small game load for this rifle. I don't want any more velocity, and no GC is needed. Simple and easy. This combination is capable of shooting into just over an inch at 50 yards.

The plain-based Express bullet from the 1890s, the 83 grain Ideal 25727, was found to shoot very nicely at 1725 fps with 10.4 grains of 4198, making an excellent "old-timey" varmint load. This load shot into 1 ½" at 50 yards (again, open sights). I think I'm going to take this load out after a coyote (or two) this winter.

The 88 grain Ideal 257312 HP proved itself to be a very accurate bullet, and loaded over 10.5 grains of Acc. Arms 1680 this bullet should be an excellent load for critters up to about 50-60 lbs in size.

Accurate Arms 1680 made a good showing for itself with most of these cast bullets, and being a ball powder meters very smoothly and uniformly. I will be burning a lot of Acc. Arms 1680 in this sweet little Remington.

The .25-20 is a fine cast bullet cartridge and one that gives the shooters a feeling of what "old-school" varmint hunting was all about. I like it!

- Glen E. Fryxell

The .32 S&W Long:
A Handgun Hunter's Perspective
By: Glen E. Fryxell

The .32 S&W Long is regarded by some as an archaic artifact of another time, best left to the dust of the Ages. I would suggest a less hasty conclusion. Yes, it was originally introduced by Smith & Wesson in 1878. Yes, it was originally housed in the weak Model 1 1/2 top-break revolver. Yes, it was originally a black powder load only generating 680 fps with an 85 grain lead round nosed bullet. Yes, it was introduced as a pocket pistol for self-defense, and yes it was marginal in that application. Yes, smokeless powder, stronger steels and the Magnum Age would come along and make such pip-squeak ballistics "yesterday's news". So what? Is there a problem with all that?

While the hinged-frame top-break revolvers are indeed very weak and need to be treated with care (i.e. loaded to black powder pressures ***only***), S&W entered the modern era with their first Hand Ejector (the Model 1896), and it was chambered for the .32 S&W Long. The fixed frame of the Hand Ejector series of revolvers would revolutionize the handgun world, and ultimately lead to the first Magnums. With the introduction of smokeless powder, factory ballistics for the .32 S&W Long were upped only slightly to a 98 grain lead bullet at 705 fps (undoubtedly out of deference for the weaker top-break revolvers). I have shot small game and vermin with lead round-nosed bullets at roughly 700 fps -- head shots are effective, body shots leave a great deal to be desired. The bottom-line is that these slow round-nosed bullets are just not a humane hunting combination.

However, the fixed-frame Hand Ejectors were stronger than the older top-break revolvers, and could be safely loaded to somewhat higher pressures (i.e. 15,000 CUP). This increased pressure allows 90-100 grain cast bullets to be pushed 900-1000 fps safely (for example, see the pressure-tested load data in Phil Sharpe's "Complete Guide to Handloading"). Coupling this added velocity with improved bullet designs bearing a decent meplat, and you now have an excellent hunting combination for small game.

If this sermon sounds familiar, others have preached it long before me. In "Sixguns" Elmer Keith summarized the .32 S&W Long as, "...a wonderfully accurate target cartridge...but in factory loadings is a very poor game cartridge." He went on to say, "Properly handloaded with a bullet like the Ideal 313445 and 4.0 grains of Unique for a velocity of 1000 fps, it is a wonderful small game cartridge.". In "Hoglegs, Hipshots and Jalapenos" Skeeter Skelton also sang the praises of the .32 S&W Long as being very accurate, although underpowered for anything but the smallest game, and that its performance as a hunting cartridge could be significantly enhanced by handloading. The load he cited was comprised of a 95 grain cast bullet over 4.3 grains of Unique for 1010 fps. Generally speaking, when Skeeter was looking for this level of .32 caliber ballistics, he usually turned to the .32-20 cartridge, but I suspect that was in large part due to the fact that the .32-20 was available in his beloved Colt Single Action Army, while the .32 S&W Long was not.

Several other gun writers have gone on record in favor of the .32 rimfire rifle as a preferred small game load. For those of you that might not be familiar with the ballistics of the old black powder .32 rimfire loads, they generally had an 80-90 grain lead bullet at 950-1050 fps. The .32 rim fires had a reputation for adequate accuracy out to about 50 yards (black powder fouling could be problematic), and would kill small game cleanly without spoiling a lot of meat. When .32 rimfire ammo became scarce and hard to find, many of these shooters moved on to reproduce these ballistics in a .32-20 rifle or revolver, but the extra case capacity isn't necessary to achieve this ballistic level and a solid-framed .32 S&W Long revolver is just as capable of reproducing the old .32 rimfire ballistics (and accurate loads will probably be easier to find than with the .32-20). This, I would argue, is the special niche that the .32 S&W Long now occupies -- the ~95 grain bullet at 900-1000 fps, useful for hunting small game.

Yes, we now have stronger steels and modern CNC machine capabilities, and we can build better, stronger, more powerful revolvers than ever before. Yes, we now have the .32 H&R Magnum and the .327 Federal, both capable of delivering significantly higher velocities than the ancient .32 S&W Long. So what? For the small-game hunter the bottom-line is that a rabbit is still a rabbit, and a squirrel is still a squirrel. I really like Brunswick stew, and I'm not a big fan of a whole lot of bloodshot goo. The .32 S&W Long kills small game cleanly (it is significantly more effective that the .22 Long Rifle), and doesn't spoil a lot of meat in the process. The .32 H&R Magnum and .327 Federal are both fine varmint cartridges, but their extra velocity equates to a certain amount of wasted meat when the quarry is intended for the dinner table. I have (and hunt with) more powerful handguns, but when edible small game is on the menu there is a strong probability that a .32 S&W Long revolver will be along for the ride. Simply stated, when properly loaded, the .32 S&W Long is the perfect small game cartridge.

Handloading the .32 S&W Long:

The .32 S&W Long is pretty much a definitive "small case" in terms of powder capacity. Uniform ignition is not a problem since the brisance of pretty much *any* primer will completely fill the available volume in the loaded round. The small case capacity, combined with the pressure limitations, make the .32 S&W Long best served by the medium to fast burning pistol powders, ranging from Bullseye on the fast side out to about HS-6 on the slow side. I have gotten excellent results with Red Dot and W231 in the .32 S&W Long. Red Dot in particular, bulks up well in the tiny case and has given me excellent accuracy over the years in the .32 S&W Long. Bullseye, PB and American Select are also excellent choices for the .32 S&W Long. A pound of powder goes a LONG ways when it's metered out in 2.0 to 2.5 grain doses!

One of the things that appeals to me about the .32 S&W Long is how well it performs with cast bullets. In fact, in all of the thousands and thousands of rounds of .32 S&W Long that I've shot over the years, fewer than 1% of them have involved jacketed bullets. At ~900 fps and 15,000 CUP, cast bullets are right at home, and just make sense. With a gang mould and a pot full of lead, you can make *bunch* of .32 cast bullets in a hurry from a few pounds of scrap wheel weights! As far as mould designs go, there are some excellent .32 wadcutter moulds available from RCBS, NEI (I like #79 in PB form) and H&G (originally listed as #66 by H&G, now available from Ballisti-Cast), and at one time Lyman made a couple of very interesting variations on the .32 wadcutter theme that make for very interesting field loads (the 95 grain 313445 SWC and the 93 grain 313492 Type III wadcutter). Other .32 cast bullet designs worthy of note are the timeless Lyman/Ideal 3118 (now labeled the 311008), the RCBS 98 grain SWC, the RCBS 88 grain Cowboy bullet, and SAECO also makes some good-lookin' .32 moulds (I have an old Cramer 95 grain SWC that I am very fond of, a design that SAECO still offers). Several years ago, I had Mountain Molds make a mould for me to produce a 98 grain .312" Keith-style SWC (73% meplat, three equal driving bands, beveled crimp groove and a big flat grease groove). A couple of years later, this bullet was used as inspiration for one the Lee custom mould Group Buys for a 6-cavity gang mould to make a .315" diameter 98 grain Keith-style SWC (there were some changes made to the ogive and driving bands). The bottom-line is that there is no shortage of good bullet moulds available to the handgun hunter who wants to hunt with the .32 S&W Long.

Some of the excellent cast bullet designs available for the .32 S&W Long (l-r: H&G #66, NEI #75, RCBS .32-90-Cowboy mould, Cramer #52D 95 grain SWC (now available as the SAECO #325), Lee custom Group Buy 98 grain Keith-style SWC, Mountain Molds Keith-style 98 grain SWC, Ideal 31133 (the 109 grain HP version of the 3118), and the 115 grain Lyman 311008).

My preferred load for the Type I wadcutters (i.e. the button-nosed target bullets that are seated deeply) is 2.0 grains of Bullseye (which, conveniently, is the lightest load I can get my Dillon 550B powder measure to drop), which averages about 750 fps or so (depending on barrel length), and with that full-diameter meplat it anchors grouse very effectively. For the lighter field bullets (like the RCBS cowboy bullet and the Lyman 313492, both of which weigh about 90 grains when they drop from my moulds), I like to load them on top of 2.6 grains of Red Dot for about 965 fps, a load that delivers excellent accuracy. Both of these loads drop small game effectively, and don't waste a lot of meat in the process. For the 98-100 grain SWC bullets, like the RCBS 98 grain SWC and Keith-style SWC’s, I have gotten very good results with a variety of powders (from Red Dot to HS-6), but commonly turn to 2.5 grains of Red Dot or 3.0 grains of W231, both of which produce a little over 900 fps (depending on barrel length) and excellent accuracy.

Another thing that I like about the .32 S&W Long is that the brass seems to last forever. I can't recall ever having a case wear out, or split.

The guns:

That brings us to the guns -- ah yes, the guns! As mentioned earlier, the .32 S&W Long was originally brought out in the weak, top-break S&W Model 1 1/2. I am going to skip over the old black powder hinged-frame guns since the focus of this article is on the optimum small game hunting loads, generally operating in the 900-1000 fps range, and these loads are entirely unsuitable for the old top-break guns. That brings us to the Hand Ejectors -- as this is written, I have no first-hand experience with the Model 1896 (I hope to change that in the near future), but I have plenty of experience with the Model 1903 (and the various changes associated with that Model). This dainty little I-framed sixgun is just about the definitive "grouse gun" in my mind -- light, easily carried in a vest pocket or bib overalls when hunting big game, and able to dispatch a grouse quickly and cleanly without wasting a lot of meat (and without making a lot of noise). The Model 1903 was available with 3 1/4", 4 1/4" and 6" barrels. I have shot all three, and they have all shot very well for me. The one issue that I've encountered is that the sights are rather fine, and with bifocals sometimes it can be a challenge to quickly get a good, clean sight picture. But these little I-frames sure do shoot! The 3 1/4" I have has a bore that still has decent land/grooves, but is spider-webbed with pitting throughout the length of the barrel -- and it will still put 12 shots into 1 1/4" at 50 feet! The other I-frame .32 S&W Longs I've shot have displayed similar capabilities. I ran some tests on 4 different I-frame .32 S&W Long revolvers -- all 4 guns would allow a Hornady 85 grain XTP (that mikes .312" on the nose) to pass smoothly (the 3 1/4" Model 1903 was a little snug, but it still passed), and none would allow a cast bullet sized .313" to pass. Clearly, a good place to start with cast bullets for these little guns is .312".


.32 S&W Long ammo, loaded with a few of the excellent cast bullet designs available (l-r: NEI #75 wadcutter, RCBS .32-90-Cowboy bullet, Lyman 313445, Lee custom Group Buy 98 grain Keith-style SWC, Mountain Molds Keith-style 98 grain SWC, RCBS 98 grain SWC, and the Ideal 31133 HP).

S&W built the I-frame (and the improved I-frame) up until 1961, when they introduced the J-frame. By this point, the revolver was known as the Model 30 (round butt) or Model 31 (square butt). Years ago, I picked up a 3" Model 31, and it not only shoots to the fixed sights, it groups quite nicely to boot! I haven't carried this little J-frame very often because it's just too pretty to get beat up when I'm in the black timber hunting elk, but it has nonetheless accounted for a handful of vermin and small game in the off-season. Throats on this revolver run just a little over .313", so that's what I size cast bullets when I'm loading for it.


The I-frame .32 S&W Long (Model 1903) was available with 3 1/4", 4 1/4" and 6" barrels.

S&W also built a few .32 S&W Longs on the K-frame. These tend to be rather rare, and you don't run across them every day. I was fortunate to pick up a 4" M&P in .32 S&W Long a while back, and it has quickly turned into one of my personal favorite revolvers. The bluing on the barrel is worn, but mechanically this gun is in very good shape, and it is one fine shooter! In this revolver, cast bullets sized .313" are a snug fit in the throats, and so that is how I size them.


The J-frame .32 S&W Long (Model 31-1), with a 3" barrel and fixed sights.


S&W made a few M&Ps (K-frame) chambered for .32 S&W Long.

I have always wanted a K-32 Target Masterpiece, but given the steep prices they tend to command, I just haven't been able to find one that I could afford. So a number of years ago I decided to have a custom gun built instead (and still ended up saving a bunch of money). I bought a 6" full-lugged Model 16 barrel (from the .32 H&R Magnum production run) and a K-22 cylinder, and had these fit to a K-38 frame. I also commissioned a set of very tight reamers to be made up (.0015" clearance on the chamber dimensions, and .3125" for the throats), and took all these parts over to my good friend Dave Ewer and asked him to build the gun. This gun is mechanically VERY tight, and it shoots superbly! In hindsight, I probably should have gone with about .003" clearance on the chamber dimensions, as occasionally variations in crimp dimensions can cause problems with getting ammo to chamber, but boy does this gun shoot! When hunting, this gun gets cast bullets sized .312", at 900-1000 fps, and it shoots them all day long into little-bitty groups. This is truly a connoisseurs small game handgun.


Custom K-32 target gun built by Dave Ewer. This tight little gun is exquisitely accurate!

Well that covers the I, J and K-frames. Believe it or not, I have seen exactly one N-frame .32 S&W Long. Now before anybody gets their "tail tied in a knot" over that statement and calls me a liar, this was most certainly NOT a factory gun! This was a fixed sight 3 1/2" .45 caliber N-frame that somebody had sleeved the chambers and re-chambered/re-throated them for .32 S&W Long, and then they had lined the barrel with a .32 liner, and nickel plated the whole mess. Why somebody went to all that work, I don't know, but it was certainly a unique handgun. Who knows? It might have been a real tack-driver.

Applications:

The .32 S&W Long makes an excellent target gun. The custom K-frame described above was originally built as a bullseye gun, intended for wadcutters (either home-cast or commercial hardcast, and the Oregon Trail Bullet Company makes a fine 98 grain .313" double-ended wadcutter), loaded over 2.0 grains of Bullseye. Years ago, I shot a number of bullseye matches with this gun for the centerfire stage and it served extremely well. It is extremely accurate, and the trivial level of recoil makes recovery very easy during a rapid fire string. The full-lug barrel makes the gun slightly muzzle heavy, so the sights "hang" on the target very nicely. All in all, a very nice bullseye package.

Anymore, I don't shoot as much bullseye as I used to, so this gun gets used mostly for small game hunting now. It is big enough and heavy enough that it doesn't really fit in as a "second gun" when I'm hunting big game, so this gun gets carried main as a primary gun when hunting edible small game, a role in which it excels. It is particularly well-suited for cottontails with the 90-100 grain cast SWC's at 900-1000 fps, and it is notably more effective at anchoring small game than a .22 handgun, yet it doesn't spoil a lot of meat. My favorite way of fixing rabbit is to quarter them, bread the pieces, adding a little black pepper and garlic salt to the flour, and pan fry them. Quick, simple, easy and tasty!

When hunting tree squirrels, I like to use the .32 S&W Long loaded with wadcutters. Since squirrel hunting commonly involves shooting upwards into the tree canopy, in the event of a miss a wadcutter tends to become unstable (especially if it hits branches) and start to tumble, shedding velocity quickly and falling to earth a short distance away. A more stable profile (e.g. SWC or round-nose) could potentially maintain its stable nose-forward flight, fly great distances, and return to earth at high velocity, potentially causing property damage or personal injury. A 98 grain wadcutter at roughly 750 fps will take a bushytail cleanly, but not fly into the next county if the shooter misses. I lived in the southeast for a number of years and became a big fan of Brunswick stew while there. For squirrel, I throw the skinned carcass (whole) into some salted water and put it on a slow simmer for a couple of hours. Then I pull the meat out and let it cool, and pull all the meat off the bones, putting the meat back into the soup-stock with a little Worcestershire sauce, onions, carrots, potatoes, barley, salt and pepper and simmer till the veggies are done. Don't be late for dinner, or you won't get any!

The .32 S&W Long also makes a good varmint round. For critters like ground squirrels and prairie dogs, I will commonly use the Keith-style SWC's loaded to around 1000 fps, and it pops burrowing rodents smartly. For jack rabbits, I generally want a little more "thump" and will commonly load the .32 S&W Long with a cast HP like the Lyman/Ideal 31133 (the 109 grain HP version of the 3118), cast soft (BHN of 9 or less, e.g. 25-to-1 alloy) and load it to 1000 fps with 3.0 grains of Red Dot (this load is too hot for the I-frame guns and only gets shot in my K-frame .32s). This load does not produce the explosive expansion that magnum cast HP loads commonly deliver, but it does offer notably better killing power for moderate-sized vermin like jack rabbits, nutria, rock-chucks, and such.

Perhaps my favorite application of the .32 S&W Long is as a grouse gun. Here in the Pacific Northwest, grouse are commonly encountered in the mountains during deer and elk season. These encounters are typically at close range (commonly ~15 yards or less), and in country where big game (the primary quarry) is likely to be nearby. This means that a small, accurate, quiet handgun, capable of killing grouse cleanly without wasting a lot of tasty meat makes a sensible companion. The .32 S&W Long, loaded with wadcutters at target speeds, does a fine job putting grouse in the game bag (so do the Keith-style SWC's, but the target wadcutter loads are a little quieter, and thus less likely to spook big game). My favorite way to prepare grouse is to bone out the meat and slice it into bite sized chunks, simmer it gently in some white wine (preferably Riesling), butter, a little dab of Dijon mustard, some garlic, onions, and sliced mushrooms, and it becomes a meal fit for a king.

Yes, in some ways the .32 S&W Long is a relic from a by-gone era, a 19th century pocket pistol for self-defense. More effective cartridges have since been developed for that application, but the .32 S&W Long still has a place in a handgunners battery. While the .32 S&W Long lead round-nose factory ammo isn't particularly effective, when the cartridge is loaded with wadcutters at 750 fps or SWC's at 900-1000 fps, it makes an outstanding small game round for the modern handgun hunter.

- Glen E. Fryxell

Addendum on cast SWC's in the .32 S&W Long:

Commonly, when I am working up new loads for the .32 S&W Long, I will do all the shooting and chronographing with the custom Ewer K-32 bullseye gun described above. It is very accurate so I know that I'm getting everything out of the load that it has to offer, and if the chronograph tells me that the loads are a little too warm for the I-framed guns, I don't have to worry about damage to the very strong K-frame. The realization hit me that I had chronographed the wadcutter loads out of the I-framed revolvers, but I had just taken the other loads out and shot stuff with them, without knowing exactly how fast they shot in the various guns. This last weekend, I decided to rectify that oversight.

All cast bullets cast of range scrap (BHN ~ 10).
Sized .312" lubed with 50/50 beeswax/Moly grease.
Winchester Small Pistol primers.
Temperature ~75^F.

Velocity data for .32 S&W Long loads

3.0 grains of W231 with the Lee 98 grain SWC.		2.5 grains of Red Dot with the Mountain Molds 102 grain SWC.	
Ewer K-32 (6")	974 fps	Ewer K-32 (6")	857 fps
3 1/4" Model 1903	820 fps	3 1/4" Model 1903	727 fps
4 1/4" Model 1903	908 fps	4 1/4" Model 1903	782 fps
6" Model 1903	866 fps	6" Model 1903	734 fps

3.0 grains of W231 with the Mountain Molds 102 grain SWC

Ewer K-32 (6")	911 fps
3 1/4" Model 1903	766 fps
4 1/4" Model 1903	836 fps
6" Model 1903	792 fps

The first thing that jumps out of these numbers is that these loads are going notably slower from the old I-framed guns than they are out of the tight custom K-32 bullseye gun. This in and of itself isn't surprising, but the margin of difference between the 6" K-32 and the 6" I-frame took me by surprise (~120 fps). The other thing that jumps out of these numbers is that the 4 1/4" is consistently the fastest of the I-framed guns, and it is consistently ~40 fps *faster* than the *longer* barreled 6" Model 1903. As my friend John Taffin has said for years when people ask him about revolver velocities, "Each sixgun is a law unto itself.". John's right.

All of these guns have cylinder throats that run less than .313", so these observations got me to thinking about the cylinder gaps in these various revolvers, so I broke out the feeler gauges and made a few measurements.

Ewer K-32 bullseye gun	.0025"
3 1/4" Model 1903 (5th change, 1914)	.004"
4 1/4" Model 1903 (2nd change, 1906)	.0025"
6" Model 1903 (5th change, 1910)	.005"

Sure enough, the slow 6" Model 1903 has the largest gap, and the fast 4 1/4" Model 1903 has the smallest gap.

Next, if we compare the two bullets by examining the data from the two loads using 3.0 grains of Winchester 231, we see that the Lee custom Keith-style SWC is consistently ~60 fps faster than the Mountain Molds Keith-style SWC. The Mountain Molds SWC stays true to the design parameters laid out by Elmer Keith (3 driving bands of equal width, large flat-bottomed grease groove, beveled crimp groove, large meplat), and was designed with a 73% meplat. This is a design that has proven itself for over 3/4 of a century. The Keith-style SWC that we got as a part of the custom group buy from Lee has a meplat of .205", which equates to about 66% (very similar to what Elmer used when he designed his first SWC, the 429421, which leaned heavily on the 429336, the so-called "Heath bullet" designed back before World War I; Elmer would use larger meplats on his later SWC designs, varying between 70% and 75% of bullet diameter). There are two possible explanations for this velocity difference between the Mountain Molds SWC and the Lee SWC -- 1) the weight difference, and 2) the difference in thickness of the base bands. These bullets were cast with range scrap with a BHN of about 10 (similar to WW alloy) and the Lee SWC weighs 98 grains, and the MM SWC weighs 102 grains. Is a 4 grain difference in weight enough to cause a 60 fps difference in velocity? Maybe, maybe not. Changes in base band thickness are known to have an impact on how well the bullet's base can seal the propellant gases. The MM SWC has a base band that is .075" thick, whereas the Lee SWC has a base band that is .110" thick. Which parameter is responsible for the velocity difference? I don't know, but I suspect that it could be the base band difference. In any event, I think it would be appropriate to use this example to modify Taffin's Axiom to, "Every bullet is a law unto itself.". As for the 60 fps difference, I'm not going to get too wound up over it since both of these loads use good flat-pointed bullets and there isn't a grouse in the world that could ever tell the difference between these two loads.

Lastly, if we compare the two loads using the Mountain Molds SWC (over 3.0 grains of 231 and 2.5 grains of Red Dot), we see that the 231 load tends to be about 50 fps faster. In my experience, the Red Dot load is more consistently accurate (from gun to gun). Some guns shoot the 231 load well, others don't, but they all seem to like the Red Dot load, so that's a load that I generally tend to gravitate towards.

The bottom line is that these loads were going a little slower than I thought out of the old I-frame guns, but these flat-pointed bullets still kill rabbits, grouse and squirrels just fine, thank you.

- Glen E. Fryxell

Is the .44 Magnum becoming overweight?

By: Glen E. Fryxell

There is a popular trend among handgun hunters towards heavier bullets, with the goal of increased penetration. While a 300 grain bullet in either a .44 Magnum or a .45 Colt will shoot through a deer from pretty much any angle, many hunters dream of hunting larger game, and spend a lot of time thinking about even heavier bullets to obtain similar performance on elk, moose, buffalo and the like. This door to this level of revolver performance was opened by J. D. Jones back in the early 1980s when he introduced his cast bullet designs, and most notably the 320 grain SSK .44 Magnum bullet. At that point in time, most bullet manufacturers were limiting their .44 bullets to 250-265 grains. J. D. saw a need for well-designed heavier bullets and answered that need by developing the JDJ line of bullet moulds. In the years that have passed since, others have followed suit with their own designs. The question then arises as to when does more weight become too much weight for the .44 Magnum? The "conventional wisdom" is that a 300 grain bullet (either cast or jacketed) is the optimum "heavy bullet" weight for the .44 Magnum, and that anything heavier compromises terminal performance by limiting muzzle velocity. Is this really true, or is it just more gun-shop hot air? The 320 grain SSK has an excellent reputation, having taken everything from elk to elephant, but are some of the newer .44 heavyweights even better? There are commercial .44 Magnum loads that go up to 350 grains, and commercial hardcast bullets that allow the handloader to go as heavy as 405 grains. For example, Randy Garrett uses 310 grain bullets (with a .320" meplat) at 1325 fps in his Sledgehammer .44 Magnum loads (Garrett Cartridges). Cor-Bon has hardcast heavyweight loads featuring a 305 grain flat-point penetrator at 1300 fps, and a 320 grainer at 1270 fps. Buffalo Bore offers a 305 grain LBT LFN at 1325 fps, and has a commentary on their website about overly large meplats and how they can limit penetration. These are some of the 300+ grain loads that are marketed for all .44 Magnum revolvers, there are also heavier loads marketed specifically for the Ruger Super Redhawk that are too long for the "standard" .44 Magnum revolvers (e.g. Garrett's .44 Magnum Hammerhead +P ammo with a 330 grain long-nosed bullet at 1400 fps, with a .320" meplat).

Commercial hardcast heavyweights are also available as components. For example, Cast Performance offers 320 grain WLN bullets for handgun hunters. In addition, Beartooth offers .44 caliber heavyweights in 325, 330, 355 and 405 grains, in a variety of nose configurations.

The question then becomes, is all this extra weight useful for a .44 Magnum revolver, or is it just too much of a good thing? I decided to do some testing with a wide variety of heavyweight cast bullets in the .44 Magnum to see what I could learn. There is very little reason to look for expanding designs in this weight range for the .44 Magnum for the simple reason that bullets in this weight range are chosen for deep penetration and expansion would be counter-productive. The purpose of this article is to examine some of the various 300+ grain cast bullet designs that are available and evaluate their performance in typical hunting guns.

So, let's take a tour of some of the heavyweights and see how they shoot. I'm going to simplify things and just accept that W296 is the most popular powder for high performance heavyweight .44 Magnum loads and stick with that one powder. Yes, other powders work just fine for this class of load, but if you can't make a bullet shoot in .44 Magnum with W296, then it's unlikely that that bullet is going to shoot well with any other powder. Likewise, previous experience has shown me that the top performing primer (both in terms of velocity and accuracy) in the .44 Magnum is CCI 350, so I'm going to stick with that one primer for the following comparisons. Choice of guns was also straightforward -- I prefer to shoot lighter bullets in my S&W's (like the 429421, the 429640 HP and the LBT 280 WFN), and save the heavier stuff for my Rugers, so I picked out a pair of 7 1/2" Super Blackhawks (SBH's) for these comparisons, and also ran these loads through my Marlin 1894 .44 Magnum lever-gun. Yes, stiffer loads +P can be assembled for the Ruger Super Redhawk, Dan Wesson and Colt Anaconda revolvers, but I was interested in answering this question for "standard" .44 Magnum revolver loads (the same trends will likely hold true for the +P loads, just offset to somewhat higher velocities).

Pictures of some of the bullets tested.

All bullets were cast from WW alloy, sweetened with approximately 2% added tin. Bullets were sized .430", except for the Lyman 429649 340 grain GCFP and the NEI 365 grain ogival wadcutter, which were sized .429" so that these tubby bullets would chamber. Both of these bullets have extended full diameter sections on their noses and would not chamber in the test revolvers if sized .430".

Marlin 1894 44 Mag.

None of the loads discussed below displayed any signs of excessive pressure.

The Saeco 300 grain GC-RNFP was loaded on top of 21.5 grains W296. From the 7 1/2" Super Blackhawk this load generated 1373 fps with reasonable accuracy. This load fed from the Marlin's magazine superbly and delivered excellent accuracy at 1679 fps.

Liberty Super Black Hawk.

The LBT 300 LFN was also tested over the same load (21.5/W296). Similarly, it delivered so-so accuracy from the SBH, and velocity was measured at 1326 fps. The Marlin carbine cycled this combination smoothly, and delivered good accuracy and 1711 fps. As a side note, the ogive and meplat on the LBT 300 LFN are virtually identical to the Lyman 429640 (275 grain), the LBT is just a little longer, heavier, has more grease grooves and is a PB design (the Lyman is a GC design). NEI has a very similar plain-based bullet listed as the 290-429-PB (#263) that gave virtually identical performance.

The RCBS 300 GC-SWC weighs 303 grains when cast of WW alloy, so it was seated over the same test load (21.5/W296). This bullet delivered excellent accuracy from the stainless SBH at 1372 fps.

The Lyman 300 GC-SWC (#429650) weighs 310 grains when cast of WW alloy, so I chose to reduce the test load 0.5 grain (21.0/W296). This combination provided excellent accuracy and 1379 fps from the sixgun. It fed just fine from the magazine of the lever-gun, and demonstrated decent accuracy (1708 fps). Informal plinking at softball-sized rocks at 150 yards verified that these bullets were fully stabilized by the 1 in 38" twist and flying true.

J. D. Jones of SSK Industries designed a series of heavyweight flat-pointed bullets for handgun hunters back in the 1980s. These moulds were made by NEI. The most popular of these was the 320 grain version for the .44 Magnum. The SSK 320 was loaded over 21.0 grains of W296, which delivered 1345 fps, along with excellent accuracy, from the 7 1/2" Ruger SBH. When crimped in the crimp groove, this bullet is just a touch too long to cycle through the Marlin, but single loaded it chambers and shoots very well indeed (delivering excellent accuracy and right at 1600 fps).

The expander ball on my Dillon die set runs .4275" and I size the SSK bullets to .430" With a bullet that has as much bearing surface as the SSK bullet, this provides enough bullet pull to prevent recoil from shoving the bullet deeper into the case while the round is "waiting in line" in the magazine. I loaded this bullet up to an OAL of 1.638" and placed a hearty roll crimp over the forward driving band. Seating a bullet deeper into the case requires that the load be reduced accordingly. I was guessing that this load reduction would take me to somewhere around 19.5 grains. Using Winchester Super-X cases, the SSK bullet leaves room for 20.3 grains of water when seated to its normal depth. Although seating it to an OAL of 1.638" to crimp over the forward driving band doesn't look like a huge difference, there is now only room for 17.3 grains of water, indicating that internal case volume has been reduced by almost 20%! As a result, I reduced the powder charge to 17.5 grains of W296 (I'm glad I didn't just guess!). So loaded, this ammo cycled through the Marlin flawlessly. Accuracy was excellent and velocity came out to a consistent 1414 fps. All pressure indications were normal.

The LBT 320 WLN weighs 311 grains when cast of WW alloy and so the test load was once again 21.0 grains W296. When loaded into .44 Magnum brass and crimped in the crimp groove, the meplat of this bullet comes right up to the front face of the SBH cylinder. There is no more than a thousandth, or maybe two, of clearance. Bullet creep is something that happens with heavy recoiling loads (like a 300+ grain .44 Mag load at almost 1400 fps). We usually don't see it a) because it's generally pretty minimal (only a few thousandths), b) we destroy the evidence by shooting the ammo, and c) there's enough clearance built in to most bullet designs that a few thousandths bullet creep has no impact on our shooting. Even seating the bullet as deeply as I could and using a heavy roll crimp, I could never get through a cylinder-full of 6 shots without tying up the gun. Usually by the third or fourth shot a bullet had snuck just far enough out of the front of the cylinder to prevent rotation. Another issue that comes to the forefront with a cast bullet loaded right up to the front of the cylinder is that the cylinder gap flash of the shot preceding it will literally melt/blast a fair amount of lead off of the near side of the nose. Asymmetric bullets don't tend to fly very straight (this is another reason most bullet designs have a minimum of .050" clearance between the meplat and the front of the cylinder). In addition, these loads did not feed at all from the magazine in the Marlin lever-gun (they would chamber if single-loaded, but were too long to eject if not fired). The bottom line is that the LBT 320 WLN is not well-suited for use in either the Ruger Super Blackhawk or Marlin 1894 *if loaded into .44 Magnum cases*. These problems were side-stepped by loading these long bullets into .44 Special cases. Loaded into W-W .44 Special cases and crimped in the crimp groove, the 320 WLN chambered easily in .44 Magnum revolvers (as well as .44 Special revolvers, although the clearance problem returns) and cycled reasonably well through the Marlin action if it was cycled slowly (slamming it home quickly generally led to rough feeding). These dummy rounds were found to have a case capacity of 19.8 grains of water. Note that this is only half a grain below the case capacity for the SSK 320 seated normally in a .44 *Magnum* case, and significantly greater (2.5 grains) than the deep seated 320 SSK, again in a .44 Magnum case. The LBT bullet was explicitly designed to get as much of the bullet out of the case as possible. All this leads up to the question of what is a suitable powder charge? My standard load for bullets of this weight in the .44 Magnum is 21.0 grain of W296, and given the slight reduction in case capacity, I chose to reduce this to 20.0 grains (this load applies *only* to this specific bullet loaded into .44 Special cases for use in .44 Magnum firearms!). So loaded, this combination gave 1262 fps from the 7 1/2" Super Blackhawk and 1540 fps from the Marlin 1894.

This bullet was clearly designed for use in the Ruger Super Redhawk (and other sixguns with longer than normal cylinders, like the Dan Wesson and the Colt Anaconda). Testing of this bullet loaded normally in a 7 1/2" Ruger SRH .44 gave velocities of 1329 fps and good accuracy.


Ruger Super Redhawk 44 Magnum.

SSK also commissioned a 330 grain GC .44 bullet, although this bullet has a slightly smaller ogive (.300") and meplat (.270") than does the original 320 gain PB SSK bullet (.322" and .280" respectively). In fact this bullet more closely resembles the .41 SSK ogive and meplat than it does the 320 grain .44. In any event, when loaded on top of 20.0 grains of W296, the 330 SSK delivered very good accuracy and 1313 fps from the SBH revolver. Once again, the SSK profile is just a wee bit too long to cycle through the Marlin, and it was felt that little would be gained over the 320 SSK by similar deep seating of the heavier, longer bullet, so no tests were run with ammo so loaded.

Back in the early 1990s Lyman introduced a blunt, heavyweight bullet for the .44 Magnum. The Lyman 429649 weighs 338 grains when cast of WW alloy and is a GC-FP design reminiscent of some of the classic African solids in shape. This bullet has a large amount of full-diameter bearing surface forward of the crimp groove, so it's important to size them to fit your revolver's throats, or else they won't chamber.

When this blunt sledgehammer is loaded on top of 18.3 grains of W296 it generates 1226 fps with good accuracy from the stainless SBH. This load feeds from the magazine fine in the Marlin 1894, but the extended full-diameter bearing surface is too long to allow the round to chamber. If one wanted to shoot this bullet from their Marlin lever-gun, some minor throat work should clear this issue up (although it's not clear that the 1 in 38" twist of the barrel would fully stabilize this bulldozer).

SRH & LBT.

The LBT 350 grain WLN-GC, loaded into .44 Magnum cases over 17.5 grains of W296, was found to deliver good accuracy and 1166 fps from the Ruger SBH. This combination chambered easily in the SBH and left ample room for creep, with minimal problems from flamed bullet noses (in contrast to the 320 WLN). The 350 WLN cycles (albeit roughly) and chambers just fine in the Marlin 1894. However, groups at 50 yards were quite poor, with almost half of the shots key holing (just for the record, the velocity was 1410 fps). Clearly, at 350 grains we have passed the limit of what the 1 in 38" twist of the Marlin's barrel is able to effectively stabilize at .44 Magnum velocities.

SSK added a gas-checked shank onto the stern of their 320 classic to arrive at the SSK 350 GC (.320" ogive and .285" meplat, i.e. the original SSK dimensions). This bullet was paired with 17.5 grains of W296, and velocities averaged 1180 fps, with very satisfying accuracy from the Ruger SBH. As before, the SSK profile doesn't work well with the Marlin when crimped in the crimp groove, and I had no desire to deep seat this long, heavy bullet. Based on the results obtained with the LBT 350, it is doubtful that the 1 in 38" twist would stabilize this bullet anyway as the two bullets are the same length.

I also have an NEI mould for a .44 caliber 365 grain ogival wadcutter. Like the Lyman 429649, this bullet also has lots of bearing surface forward of the crimp groove so it's important to pay attention to sizing them to fit your revolver, or else they won't chamber. This leaden drum was loaded over 17.0 grains of W296, which delivered 1108 fps and decent accuracy at 25-30 yards with the stainless SBH. Plinking at targets on a hillside 75-80 yards away revealed an interesting trend -- roughly half of the shots fired smacked the target dead-on, while the other half missed by anywhere from 5 to 20 feet. The bullets were clearly starting to tumble somewhere in the 50 to 70 yard range. With the long nose and porky ogive of this ogival wadcutter, loading it into the Marlin wasn't even attempted, as this would most certainly tie up the gun and probably require considerable frustration to remove.

> Warning! What follows is a mathematical exercise intended for comparison purposes only. This is not intended to quantify the actual penetration of bullets, but rather to simply demonstrate the factors involved in bullet penetration and allow some simple comparisons to be

made. If this model doesn't sing the praises of your favorite bullet, that doesn't mean that your favorite bullet is a bad bullet, just that there are others out there that might out perform it. Remember, this is just a model. You have been warned....

The ability of a non-expanding bullet to crush and displace tissue is a function of its momentum and its meplat. Ignoring the role of the meplat for the moment, we can calculate momentum by multiplying bullet weight (in grains) times velocity (fps) and diving by 7000 (grains/pound). The velocity data presented above can be reduced down to the following table. As we can see, optimum momentum is obtained with 320-330 grain bullets in the .44 Magnum Super Blackhawk (somewhat hotter loads are possible in the Super Redhawk, DW and Colt Anaconda, so all of these numbers would be offset upwards).

Sixgun	Momentum	Momentum/meplat area
300 @ 1375	58.9	120 (SAECO), 99.4 (Lyman), 87.3 (RCBS), 82.8 (LFN)
320 @ 1350	61.7	82.0 (SSK), 64.2 (WLN)
330 @ 1300	61.3	87.6 (SSK)
340 @ 1250	60.7	85.4 (Lyman)
350 @ 1200	60.0	79.5 (SSK), 66.1 (WLN)
365 @ 1100	57.4	50.6 (NEI)

Lever-gun		
300 @ 1700	72.9	147 (SAECO), 123 (Lyman), 108 (RCBS), 107 (LFN)
320 @ 1400	64.0	85.3 (SSK)

Reference		
250 @ 1200	42.9	69.6 (Lyman 429421 Keith .44 Special load)
250 @ 1400	50.0	81.2 (Lyman 429421 .44 Magnum load)

It is reasonable to hypothesize that the amount of tissue crushed by a bullet is directly proportional to the frontal surface area of the meplat, and since crushing tissue constitutes work and depletes the bullet of momentum, it follows that the depth of penetration is going to be inversely proportional to meplat frontal surface area (i.e. larger meplat = less penetration, all other things being equal). The simplest comparison therefore is to simply divide the momentum by the meplat frontal surface area (calculated here in square inches). This model assumes homogenous "tissue" and ignores the drag on the ogive, and any possible change in meplat diameter -- remember this is just a model for comparative purposes. The next step would be to compare the penetration of all of these bullets in standard medium (like John Linebaugh does in his seminars), and see how well this mathematical model holds water in wet newsprint.

The clear penetration winner from this analysis is the SAECO 300 grain RNFP, but that is undoubtedly a result of it having by far the smallest meplat of the group (which would suggest the narrowest wound channel). For means of comparison, similar calculations were carried out for the Keith .44 Special load (the Lyman

429421 at 1200 fps) and the same bullet at full throttle in a .44 Mangum load (1400 fps). Comparing these results, we find some interesting observations. First off, several of these heavyweight loads are predicted to penetrate *less* than the standard .44 Magnum load, or even Elmer Keith's .44 Special load! (read that sentence again and reflect on how clever Elmer Keith really was!) The LBT 320 WLN, the LBT 350 WLN and the NEI 365 ogival wadcutter all come up short of the Keith SWC (in either load). To be sure, these heavyweights would leave a devastating wound channel in their wakes, but this simple model suggests that they would not penetrate as deeply as the LBT 300 LFN, the RCBS and Lyman 300 SWC's, the SSK 320, 330 and 350 FP's, and the Lyman 429649, all of which would penetrate more deeply than the "standard" .44 Magnum load.


The SAECO 44 300 Gr.


The SSK 320 Gr. Mould and Bullets.

These trends show that the simple mantra of "more bullet weight + more meplat" does not necessarily equate to deeper penetration. After all, the meplat is the brake that stops the bullet. Admittedly, this model really amounts to little more than an entertaining exercise in mathematics, but it serves to illustrate that penetration depth and wound channel diameter are inversely related (as one goes up, the other goes down) and that choice of a bullet design represents a compromise between these two performance metrics. Obviously, the reason for choosing heavier than normal bullets is to obtain greater than normal penetration, so one

Lyman 429650 mould.

selection criterion would be to eliminate from consideration all bullets below the threshold of the "standard" .44 Magnum load. From the remaining bullets, a sensible second parameter would be the largest possible meplat for the greatest tissue crushing capability. Combining these two selection criteria focuses the discussion on those bullets with values in the 80s in the table above (the SSK's, the Lyman 429649, LBT LFN and RCBS SWC). It is worth noting that all of these bullets have meplats that are 69-72% of the bullet diameter (recall that Elmer Keith settled on a meplat diameter of about 70% for his last 3 SWC's).

Looking at the Super Blackhawk numbers, the best performance is turned in by bullets in the 300-340 grain weight range, with a peak in terms of velocity and momentum at about 320-330 grains, providing an answer to our initial question ("Is all this extra weight useful for a .44 Magnum revolver, or is it just too much of a good thing?"). There are a number of excellent cast bullets in this weight range for the handgun hunter to choose from. In choosing one of these bullets, an issue that should be kept in mind is that heavier than normal bullets do print to a higher point of impact than do standard weight bullets. If you have a revolver that tolerates heavy bullets well (i.e. has sufficient sight adjustment to regulate point of aim to coincide with point of impact), then any of these bullets will provide good service. But if you have a gun that is limited in terms of what bullet weights will "shoot to the sights", you might want to shift your focus towards the lighter end of this group. After all, the whole point of shooting is hitting what you're shooting at, and if you can't place the bullet precisely where you want it, there's not much point in dropping the hammer.

For the Super Blackhawks, there are a lot of good choices. The best accuracy was turned in by the 300 grain GC-SWC's from Lyman and RCBS and the various different weight SSK bullets. These are all excellent bullets, but my favorite overall is the 320 grain SSK; this bullet can, and has, done it all. And while it's not a very efficient bullet for the .44 Magnum, I can't help but think of wild hogs and Russian boar when I look at the NEI 365 ogival wadcutter; although this bullet is limited in terms of both velocity and penetration, it's a definitive short-range, heavy-duty bludgeon (but it's a poor choice for pretty much anything else).

The LBT 320 WLN is a specialized bullet that is really only suitable only for the Ruger Super Redhawk and the Dan Wesson .44 Magnum revolvers. It will not feed in the Marlin when loaded in .44 Magnum cases. While it can be loaded in the Super Blackhawk and S&W N-frame .44 Magnums, the meplat comes right up to the mouth of the cylinder and ***any*** bullet creep will tie up the cylinder. This bullet can be loaded to function in these guns by loading it into .44 Special cases, but it's doubtful that it's worth the effort. There are much better choices out there for these guns.


RCBS 44 300 Gr. SWC GC Mould and Bullet.

For the Marlin 1894 lever-gun, there is a clear advantage to the 300s (SAECO, LBT LFN, Lyman or RCBS 300 GC-SWC) at 1700 fps. All will deliver good to excellent accuracy and more than enough thump to handle anything I'm going to point that sweet little carbine at. The heavier bullets have specialized profiles that make them difficult (or impossible) to use in this gun and the 350s don't stabilize properly with the 1 in 38" twist.

So, for the .44 Magnum, it appears that the optimum bullet weight (in terms of penetration) is in the range of 300 to 330 grains. Today we have many fine choices for cast hunting bullets for the .44 Magnum, but it is clear that a lot of good thinking went into the design of the Keith 429421 and the SSK 320. The quality of these two designs is really showcased now, years after their design, when we compare them to all the rest of these challengers. Truly, both bullets are landmarks for the handgun hunter. Good teachers are a blessing indeed.

- Glen E. Fryxell

The .40-50 Sharps Straight Contender

By: Glen E. Fryxell

Load Data
At
Bottom of Page

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Some of the old black powder cartridges of yesteryear can be quite well-suited for use in the Contender due to their straight cases, husky rims and modest operating pressures. I have been fascinated for some time with the concept of putting together a Contender in one of these old-timers, specifically one in caliber .40, able to use commercially available jacketed pistol bullets (that are all the rage these days), and some of those lovely .40 caliber black powder cartridge rifle cast bullet designs, like the Lyman 403169 and 403173 (that were all the rage in days gone by). Many concepts and candidates for this project have come and gone; some very nearly came to fruition and others were just fleeting fancy, but all carried the same basic attributes -- a straight case about 2" long, a big rim, and a nominal .40 caliber bullet.

Regardless of the final case design chosen, barrel stock was going to be needed for this project. T/C has established a website to sell off their "loss leaders" (www.foxridgeoutfitters.com/netcont.html) at very friendly prices. A blued 10" 10mm barrel was purchased as re-chambering fodder for this project. Interestingly, it was found when the 10mm barrel arrived that it slugged out at .404", making it appropriate for one of the .403" bullet diameter .40 caliber black powder rifle cartridges, loaded with slightly over-sized cast bullets. Other 10mm T/C barrels undoubtedly will have a tighter groove diameter, probably somewhere around .401".


10" T/C Contender re-chambered from 10mm to 40-50 Sharps Straight, loaded with the Lyman #403169.

The final decision to re-chamber to .40-50 Sharps Straight was made based on the suitability of the bore dimensions, the ability to make cases from .303 British (or .30-40 Krag) brass and the fact that dies are available from Huntington's (for either .403" or .408" bullet diameters). While visiting with friend Cliff Labounty (of Labounty Precision Reboring), I mentioned that I was looking for a .40-50 Sharps Straight reamer, and did he by any chance know anybody that had one? He walked over to his tooling files, rummaged around for a minute, pulled out a nice, clean, shiny reamer and said, "What? You mean like this?". After picking my jaw up off the floor, I had to ask what diameter bullet it was for, and why on earth did he have a .40-50 Sharps Straight reamer just lying around? It was indeed for the desired .403" diameter bullet and was left over from a project he did for a customer about 10 years ago. This reamer had cut exactly one chamber. Cliff offered to rent it to me for a nominal fee. I was on Cloud 9 for the entire drive home.

First, I sat down and turned out a .40-50 Sharps Straight trim die from 7/8" round stock so as to simplify case forming operations. Next, I cut the new chamber, which was straightforward. Case forming was next on the agenda; to simplify this operation I took a 1/2" x 20 bolt, cut the head off and turned half of the shank down to .396" and then cut a 10 degree taper down to about .280" and polished it. This tapered expander plug threads into a standard RCBS pistol flaring die body.

Instead of going through all of the gory details of what didn't work, let me just report the final case-forming protocol that worked very well indeed (no cases were lost using this procedure). New .303 British cases were first run over a .338" expander, followed by a .358" and then finally over the .396" tapered expander plug. At this point, they were run into the trim die, trimmed to 1.87" and de-burred. From here out, cases were loaded normally. Fire-form loads were slightly "wasp-waisted" due to the difference in tapers between the .303 British and .40-50 Sharps Straight cases (.30-40 Krag brass more closely matches the taper of the .40-50 Sharps Straight and probably wouldn't display this minor wasp-waist). Also, there was a small "wrinkle" just aft of the case mouth on the fire-form loads, where the original .303 shoulder was. This wrinkle was "ironed out" by removing the de-capping stem from the sizer die and gently running the loaded round into the sizer die just far enough to iron the wrinkle flat (being very careful not to distort the bullet). An excellent fire-form load is composed of the Lyman 403169 bullet (about 245 grains) over 32.5 grains of H4895. This load is quite uniform shot-to-shot and approximately reproduces the original black powder rifle ballistics from a Contender length barrel (1380 fps). Brass seems to be quite long-lived; no cases have been lost to date.

Once-fired .303 British brass can also be used to form .40-50 Sharps Straight cases, but a small percentage (about 5%) will be lost due to the necks tearing out during the neck expansion steps. In addition, most .303 British chambers are cut quite generously, so once-fired brass is usually rather grossly expanded just forward of the web. While this expansion can be sized back down to form .40-50 Sharps Straight cases, it creates an over-worked and weakened case in so doing -- and weakens it right where the strength is needed most. Factory new .303 British brass is cheap enough that it just makes sense to go that route to form these cases.

A little bit of history -- the .40-50 Sharps Straight was introduced in 1879, and was one of the last of the Sharps family of cartridges. The Sharps Rifle Co. went under in 1881. It is the smallest of the Sharps line, and was presumably designed as a moderate hunting and target cartridge, similar to its curvaceous cousin, the .40-50 Sharps Bottleneck. Original ballistics for the .40-50 Sharps Straight had a 265 grain lead bullet sailing forth at 1410 fps. Obviously, black powder was the original propellant, but contrary to the name, these cartridges were only charged with 40 to 45 grains of the smoky stuff. The Sharps Rifle Co. was not alone in reaming these chambers, Winchester and Remington also made single-shot rifles for this cartridge. But the writing was indeed upon the wall -- repeating rifles, smokeless powder, higher velocity and flatter trajectories left the .40-50 Sharps Straight in the dust of the Old West and the history books, to die quietly with the last of the ravaged buffalo herds.

Several of the design features of the .40-50 Sharps Straight case make it very well suited for use in the Contender, however. It is a rimmed case, simplifying extraction. It is essentially a straight case with only a modest amount of back-thrust accentuating taper. The 1.88” case has an appropriate case capacity and powder column length to be efficiently exploited in Contender length barrels. And it’s a cute little bugger -- it looks kinda like a .45-70 that got left out in the sun and shriveled up and shrunk just a little bit. It needed a good home, so I gave it the best one I can think of -- the Thompson-Center Contender.

Due to back-thrust considerations, the .40-50 Sharps Straight must be held to 40,000 psi peak pressure or less in the Contender. I have tried to keep things in the 30,000-35,000 psi range in my loading for this cartridge (I estimated these pressures by using the pressure data provided by the “Load From a Disc” calculations. I completely ignored the suggested powder charges. Using powders slightly slower than those identified as “ideal”, I worked up to the velocity that correlated to the chosen pressure ceiling. Measuring case expansion at this point provides a tangible method for approximating this pressure with faster and slower powders. Remember, these are only estimated, not measured, pressures.). If you want to hot-rod your Contender, J.D. has any number of well thought-out wildcats that will make your heart go all a-flutter. The aim in resurrecting a 120 year old cartridge was not to “push the envelope” in terms of what could squeezed out of some helpless old geezer, but rather to explore a comfortable “fit” between the old and the new. Kept within these moderate pressure levels, the .40-50 Sharps Straight can still push a 245 grain cast FP (Lyman 403169) at 1600 fps from a 10” barrel, 300 grainer's at 1400+ fps, and the 200 grain Hornady XTP at 1800 fps. “Load From a Disc” calculations suggest that a 14” barrel picks up only 100 fps over these numbers. The .40-50 Sharps Straight is clearly very much at home in a 10” T/C.

Some of you might very well be asking at this point, “A 245 grain cast bullet at 1600 fps? A 200 grain XTP at 1800 fps? Why not just shoot a .44 Magnum Contender?”, and you would be raising a very good point indeed. For a given bullet weight and shape, a .40 caliber bullet will have better sectional density and aerodynamics, so trajectories will be somewhat flatter and impact velocities will be a little bit higher. In addition, penetration should be deeper for .40 caliber cast bullets than for a similar weight and design .44 slug. Does this mean that the .40-50 Sharps Straight is a more powerful, harder-hitting cartridge than the .44 Magnum when both are fired from a Contender? Maybe, but I doubt it. I prefer to think of it as the .40-50 Sharps Straight being in darned fine company as a useful handgun hunting round. The .40-50 Sharps Straight has an old-world charm, flavor and charisma that a modern, mass-produced generic revolver round just can’t muster. Coupling that antique-stained, 19th-century *panache* with solid hard-core hunting capability, and wrapping it up in a case design ideally suited for the Contender was sufficient reason to build one. Some will understand that, some won’t. So be it.

My Lyman 403169 mould drops bullets that run .407” in diameter. Originally, I was sizing them .404” to match the groove diameter of this particular barrel, but accuracy, while acceptable, was less than what I had hoped for. Thinking that perhaps I was distorting the bullets by sizing them down that far, I bought a “.406” sizer die (which actually sizes bullets .4055”) and accuracy immediately improved. This led to an interesting observation: when attempting to extract *unfired, loaded* rounds, a few of these cases would display sticky extraction. Due to the mechanical advantage of the closing Contender action, no resistance was felt upon closing, but things were definitely sticky upon opening. This is a clear sign of a tight chamber, and more specifically, very little neck clearance. Measurement of the loaded rounds revealed that some were running as much as .4255” at the neck, while a chamber cast revealed a chamber neck of only .426”. I like tight chambers just as much as anybody, but when you’re dealing with less than .0005” clearance, then all it takes is a little bit of powder fouling, bullet lube or a cartridge that is only ever-so-slightly out of round and you’ve got problems with both excessive pressures and difficult extraction. This problem could be solved by either thinning case necks (by reaming or neck-turning) or by relieving the chamber neck. Since the RCBS resizing die was actually doing very little actual sizing of the case (*i.e*. a very good fit between chamber and die), there was a concern that thinning the case necks might possibly lead to a situation where the sizing die would not reduce case mouth diameter sufficiently to provide adequate bullet pull. Therefore, it was decided to relieve the chamber neck to .429”. This was accomplished with a .429” throating reamer. Please note that this modification would not be needed for anyone shooting .403” (or smaller) bullets, as the reamer dimensions are fine for that scenario. This modification was made necessary by my shooting over-sized .4055” cast bullets in a .404” barrel, which is incompatible with .403” diameter (or smaller) cast bullets.


403173 (left) and the 403169 (right) shown in both solid and HP form.

My 403173 mould drops bullets that are significantly out of round. I have hand-lapped the mould to try and “true it up” and that has helped, but it still isn’t round (diameters range from .402” to .405” depending on where it’s measured). In spite of this, these bullets actually shoot just fine.

In general, the best accuracy for both of these cast bullets seemed to come in the 1350-1450 fps ballpark. Whether this is due to the alloy used (wheel weights), the nature of this particular throat, or just part of the “personality” of the .40-50 Sharps Straight cartridge, I don’t know, and frankly I don’t care. As mentioned earlier, the motivation behind this project was to reproduce the original BP ballistics in a hunting handgun, not red-line the pressures in an effort to get every last shred of velocity possible before something came unglued.

Based on my experience with the .444 Marlin Contender, I tried using magnum primers to see how they would affect accuracy. In contrast to the larger .444, the .40-50 Sharps Straight didn’t show any real preference for the hotter spark, and in fact some of the most accurate loads were assembled using regular primers. Perhaps this is due to the smaller case capacity of the .40-50 Sharps Straight, or maybe it’s the lower operating pressures, but either way regular primers seem to work just fine. I haven’t tried pistol primers yet, but there may be some benefit from their use.

As far as powder selection goes, the faster powders (4227, 5744, etc.) were generally disappointing. 4198 did turn in a few good loads, but overall the best accuracy was consistently turned in by powders of more moderate burning rate. If I had to choose a single powder for use in the .40-50 Sharps Straight Contender, it would have to be IMR 3031 -- easy to light, moderate pressures and excellent accuracy. H4895 would be a close second choice, and for the very same reasons, and Acc. Arms 2520 was also quite good. Quite surprisingly, virtually all of the loads tested using Re 7 turned in horrid accuracy. Ken Waters noted similar behavior in his study of the .40-50 Sharps Bottleneck (published in *Handloader*, #163, May/June 1993). I expected Re 7 to be very well suited for a cartridge of this capacity and configuration, but for whatever reason, these two just don't play well together.

The RCBS die set does not provide adequate bullet pull to load 10mm (.400") jacketed pistol bullets in the .40-50 Sharps Straight, nor was it intended to. Since this was originally a 10mm barrel, I wanted to at least see if the 200 XTP could be shot with any kind of accuracy (in spite of the fact that they were .004" undersized). Therefore, to load these bullets, I resorted to "neck-sizing" the cases with a 10mm carbide sizing die, flaring with the 10mm flaring die and then seating the bullet normally. This overworks the case neck somewhat, but worked sufficiently well for assembling a few test loads. A load of 38.0 grains of Acc. Arms 2015 BR, sparked with a Fed 215 primer gave right at 1600 fps with the Hornady 200 XTP. Accuracy was good, although point of impact (not surprisingly) was considerably lower than with the heavier cast bullets. This is a mild load and it should be possible to push this bullet another 200 fps faster (or so) and still stay within the back-thrust limitations of the Contender. Nonetheless, a .40 caliber 200 grain XTP at 1600 fps should be deadly on deer as it is.

One of my favorite ways to fire-form brass is to use fire-form loads during my summer varmint hunting. There's more than enough shooting to be done and it gives me some preliminary familiarity with the new gun. Varminting with the .40-50 Sharps Straight was an eye-opening experience. Trajectories were much flatter than anticipated, especially for a long-forgotten old-timer. Even at a leisurely 1100 fps, the 403169 was surprisingly destructive to rodent flesh, and higher velocities only added more spectacle. The .40-50 Sharps Straight would be just about perfect for hogs, or that late season doe-hunt, or...

Just for the record, the .40-50 Sharps Straight should make a fantastic lever-gun round; a truly definitive north-woods black bear carbine. I would expect the conversion to be quite straight-forward. If anybody does this, I'd be very interested in hearing about your results.

The .40-50 Sharps Straight didn't get much of a chance back in the 19th century to show its stuff. The Sharps Rifle Company went under shortly after its debut and the field of small arms cartridge design was evolving rapidly towards higher pressures, smaller bores and a fashion statement involving belts. Now that we're waltzing our way into the new millennium, perhaps the .40-50 Sharps Straight can prove its mettle in a different kind of single-shot, the Thompson-Center Contender.

- Glen E. Fryxell

Load data Follows

40-50 Sharps Straight Contender Load Data
- re-chambered from 10mm with a .404" groove diameter -
Cases formed from Frontier .303 British brass.
WLR primers unless otherwise noted.

Lyman 403169 (sized .4055" @ 245 Gr.)

Powder	*Charge*	*Velocity*	*Comments*
IMR 4227	25.0	1272	Sticky cases, vertical stringing
AA 5744	25.0	1358	Mediocre, warm
IMR 4198	27.0	1327	OK
IMR 4198	30.0**	1531	Poor
Re 7	28.0	1199	Poor, large velocity variations
Re 7	31.0**	1384	Poor
AA 2015	30.0	1317	OK
AA 2015	33.0**	1424	Bad
IMR 3031	33.0	1452	Very accurate
H322	31.0*	1308	
H322	34.0**	1447	Good
AA 2230	31.0*	1246	
AA 2230	33.0**	1420	Good
H4895	32.5	1383	Very accurate, mild pressure, very consistent velocities (+/- 2 fps)
AA 2520	34.0*	1468	
Varget	36.0**	1306	Decent

* = CCI Large Rifle Magnum primer
** = Fed 215 primer

Lyman 403173 - 298 grain when cast with WW
- All of these loads used Federal #215 Primers -

Powder	*Charge*	*Velocity*	*Comments*
IMR 4227	25.0	1425	Poor
AA 5744	25.0	1300	Very bad accuracy
IMR 4198	29.0	1425	OK
Re 7	30.0	1382	OK
AA 2015	33.0	1470	Very accurate, best load
H322	33.0	1449	OK
AA 2520	34.0	about 1400	
Varget	35.0	1320	Very accurate
H4895	37.0	1339	Accurate

The 357 Maximum

By: Glen E. Fryxell

This article written for The Los Angeles Silhouette Club
For publishing on lasc.us. Thanks Glen, another great article.

I wasn't there, so I can't say for sure, but I've got a feeling that marksmanship competitions have been around ever since that second cave-man learned how to throw a rock. Almost certainly, these competitions started off just aiming at some random target of opportunity, but then likely evolved into a test to see who could *knock something down* (e.g. knock a pine cone down out of a tree, knock over a piece of firewood, knock a deer skull off a hillside, etc.). Mankind has long been fascinated with the accurate placement of a projectile onto a remote target, and to have that target respond to the impact. The roots of silhouette competition run deep through human history.

We also like to eat. Year's ago, a group of shooters in Mexico started tethering barnyard animals (goats, chickens, pigs, etc.) out at braggin' distances, and shooting at them as a part of a larger social event. When an animal was killed, it was butchered and thrown on the grill for the post-match festivities. Eventually, humanitarian concerns arose surrounding the occasional crippled beast, leading to the animals' silhouettes being cut out of steel and the critters left in the barn. The pigs and goats were slaughtered cleanly and humanely back in the barn and were grilled behind the firing line while the competitors fired their relays, and salivated over the aromas emanating from the fire-pit.

Formal silhouette competition came about in the mid-1970s and was led by such handgun pioneers as Lee Jurras, Hal Swiggett, Elgin Gates and John Adams (John Adams was the first President of IHMSA, founder of LASC and owner of SAECO Bullet Moulds). IHMSA silhouette competition experienced dramatic growth in the 1980's, and is still an active and fun form of shooting competition today. Some venues have even maintained the tradition of cooking barbeque to distract the shooters olfactory senses while they concentrate on the mantra "sight picture, trigger control.... sight picture, trigger control.... man! that sure smells good!".

As with any form of competitive shooting, once the game got rolling, the hardware gurus started tweaking the tools for a competitive edge. There was a great deal of experimentation going on the in world of silhouette handguns and cartridges in the early 1980s. The .357 Magnum was considered an absolute minimum cartridge to be competitive, but it would sometimes still leave full-footed rams standing. Elgin Gates was among the silhouette pioneers building new guns and developing new wildcat cartridges at this time. As a part of his experimentation, he developed the SuperMag series of cartridges specifically for revolvers (he also had an extensive line of wildcats for single-shots, like the XP-100 and T/C Contender). The idea was to increase the downrange momentum by increasing case length to 1.6" (thereby increasing case capacity) to drive heavier bullets faster, but still have a relatively compact revolver, with modest recoil. Gates developed SuperMag cartridges in .357, .375, .414 and .445 calibers. Basically, the .357 SuperMag was born specifically to knock over the stubborn full-footed rams on the 200 meter line. Rarely has a cartridge ever been born into such a specific ballistic niche. Usually new cartridges are developed and marketed to address multiple applications in order to maximize sales, but the .357 SuperMag was born to bust steel, period. No military applications, no law enforcement applications, no bullseye or PPC, no IPSC, no cowboy action shooting, and while it is a capable hunter, it was (and always has been) overshadowed by the tremendous success of the .44 Magnum in the hunting fields, making the more modest hunting capability of the .357 Maximum little more than an after-thought initially. It was born to topple steel. It succeeded admirably.

In 1983, Elgin Gates' SuperMag concept was commercialized in the form of the .357 Remington Maximum cartridge, with ammunition being made by Remington and a stout single-action revolver based on a "stretched" Super Blackhawk frame being made by Sturm Ruger & Co. Dan Wesson followed suit with a double-action revolver, Seville with another SA sixgun, and Thompson /Center with their single-shot break-action Contender. Federal also made brass for the .357 Maximum. The stage was set for success. So what happened?

The Ruger .357 Maximum Super Blackhawk revolver, built on a stretched Super Blackhawk frame. This revolver was available in 7 1/2" and 10 1/2" barrel lengths.

Initially, there was a surge of interest in taking light bullets and trying to drive them as fast as possible with the .357 Max. This is counter-productive. These short stumpy bullets are ballistically inefficient and shed velocity quickly, and provide poor terminal performance. These loads also tend to be the ones that accelerate top-strap cutting and forcing cone erosion (especially with W296/H110). Like any Magnum, the reason for the .357 Maximum's existence is not to take lightweight bullets and drive them ultra-fast, but rather to take heavier than normal bullets and drive them as fast (or faster) than the standard cartridge drives standard weight bullets. The .357 Max does its best with bullets weighing 175 grains and up. The top-strap cutting and forcing cone erosion that resulted from these experiments rattled the folks at Ruger, and the .357 Maximum was dropped from production after only about 9,000-10,000 were made. The negative PR also damaged the sales of Dan Wesson revolvers. They tried to counter it by offering a second barrel with the gun, but that didn't help much. The popularity of the .357 Maximum was waning. Which is too bad, because all that was really needed was an under-standing of how to properly load the cartridge, and to recognize that top-strap cutting is a self-limiting process that stops after it reaches a certain point.

In terms of hunting applications, the .357 Maximum is far more cartridge than is needed for varmint hunting, and is too light for elk and black bear. For the handgun hunter who prefers to hunt with a revolver it is suitable for deer and antelope when loaded with the right bullets.

For silhouette competition, cast bullets are a natural choice for their accuracy, higher velocities at lower pressures, kindness to barrel steel and affordability. As with any shooting discipline, the only way to get good is to practice. A lot. Casting allows one to do this. However, the .357 Maximum presents an interesting situation to the handloader: it is one of those unique revolver rounds that generates pressures in excess of 40,000 psi, along with velocities that routinely exceed 1500 fps. Plain-based cast bullets can be severely tested under these conditions if the handloader doesn't pay attention to all of the details. Gas-checked cast bullets are definitely appropriate for the .357 Max.

Handloading the .357 Maximum:

Ball powders have been implicated in contributing to top-strap cutting and forcing cone erosion (especially W296/H110). If your gun is going to be used for competition, with thousands of rounds put through it annually, then it's probably best to stick with extruded stick powders (e.g. 4227 or even Re 7). If the gun is going to be used to hunt with, and maybe have a couple hundred rounds a year put through it, then the damage from slow ball powders will likely be minimal as long as heavy bullets are used. My favorite powder for the .357 Maximum overall is IMR 4227. The now discontinued Winchester 680 is also an excellent powder for the .357 Maximum in terms of top velocities and accuracy. I have a stash of W680 that I have held on to, specifically for the .357 Maximum. The newer, and still available AA 1680 is similar (a little slower), and also works nicely in the Max (keep in mind previous comments about ball powders if you're going to be shooting your Max a lot with either 680 or 1680).

When one peruses the available loading data for the .357 Maximum, it becomes apparent that there's a fair amount of discrepancy between the various sources, both in terms of what a given source considers an acceptable pressure ceiling, as well as what velocity correlates to what pressure level. For the jacketed bullets, I have stayed within the guidelines set forth by the manufacturer in terms of powder charges. For the cast bullets I have worked up loads until extraction became sticky and then backed off approximately 3/4 grain. There is about .009" clearance at the expansion ring in the chambers of my revolver, so high pressure rounds will bulge cases and cause sticky extraction. These loads were found to be completely safe in my guns, but may not be in others. Pay attention to what you're doing and work up carefully.

Small rifle primers are recommended for use in the .357 Maximum as a result of the high peak pressure encountered. I have gotten much better consistency using the CCI 450 primer (particularly in cold weather), so that's my default primer choice. This data uses the CCI 450 primer unless otherwise noted. Be aware that some of the loading data you see for the .357 Maximum uses small pistol, small pistol magnum, small rifle, or small rifle magnum primers. Using a small rifle magnum primer increases both chamber pressures and velocities relative to "gentler" primers, but provides better uniformity. Substituting a small rifle magnum primer with a powder charge worked up with a small pistol primer can raise peak pressures to unacceptable levels. Again, pay attention and work your loads up slowly if you make a primer substitution.

Jacketed bullet loads:

As far as hunting loads go for the .357 Maximum, the bullet diameter is small enough that the bullet needs to either expand well upon impact, or have as much meplat as it can and still provide stable flight over all hunting distances. My favorite jacketed load for the .357 Maximum is the Hornady 180 grain XTP HP over 20.0 grains of IMR 4227. This combination delivers about 1450 fps, and superb accuracy. 22.0 grains of Winchester 680 is also very accurate and gives 1457 fps. Tests reveal that this bullet provides controlled expansion at these velocities. For hunting deer and antelope sized game with the .357 Maximum, this bullet would be a fine choice.

Top-strap cutting and forcing cone erosion are obviously not an issue with T/C Contender, so the handloader has more latitude in terms of powder selection during load development. The fixed breech design also allows more flexibility in terms of cartridge OAL, allowing the use of longer spitzer bullets. Hunters have reported top-notch performance from the .357 Maximum in the Contender using the excellent Hornady 180 grain SSP bullets on deer sized game, approaching the velocities possible with the .357 Herrett. I have seen two big-bodied mulie bucks dropped by the Hornady 180 SSP bullet at these speeds and was impressed by its performance, both bucks basically folded up in their tracks. The SSP delivered a superb combination of expansion and penetration, exiting in both cases (in one case after penetrating almost 3 feet of mule deer on a raking shot).

The Hornady 180 is very accurate, and makes a fine hunting bullet for the .357 Maximum.

Cast bullet loads:

Given the pressures and velocities that the .357 Maximum operates at, this is definitely a case where hard bullets and GC's are called for. I generally either cast my .357 Max bullets from straight linotype (BHN of about 22), or water-quenched WW alloy (BHN of about 18). As far as cast bullets go, my Ruger demands that bullets be sized .357", and that *all* of the bearing surface be *completely* sized. It has snug .357" throats and stubbornly will not allow .358" bullets to chamber.

Wadcutters provide the maximum possible meplat for a given bullet diameter, but they tend to be aerodynamically unstable and start to tumble after about 50-60 yards, not much use if that 15" antelope buck walks out broadside at 85 yards. After much cast bullet experimentation, I believe that the 73% meplat offers the best compromise of good aerodynamic stability and meat-crushing meplat. Below 70% and one begins to sacrifice tissue crushing capability, and above 75% the bullets start to lose both aerodynamic and hydrodynamic stability and can tumble on impact (straight line penetration is always a good thing as it allows the hunter to plan where the wound channel goes, tumbling creates a random wound path and destroys this ability to place the wound channel through specific vital organs). The LBT WFN meplat diameter is arrived at by subtracting .090" from the bullet diameter, so in

.357 this means a meplat of .267", or about 74% -- excellent balance for a hunting bullet. Note also that the time-honored .44 Keith SWC (Lyman 429421) has a meplat diameter of .275", and since it is the combination of meplat and momentum that creates the wound channel, it can be seen that the LBT 180 WFN is in fine company.

As a result, my favorite cast bullet for hunting in the .357 Maximum is the LBT 180 grain WFN-GC at 1550-1600 fps. This bullet weighs 175 grains (checked and lubed) when cast of linotype. When loaded over 23.0 grains of IMR 4227 this bullet gave 1600 fps with good accuracy. Winchester 680 is also a good powder for this bullet, and in 24.7 grain charges delivers 1547 fps and good accuracy over all revolver hunting ranges. Accurate Arms 1680 delivers similar velocities (1555 fps) with 26.0 grain charges, but groups aren't quite as tight as with Winchester 680 (in my gun). The 180 WFN-GC is a long bullet, seated well out of the case to make lots of room for powder (in other words, do NOT use these powder charges with other 180 grain bullets, all of which are much more deeply seated). When loaded it comes right to the front edge of the Ruger Super Blackhawk's cylinder, so it needs to be fully seated and well-crimped to make sure that it doesn't inch forward and tie up the revolver. Fortunately, the .357 Max doesn't have that much recoil.

The LBT 180 grain WFN-GC is an excellent hunting bullet for the .357 Maximum.

In contrast to it's larger bore brethren, the .357" 180 WFN has good flight stability and groups well at extended range. For the .357 WFN, the meplat is 74% of bullet diameter, while for the .44 and .45 WFN's the meplat is about 80% of bullet diameter. The big bore WFN's start to lose aerodynamic stability out about 100 yards or so, and accuracy falls off rapidly after that (much like a wadcutter). Thus, due to the smaller aspect ratio of meplat diameter to bullet diameter, the .357 180 WFN groups well at longer range, while the larger WFN's generally do not.

While the .357 180 WFN may group well at the ram line, it's broad meplat slows the bullet down to where it has lost too much momentum, and it's momentum that knocks rams down. A shapelier form is needed for maximum retained momentum at the 200 meter line. The truncated cone designs of SAECO and SSK (NEI 200-358-GC) satisfy this criterion nicely, as does the all-round utilitarian SWC design from Lyman (358627), useful for both hunting and silhouette. All of these bullets group well at 200 yards. RCBS also makes a fine-looking 180 grain silhouette bullet, but I haven't worked with this bullet yet.

The SAECO 200 TCGC bullet weighs 196 grains when cast of water-quenched WW alloy (199 grains checked and lubed). When loaded on top of 19.5 grains of 4227 with a CCI 450 primer, this bullet delivered exceptional accuracy (5 shots into less than an inch at 25 yards) at 1571 fps. It grouped well out to 200 yards. Of all the bullets tested, this one appears to be the flattest-shooting in general.

The SSK cast bullet designs have given me consistently good accuracy across

The 217 grain SSK truncated cone, a hard-hitting silhouette bullet.

The Saeco 200 grain TCGC bullet is both accurate and flat-shooting.

the board, due to their extended bearing surface and ample lubrication. The NEI 358-200-GC bullet is no exception, and in this case the TC ogive and the moderate meplat make this bullet very aerodynamic, and it's added weight means that it packs extra punch out at the ram line. When cast of water-quenched WW alloy, it weighs 217 grains as-cast (221 grains checked and lubed). When loaded over 18.5 grains of IMR 4227 with a CCI 450 primer, it generates 1427 fps from the 7 1/2" Ruger Super Blackhawk and groups nicely (1 1/2" at 25 yards). This accuracy is carried out to at least 200 yards and it groups well at this distance. This is an accurate, stable and hard-hitting bullet; one very well-suited for hammering steel targets.

Back in the late 1920's, Elmer Keith drew up what he figured was the best all-round bullet profile for use in revolvers. Over the last 3/4 of a century, the Keith SWC's have proven to generation after generation of sixgunners that Elmer's vision was right on the money. Lyman used the Keith SWC as their inspiration for designing their entry into the handgun silhouette market. Conceptually the Lyman 358627 can be envisioned as starting out with the Keith 358429 and adding another center driving band and crimp groove, and then adding a GC shank onto the backside. This second crimp groove has often left me scratching my head, as it is .140" behind the first. The difference in case length for .38 Special and .357 Magnum is .100"; and the difference between the .357 Magnum and .357 Maximum is .310", so what is the purpose of putting a second crimp groove .140" behind the first? It's not so one can use Special brass in a Magnum revolver, nor does it seem to be tailored to allow the use of Magnum brass in a Maximum revolver. Who knows? In any event, the result is a GC-SWC that is listed at 215 grains (presumably with Lyman #2 alloy). When cast of linotype, they weigh 208 grains after being checked and lubed. Loaded over 19.0 grains of IMR 4227, and using the CCI 450 primer, this bullet delivers 1517 fps and excellent accuracy (5 shots into less than 1 1/8" at 25 yards). As an all-round hunting/silhouette load for the .357 Maximum, this one would be hard to beat.

The 208 grain Lyman 358627 GC-SWC, an excellent all-round bullet for the .357 Maximum, inspired by the Keith SWC.

Moderate loads:

Not all Maximum loads have to be loaded to the maximum. Previous experience with the Lyman 358156 GC-HP from a .357 Magnum Marlin 1894 carbine at 1700 fps has shown this bullet to be an accurate and reliable varmint shredder. I wanted to see if I could reproduce this performance with moderate pressure loads from the .357 Maximum (max loads will easily launch this bullet in excess of 1850 fps, which would surely vaporize this bullet on impact, not to mention erode the forcing cone of this revolver). I also wanted to find out if this bullet at this speed was a "varmint only" proposition, or if it might also be useful for antelope sized critters. Ray Thompson designed the 358156 HP to have a smaller cavity than the other .357 cast HP's, and I thought this characteristic might be of value when paired with the higher velocities of the Max. Bullets were cast of sweetened WW alloy, they weighed 151 grains as-cast (154 grains checked and lubed) and had a measured BHN of 13. Loaded over 22.5 grains of 4227 and sparked with a CCI 450 primer, these bullets had a muzzle velocity of 1647 fps and provided mediocre accuracy. Expansion testing revealed that this bullet completely fragmented at these velocities. In fact, with the first round tested, the fragments never even left the 2L bottle! This combination may be adequate for vermin, but poorly suited for antelope-sized game.

The Lyman 358156 HP is too fragile for the velocities possible with the .357 Maximum, and fragments completely at 1650 fps.

The .357 Maximum was born a highly specialized cartridge. That hasn’t changed. For many years it was the cartridge of champions among silhouette circles, and it is still very good at slamming steel to the ground. As a hunting round it is also somewhat specialized -- a bit hard to find guns, ammo and brass, and a bit overkill for routine Varminting (it works just fine, but why not just use a .357 Magnum?). Properly loaded it will do the job on antelope and deer sized game. In this case, "properly loaded" means bullets weighing at least 175 grains and preferably using extruded powder (e.g. 4227). The Dan Wesson and Ruger .357 Max revolvers have proven themselves to be very accurate, and recoil is mild enough that shooters have little trouble mastering it and learning to place their shots with precision. 50 years from now, the .357 Maximum will likely be little more than an asterisk in the history books and an oddity in cartridge collections, but that doesn’t change the fact that they are accurate, flat-shooting, and hard-hitting; in short, all the things that a good silhouette/hunting revolver and round should be!

- Glen E. Fryxell

The .338 GEF Revisited

By: Glen E. Fryxell

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The Thompson-Center Contender is a wildcatter's playmate. The ease with which barrels can be interchanged, and that a single frame can be used with a wide variety of cartridge diameters, rim types, etc. make this a very versatile platform. A key concept that must be born in mind is that the Contender frame is not as strong as a bolt-action rifle, and the back-thrust of the cartridge must be held to approximately the level of the .44 Magnum cartridge for safe operation and long service life from the frame. Back-thrust can be thought of as basically peak pressure times cross-sectional area. In slender cartridges (e.g. the .223 Remington), higher pressures are easily tolerated, while in fatter cartridges (e.g. the .45-70), pressures must be held to much more modest levels to keep the back-thrust within the Contender frame's limitations. This is why skinny cases like the .223 Remington and .221 Fireball have been chosen as the foundation for several popular Contender-based wildcats. This is also why the handloader can't just blindly work up loads looking for sticky extraction as a sign of excessive pressures. "Excessive pressures" in one cartridge case may be 55,000 CUP, and may happen to correlate with sticky extraction. In another cartridge case, 30,000 CUP may be excessive, but sticky extraction might not show up until 50,000 CUP. Even though the cases in these high pressure loads might extract easily, the shooter would be inflicting frame damage each time a shot was fired. It is important that one understand this if one wishes to wildcat the Contender.

For .30-06 diameter cases, the Contender will work just fine as long as loads are tailored to operate at 42,000 CUP or less. The .308 Winchester is a fine handgun cartridge in guns like the XP-100 or Lone Eagle, but the fact that factory ammo is loaded to 50,000+CUP make this cartridge a no-no in the Contender.

Back in the early 1990's, I asked J. D. Jones of SSK Industries to make a custom wildcat barrel for me. It was a .338 wildcat, based on the .356 Winchester case necked down, with the body taper shoulder blown out. The cartridge was named the ".338 GEF" in order to differentiate it from other similar wildcats, which were generally designed for bolt-action guns (and loaded to higher pressures, like the new .338 Federal). The exceptional quality of the Contender barrels turned out by SSK Industries is well-known, and this barrel was no exception. With proper loads, this barrel showed its ability to go sub-MOA on a regular basis, and with the right loads it would flirt with 0.5 MOA. J. D. suggested that we cut the throat on this barrel to allow the Nosler 250 grain Partition to be seated even with the bottom of the neck, and this turned out to be an excellent suggestion, as this cartridge works best with bullets in the 200-250 grain range. In order to keep pressures in a reasonable range for the Contender, slower powders work best (e.g. 4350, H380, etc.), and loads are held within specific velocity limits to keep pressures moderate. The bottom line is that the .338 GEF can launch 200s at 2100 fps, 225s at 2000 fps and 250s at 1900 fps (from a 12" Contender). Preferred jacketed bullets for hunting are the *old*

200 grain Nosler Ballistic Tip for deer/antelope (fortunately I have a stash of these older bullets), and the 250 Partition for elk. The 200 Speer shows excellent expansion at these velocities, but for some strange reason I just haven't been able to get it to group worth beans out of this gun. The 200 Hornady SP is a very accurate bullet, but a little on the hard side for these speeds (although it penetrates exceptionally well -- I ran one of these lengthwise, on the diagonal, completely through a large mule deer). The 200 Hornady FP (designed for the .33 Winchester) is both accurate and expands well, making an excellent hunting bullet, but is rumored to be discontinued and can be very hard to find. The .338 GEF has accounted for antelope, whitetail, mule deer and wild hogs, as well as a whole pile of smaller vermin (varmint hunting is a great way to fire-form brass!). Early experiences with this round were originally written up for HHI's *The Sixgunner* back in 1994.

The .338 GEF Contender (12” barrel) and a round loaded with the Nosler 200 grain Ballistic Tip.

I've been on a cast bullet kick for many years now. In recent years, a lot of my reloading efforts have been focused on sixguns and leverguns due to their natural affinity for the poured projectile. During a introspective moment, I was rolling a .338 GEF round through my fingers and idly reviewing its history and attributes -- short fat case, loaded to moderate pressures, works best with slower powders, moderate velocities -- when suddenly it hit me, this round should be an excellent fit for cast bullets! Back in '93, I had used the RCBS 200 grain GC-FP for fire-forming cases, but I hadn't done any systematic load development for the round as a cast bullet hunting round. It was time to correct this oversight.

Cast bullets:

When J.D. made this barrel for me, I had him Magnaport it, so plain-based cast bullets probably aren't going to work very well (PB bullets are damaged when they pass over the ports; the escaping gases etch the bullet's base, leading to asymmetric venting when the bullet leaves the muzzle, which in turn leads to excessive bullet yaw and poor accuracy). Gas-checked bullet handle ports just fine. This would be a gas-checked project.

Previous experience has shown that cast bullets can expand very nicely in the 1600-1800 fps range (depending on alloy), while cast HP's expand rapidly at 1500-1600 fps, and explosively at 1800 fps and above. As a result, for these bullets I was looking for loads in the 1600-1800 fps range, with the best possible accuracy. For the cast HP's, I was most interested in the lower end of this range, while for the solids, whatever gave me the best accuracy above 1600 fps (with suitable alloys) was my target.

I like lots of bearing surface on a cast bullet, so I had Dan Lynch of Mountain Molds (www.mountainmolds.com) make me a 230-235 grain GC-FP specifically to fit the throat of this gun. He very quickly turned the order around, and made me just what I asked for -- .340" diameter, 73% meplat, bearing surface the same length as the Nosler 250 grain Partition (what this throat was originally cut for), 3 beveled lube grooves and an as-cast weight of 230 grains (232 checked and lubed, at a BHN of 13). In some ways, this bullet was inspired by the Hornady 200 grain FP profile, with a little bit of added weight for more penetration.

I stumbled across an old 2-cavity Lyman 33889 at Shapel's in Boise (sadly, Shapel's is now closed), and found that these GC-FP bullets weigh 258 grains after being checked and lubed. The Lyman 33889 was first mentioned in the 42nd edition of the Lyman Handbook, published in 1960, and was designed for the .338 Winchester Magnum cartridge. It's interesting to note that in the load data for the .338 Win Mag in the 43rd edition of the Lyman Handbook, they report loads from 1600 to 1900 fps, and mention that this bullet "Should prove very effective with hollow point." My fondness for cast hollow points is no secret. Another old Lyman 33889, this one a single-cavity mould, was obtained, and subjected to a little lathe work, and modified to drop HP bullets, with a .130” tapered HP cavity. These 33889 HP's ended up weighing 246 grains after being checked and lubed.

So I had 4 cast bullets to work with on this project -- the RCBS 33-200-GCFP, the Mountain Molds 235 grain GCFP, the 246 grain Lyman 33889 HP, and the 258 grain Lyman 33889. For initial load development, these bullets were cast to a BHN of about 13 (a little harder than typical WW alloy), checked with Hornady crimp-on GC's, sized .340" and lubed with my home-made Moly lube (equal parts by weight beeswax and automotive Moly grease).

Test loads:

RCBS 33-200-GC. I started off the .338 GEF project off back in 1993 with the RCBS 33-200-GC, as that was the bullet I originally used to fire-form the cases. Test loads with this bullet sized .338” using medium burning rifle powders (e.g. H4895, 3031, etc.) turned in lousy accuracy. So I turned to larger bullets (.340”) and slower powders. While these loads were significantly more accurate, they still weren't grouping as well as I had hoped for. The best of the lot was 49.0 grains of H414, which put 5 shots into 1 1/2" at 50 yards and generated 1766 fps. The other loads tested with this bullet were notably worse (generally 2 1/2" to 6" at 50 yards). I suspect that somewhat slower velocities might deliver better accuracy with this bullet.

The cast bullets used in these tests: (l-r) Lyman 33889 HP, Lyman 33889 GC-FP, RCBS 200 grain GC-FP, and the Mountain Molds 235 grain GC-FP.

Mountain Molds 235: In contrast, the Mountain Molds 235 grain FP consistently turned in good accuracy, and did its best when loaded over 44.5 grains of 4350, for over 1700 fps, putting 5 shots into just under an inch at 50 yards. This should make an excellent, deep-penetrating hunting load for deer, boar, black bear and elk in heavy timber and thick brush. Conveniently, this load shoots to almost exactly the same point of impact as the 200 grain Nosler Ballistic Tip load that this gun is typically sighted in for.

Lyman 33889 HP: I tried various loads that were targeting velocities in the 1700-1800 fps range, using faster powders like 4198 and 4895 (which had worked well for me with cast bullets in smaller Contender cartridges). In this case, the results were uniformly disappointing, with groups sometimes running 8" (or more) at 50 yards. Time to go back to the slower powders. Several combinations with various slow powders were tried, most of which gave acceptable accuracy, but real success with the 33889 HP was found with H4831. When the 33889 HP was loaded over 46.5 grains of H4831, the first 4 shots went into 1/2" (at 50 yards), with the 5th shot being a called flyer (high/left), that opened up the group up to just under an inch. Velocities consistently hovered right at 1600 fps -- a very comfortable and useful velocity for a cast HP. Once again, serendipity raised its head when this load was found to shoot to almost exactly the same point of impact as the 235 grain Mountain Molds FP load.

Lyman 33889: Overall, the Lyman 33889 wasn't as accurate as the HP version, but it did turn in a decent showing when paired with H4831 at 1600 fps (5 shots into 1 1/4” at 50 yards). Higher speeds were detrimental to accuracy. Once again, this load prints to the same point of impact as the other accurate cast bullet loads. A 258 grain .338” cast bullet at 1600 fps is a combination that I would expect to provide deep, deep penetration. This load could be particularly interesting with the bullet cast soft.

Now, for shooters that are mentally "calibrated" with jacketed bullets and the high velocities that they require to function properly, velocities of 1600-1700 fps might not sound all that impressive or interesting, but with a cast bullet, especially a cast HP, 1600 fps is a very useful velocity. We are no longer constrained by a hard metal jacket confining the soft metal core that we want to expand, and past experience has shown that a WW alloy cast bullet can mushroom at 1600 fps, and a cast HP will expand rapidly at 1600 fps. A bullet carries a certain amount of energy with it, some of that energy is used to crush meat and bone, and some of that energy is used to deform the bullet.

For a jacketed bullet, a lot of energy is consumed in deforming the relatively hard bullet. Therefore, higher velocities are necessary for optimum bullet expansion and performance. A cast bullet consumes less energy in bullet deformation, leaving more for tissue destruction. Therefore, in terms of wound characteristics, a similar level of performance can be obtained with cast bullets at lesser velocities simply because the bullets are more malleable (I'm not talking hard-cast bullets made out of linotype here, but rather bullets made of malleable alloys, below BHN 12). Yes, the trajectories of these slower bullets will be more curvaceous than higher velocity jacketed loads, but that's OK, I hunt with a handgun because I like getting "up close and personal" to shoot a critter. These loads suit me just fine.

Expansion testing: My standard testing procedure to see how handgun bullets expand in hunting loads is to fill a 2 liter plastic pop bottle with water, lay it on its side, and back it with a tightly packed “bale” of newspapers (about 6”, tightly bound with duct tape so the bullet passes through the duct tape, leaving a permanent record of its diameter after water expansion), then shoot through the bottle lengthwise, into the newspaper. It’s important to set things up such that the bale of papers is free to fall away with the shot, as this soaks up some of the momentum of the bullet and commonly limits penetration to a few inches (for a “fixed” bale of papers, the bale needs to be MUCH thicker). The 2L water bottle provides a water bath of uniform thickness for bullet expansion, and the newspapers stop the expanded bullet, allowing for recovery and measurement (the dry newspaper is much harder on a bullet than is typical animal tissue, so expanded “petals” typically break off in this test, whereas they may or may not in a hunting situation). This is a simple test that provides a uniform, and easily reproducible, comparison of bullet expansion (after doing a number of these tests, it’s often possible to predict the degree of expansion of a bullet based simply on the reaction of the water bottle to the shot). While I make no claim that this test reproduces the exact degree of bullet expansion obtained when shooting game animals, experience has shown that bullets that expand in this test, expand on deer in the hunting fields, and bullets that don’t expand in this test, don’t expand on deer-sized game; a valuable starting point for the handgun hunter.

Performing this test with the Lyman 33889 HP at 1600 fps revealed rapid and reliable expansion. Bullets recovered from the newspapers looked like .38 wadcutters, with a bulbous nose. On average, the recovered 33889 HP's weighed 138 grains (56% weight retention). This is very typical behavior for a cast HP at these speeds, to expand down to the base of the cavity and then have the petals shear off, leaving a bulbous wadcutter to keep penetrating (similar to the respected Nosler Partition, both in terms of expansion behavior and retained weight). For medium-sized game, this provides for violent expansion, as well as for something to punch through the other side.

Repeating these tests with the 235 grain Mountain Molds bullet revealed that it hit like a sledgehammer. When cast to a BHN of 13 and run at a muzzle velocity of 1700+ fps, expansion was limited judging from the .35 to .40 caliber holes punched in the duct tape. However penetration was excellent, as these bullets tore big, gaping holes all the way through the newspaper backstop (they weren't recovered as they all completely penetrated the test materials, even though the bale was free to fall away). When cast to a BHN of 9, significantly more expansion was observed from these bullets as the holes in the duct tape were now over 1/2” across. Recovered bullets had expanded back to the base of the ogive, and retained an average of 178.8 grains (75% of the original 238 grains). Thus, cast bullets can be tailored to provide rapid expansion with the cast HP, controlled mushrooming with the Mountain Molds FP cast soft (BHN = 9), and limited expansion, deep penetration with the Mountain Molds FP cast somewhat harder (BHN = 13). These results show in a nutshell how a bullet caster has the freedom to tailor a cast bullet’s expansion properties to fit his exact hunting needs and his own specific tastes.


The Lyman 33889 HP, as-cast, and recovered after being expansion tested at 1600 fps.

Hunting stories:

The first cast bullet load I hunted with was the 33889 HP over 4350 (this was before I had done any load development H4831), and late doe season was fast approaching. I wanted to make sure that I introduced the bullet to the lands in a slow and gentle fashion, in order to extract the best accuracy possible from the loads, so I started with 38.0 grains of 4350. Accuracy was reasonable, with 5-shot groups running about 1 1/4" at 50 yards. My chronograph was on the fritz that day, so I couldn't get any velocity readings, but recoil felt like it was more or less in the .44 Mag range, accuracy was decent, the gun was sighted in and late doe season would open in a couple of days. I decided to take that 33889 HP load hunting. That next Saturday morning found me in one of my favorite canyons on the Snake River in eastern Washington, overlooking several of the access trails leading into the canyon-bottom thickets that the local mule deer population use for cover. Around about 9:30 in the morning, a large mulie doe came in below me, along with a big-bodied 3x3 buck (where was he during buck season?). They were about 60 yards below me when the doe started acting nervous; she sensed danger, but couldn't tell where it was. The buck just stood stock-still and watched the doe go through her antics. She stomped and turned and fidgeted and walked nervously around in circles, looking over the brush and canyons, trying to find the danger that she sensed (i.e. me). She stopped, quartering away from me, and was clearly skittish and ready to bolt. I decided to take the shot. I lined up on the last rib on her right side and angled the cast HP through the heart/lung region, towards the far shoulder. At the shot, her head drooped and she trotted meekly into the thicket below her. I reloaded in case I needed to shoot again, and covered the spot where her trail came out of the far side of the thicket. She never came out. Halfway through, I heard her collapse in the dry leaves, slide downhill, kick twice, and then all was quiet. The cast HP had entered exactly where I had intended, raked the lungs and exited through the point of the far shoulder, after penetrating 30+" of mule deer. Based on the forensic evidence gleaned from the internal characteristics of the wound channel, the 33889 HP had expanded to approximately .45 caliber as it passed through her lungs. By the time it reached the far shoulder, most of its energy had been expended, as the exit wound was only about the size of a dime. She died seconds after impact and covered about 50 yards. There was very little blood-shot meat on the carcass. After the fact, I found out that this load was only generating about 1250 fps (which explains the lack of bloodshot meat), but even at this modest velocity, the 33889 HP had clearly expanded in a slow and controlled fashion. Encouraged by this level of performance at such modest velocity, I returned to the drawing board to work up faster, more accurate loads for this bullet, as well as other cast bullet designs (the results of that load development were summarized above).

I got the chance to exercise the fruits of this research a little while later. It was early March, and I spent a couple of days hunting hogs with some friends at Clover Creek Ranch in central Oregon. The night before our hunt, a storm moved in, the temperatures dropped and it started snowing. We only got a light dusting that night, but it started snowing harder the next morning. We went up to a high meadow with a creek running through it (right next to a broken down bulldozer), where we had seen lots of animals on our last visit, but there was no sign of any animal activity whatsoever. We continued up to the big pasture on top. The pond was full, and frozen over, but there were no tracks in the snow, nor any evidence of any critters trying to break through the ice to get a drink. We headed back downhill to the shelter of a large bowl-shaped basin that was protected from the wind, and found animal sign right away. We found an old, fat spotted sow, who easily weighed 600 lbs (or more). We were able to sneak up to within about 20 yards of her, but eventually we all chose to pass her by (we were looking for meat hogs in the 200-300 lb range). My hunting partners found a small group of Russian hogs that they followed, but were never able to get a shot. I moved down towards the water hole at the bottom of the bowl and found a nice 250 lb black boar rooting in the mud (the snow was melting, and based on the amount of upturned soil, the mud must have smelled really good... well, to a pig anyway). I snuck up on him, using a line of junipers as cover, and then got down on my hands and knees and crawled up to the last couple of trees and laid down in the snow. I was shooting from the roll-over prone position (the only way I could get a clear shot past the low-hanging juniper branches). The black boar was about 40 yards away, but the presentation was not good, so I laid there in the snow while he rooted around, and waited for him to give me a better presentation. After about 10 minutes, he did, and I shot him through both lungs using the Lyman 33889 HP/H4831 load. He gave no visible reaction to the shot, he just turned and trotted directly away from me for about 15 feet, then staggered for a step or two, fell over, and rolled back downhill, towards me. There was a large geyser of pink frothy blood coming out of his right (i.e. exit) side, so I knew that he was lung shot, and that the cast HP had expanded well and exited, even before I got up out of the snow. The entrance wound was a .338 caliber hole and only had a small circle of bloodshot meat around it (about the size of a nickel). Both lungs had a hole through them about the size of a quarter, with about 6" of severely bloodshot lung tissue around the hole. The far side of the ribcage had an irregularly shaped hole through it, roughly the size of a half dollar, and the exit hole through that tough pigskin was about the size of a quarter. While there was some bloodshot meat in the far side ribcage (5-6“, the expanded bullet hit two ribs on the way out), there was notably less than I’m used to seeing with higher velocity jacketed loads. The Lyman 33889 HP at 1600 fps had done everything that could possibly be asked of it. I guess that's why I like cast HP's so much.

It was satisfying to learn that my pet wildcat was such a good home for cast bullets. Cast bullets provide a great deal of versatility for the handgun hunter. The cast HP can be counted on to provide rapid expansion at 1600 fps, which can be very useful when hunting medium game. Traditional solid cast bullets can provide controlled expansion when cast to intermediate hardness (BHN of 9 or 10) and launched at velocities of 1600-1700 fps. When cast a little harder (e.g. BHN = 13), these same bullets can deliver limited expansion and very deep penetration. Thus, the bullet caster has the freedom to tailor the bullet’s expansion properties to fit his exact hunting needs and his own specific tastes. This is particularly valuable when a


Expansion of the Lyman 33889 HP at 1600 was excellent, and killed this hog quickly.

bullet manufacturer re-formulates or discontinues a shooter's favorite bullet design. This ability to tailor a cast bullet's expansion properties isn't something that just holds true for Contender-based wildcats, but is a general truth for all cast bullet hunting loads, handgun or rifle. You might consider working up some cast bullet loads for your favorite Contender round. Taking game using bullets that one has tailored specifically for the cartridge and the quarry can be a very rewarding facet of handgun hunting.

- Glen E. Fryxell

Cast bullet loading data for the .338 GEF

Cases:	Fire-formed W-W .356 Winchester cases
Primers:	WLR, unless otherwise noted
Bullets:	BHN 13, sized .340"
Lube:	Homemade Moly lube (50/50 by weight beeswax and automotive Moly grease)
Gas Check:	Hornady crimp-on

RCBS 33-200 GC-FP - 210 Grains

Powder	Charge	Velocity	Comments:
H4831	50.0	1770 fps	Poor
IMR 4350	46.5	About 1750?	2" @ 50 yds.
H414	49.0	1766 fps	Decent accuracy
H380	46.0	1850 fps	Wild - 6" @ 50 yds.

Mountain Molds GC-FP - 232 Grains

Powder	Charge	Velocity	Comments:
H4831	46.7	1622 fps	Accurate - 1" @ 50 yds.
IMR 4350	44.5	1712 fps	Very accurate - 3/4" @ 50 yds.
IMR 4350	46.0	1760 fps	Poor - 2-3" @ 50 yds.
H414	46.0	1612 fps	1 1/4" @ 50 yds.

Lyman 33889 GC-HP - 246 Grains

Powder	Charge	Velocity	Comments:
H4831	45.0	1556 fps	Marginal - 2" @ 50 yds.
H4831	46.5	1595 fps	VERY accurate! 4 into 1/2". Called flyer opened group to 1"
IMR 4350	44.5	1655 fps	4 into 1" with an un-called flyer
H414	46.0	1702 fps	Poor

Lyman 33889 GC-FP - 258 Grains

Powder	Charge	Velocity	Comments:
H4831	46.7	1595 fps	1 1/4" @ 50 yds.
IMR 4350	44.0	1663 fps	Poor - 3" @ 50 yds.
H414	46.0	1675 fps	So-So accuracy, very clean

The .44 Special Revisited

By Glen E. Fryxell

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The .44 Special is renowned for being the source of Elmer Keith's inspiration, for giving rise to the .44 Magnum, and for serving as the vehicle for Skeeter Skelton's pragmatic law enforcement loads. Historically, all of these loads have centered around the use of 250 grain cast bullets. With the ubiquitous nature of the .44 Magnum ammo, components, guns, etc. there's little need to run the .44 Special at the Keith level, and for law enforcement applications, it seems that most all departments have gone over to semi-autos (mostly .40 caliber). So, while the Keith and Skelton loads are just as good as they have always been, the original needs that they were designed to address have been entirely satisfied by new guns and cartridges.

Life moves on.

Does this mean that the nearly century-old .44 Special is on its death-bed? Hardly! In recent years there has been a surge of interest in .44 Special belly guns, starting first with the Charter Arms Bulldog, and then later with the Taurus 445 and Rossi 720, followed by the S&W 696 and 396. I suggest that the short barrels (generally 2 1/2" to 3") and lighter frames of these guns require that we reconsider how we think of the .44 Special cartridge. These little guns cannot handle the pressures of the Keith loads; even Skeeter's load is a bit too stout (pressure-wise) for these light guns, and only delivers modest velocities at best from these short barrels. The solution to these shortcomings is a lighter bullet. There is absolutely no need for a 250 grain bullet in these little guns for trail use or personal protection from cougars, wolves, skunks, etc. (if you're in big bear country, you need a bigger gun). This article is intended to draw attention to the excellent level of performance of the .44 Special from these belly guns using cast bullets in the 200 grain range at 950-1000 fps. Now before anybody scoffs at shooting "itty-bitty panty-waist bullets in a He-Man's cartridge", let me remind you that the respected .45 ACP has been praised for precisely these ballistics (200 grain bullets at 950 fps) for decades. This approach basically turns the .44 Special belly gun into a .45 ACP with the safety, reliability and accuracy of a revolver. And does it at pressures that won't turn that little belly-gun into an alloy pretzel.

In general, the efficacy of moderate velocity cast bullets is a function of meplat surface area, so lightweight wadcutters might be ideally suited for this application (in stark contrast to the semi-auto world, where this blunt profile would lead to feeding problems). There are two such wadcutters that readily come to mind -- the Lyman 429348 (a 183 grain wadcutter), and the H&G #239 (a 193 grain WC). One can also induce bullet expansion from cast HP's at these speeds if the bullets are cast soft enough. When working at this velocity level, I prefer to cast HP's from 20-to-1 alloy (or softer). The 429215 GC-HP weighs 201 grains as it drops for the blocks when cast of 20-to-1 alloy. As an all-round practice, plinking and field bullet for the .44

The S&W 696 .44 Special.

Special belly guns, it's hard to think of a better one than the fine Saeco #428, a 200 grain plain-based truncated cone (TC). One might also consider the various 205 grain .44-40 bullets in this category. With the exception of the 429215 HP (which was cast of 21-to-1) these bullets were all cast with WW alloy, sweetened with 1-2% added tin. All bullets were sized .430" and lubed with my homemade Moly lube (equal parts by weight Moly grease and beeswax).

For low pressure applications in the .44 Special, there are a number of good powders available, but no powder outshines Unique. On top of this, Unique has burning characteristics that make it very easy to light and provide top velocities and excellent accuracy from the short barrels of these little guns. The Lyman loading manual reports that 8.2 grains of Unique with 205 grain cast bullets (Lyman 42798) generates 870 fps at a peak pressure of 14,000 CUP, and the Hodgdon manual reports that 9.2 grains of Unique underneath a 180 grain JHP generates 1000 fps with a peak pressure of 13,400 CUP. Therefore it was decided to start these tests with 9.0 grain of Unique for the 183 grain Lyman 429348, 8.5 grain of Unique with the H&G #239 (193 grains), and 8.0 grains of Unique for the 200-205 grain cast bullets to stay within these pressure guidelines.

The Lyman 429348 183 grain wadcutter loaded over 9.0 grains of Unique left the little S&W 696 at an impressive 1085 fps, but delivered very poor accuracy (8-12" at 25 yards). The H&G #239 193 grain WC loaded over 8.5 grain of Unique generated a respectable 1068 fps, but also produced poor accuracy. Reducing these powder charges to 7.8 grains of Unique for both of these bullets improved accuracy to where 5-shot groups at 25 yards were now around 4"; better, but not good enough. I believe that these two bullets just don't have enough bearing surface to shoot well in the polygonal rifling of the 696 at these speeds (they do just fine in normal "cut" rifling at typical mid-range levels). Time to move on to other bullets.

Next up in these tests was the SAECO 200 grain truncated cone. Loaded on top of 8.0 grains of Unique, the SAECO 200 TC delivered 981 fps and very good accuracy, routinely turning in 5-shot 25 yard groups of 1 1/2"-2" (not bad for a snubby!).

This has been my preferred field load for the 696 for a couple of years now. It's an excellent grouse/bunny load, as the somewhat smaller meplat of the SAECO TC kills well but doesn't tear up a lot of meat. When sighted in for the Cor-Bon 180s, this load shoots pretty much to the sights.

I have long had a fondness for cast HP's due to the superb performance that I have gotten over the years from the Keith and Thompson HP designs. Therefore, I was very excited when I found a 429215 HP mould (the 215 grain Thompson GC-SWC) since I felt that this might be just the ticket for the S&W 696. The GC would allow it to be cast quite soft, and the weight was in the right range for the loads that

I was exploring. A batch was cast from 20-1 and loaded over 8.0 grains of Unique; velocities averaged 978 fps, but accuracy was disappointing. A second batch was cast with recovered range scrap (BHN of about 7.5-8), and these bullets were loaded over 7.8 grains of Unique. This combination produced 944 fps and groups ran about 3 1/2" at 25 yards, an improvement, but not good enough. Once again, I think this is the result of not enough bearing surface for the polygonal rifling at this velocity, as this bullet shoots just fine in other guns. It may also be a little too soft; I might be able to get it to shoot well if cast of WW alloy, but then it would be too hard to expand at 950 fps. This bullet is going to be saved for my longer barreled .44 Specials, with standard "cut" rifling, where it should make a dandy varmint load.

Cramer produced a line of very well thought out and very well made moulds back in the 1930s and 40s (they were bought out by Saeco in 1951, and SAECO continues to produce a number of the old Cramer designs). Relevant to this project is the Cramer 8A, a 220 grain plain-based RNFP that they made for the .44-40. The Cramer 8A has a larger meplat than the typical RNFP of this period, giving a .44 snubby the ability to deliver a hearty thump. The Cramer 8A was cast with WW alloy (220 grains) and loaded on to of 7.5 grains of Unique. This load produced 935 fps and exceptional accuracy, along with the best single group of this series of tests (4 shots into just under 1" at 25 yards, with a called flyer low, that opened the group up to 1 5/8"). This load printed about 5" above point of aim when sighted in for the Cor-Bon 180s. While it will require adjusting the sights to go from one load to the other, this load is now my preferred field load for the 696 as a result of its broad meplat. SAECO still produces this fine mould design.

When the discussion turns to meplat diameter, the name of LBT is bound to come up. Pertinent to this discussion is their .44 230 WFN (wide, flat nose) bullet design. Once again, these were cast of WW alloy (237 grains), sized .430" and lubed with home-made Moly lube. They were loaded on top of 7.0 grains of Unique and test-fired, producing 905 fps and good accuracy (1 3/4" groups at 25 yards). This load also shot high (relative to the Cor-Bon 180s the gun was sighted in for). Once again, excellent thump for an L-frame .44 Special snubby.

The key to getting good accuracy out of a cast bullet load from the S&W 696 seems to be choosing a bullet with sufficient bearing surface to minimize slippage when the bullet gets engraved onto the polygonal rifling. Lighter bullets tend to have less bearing surface, and hence are more prone to slippage. The lighter bullets that were found to be accurate in these tests were those that had longer than normal (for their weight) bearing surface, and included the SAECO 200 grain TC, the Cramer 8A and the LBT 230 WFN. With the sharper "edge" of standard "cut" rifling (found in other revolvers), this slippage is less pronounced.

Bullets that were found to shoot well out of the S&W 696 .44 Special (l-r: the Saeco 200 grain TC, the Cramer 8A 220 grain RNFP and the LBT 237 grain WFN).

S&W recommends that their "Mountain Lite" (the 3" S&W 396 aluminum-framed, titanium cylinder .44 Special revolver) should be loaded with lightweight bullets to eliminate bullet slippage under the sharper recoil impulse that this featherweight revolver generates. While I haven't worked with a 396 yet, I suspect that the loads containing the Saeco 200 TC and the Cramer 8A would be just the ticket. The LBT 237 grain WFN may be a little too heavy for the 396 (no problem at all though for the steel-framed S&W 696).

While the performance of the large-framed .44 Special revolvers was optimized years ago with Elmer's and Skeeter's loads built around 250 grain bullets, the smaller, lighter .44 Special revolvers popular today are better served with smaller, lighter bullets. While the 180-190 grain wadcutters delivered poor accuracy in the polygonal rifling of the S&W 696, the 200-230 grain flat-pointed bullets at about 950 fps are an excellent fit for the dainty little S&W 696, and make dandy field loads. With bullets of sufficient bearing surface, this little gun delivers superb accuracy. This is .45 ACP level of performance, with revolver accuracy, safety, and reliability, and Cramer 8A and the LBT 230 WFN provide all the meplat you could ever want (with no worries about feeding reliability!). The .44 Special is a cartridge deserving of being revisited, and it rewards those that do so.

- Glen E. Fryxell

Cast bullets in the .30-40 Krag

By: Glen E. Fryxell

This article is respectfully dedicated to "fatboy"

Back in the late 80s, I got bitten by the "handgun hunting bug". At about the same time, I started casting my own bullets in an effort to save money and stretch my shooting budget as far as possible. I was shooting a fair amount of bullseye competition at that time, so it's not surprising that most of my bullet-casting activities centered around handguns -- in particular loads for bullseye competition, and special loads for handgun hunting, as well as various loads for the inevitable plinking and recreational shooting. As a result, I got a lot of experience casting and loading wadcutters for bullseye, and semi-wadcutters and hollow-points for hunting. I also tinkered with a few cast loads for various rifles during this timeframe, but nothing overly serious.

A number of years ago, I got more interested in learning more about making cast bullets work well at rifle velocities. While the casting side of the equation is still pretty similar for these loads, setting up the load for optimum performance can be very different than for handguns. So, I asked some friends for their advice about building cast bullet loads for rifles. The best advice I got was from one of my Texan friends, Charles Graff. Charles emphasized the importance of sizing the bullet to fit the throat (not the groove diameter of the barrel), he emphasized the value of gas-checks at rifle velocities and the need to cast the bullet of suitable hardness for the intended velocity. Charles pays close attention to fitting the nose of a bore-riding bullet to fit the bore diameter of the rifle, he cautioned that fast-twist barrels can be hard on a cast bullet, and he told me that Marlin Micro-Groove barrels will shoot cast bullets just fine (just make sure they are large enough, hard enough and wearing a GC). In the years that have passed since, I have gained a fair amount of experience casting bullets for a wide variety of rifles -- from the 6.5x55 Swedish Mauser to the .450/400 Nitro Express, including such historically interesting and hunter-friendly rounds as the .35 Whelen, the 9.3x57 Mauser, the .405 Winchester, the .444 Marlin and the .45-70 (and given the prices that jacketed bullets cost in some of these calibers, shooting cast bullets makes a great deal of sense!). These projects have been educational and highly enjoyable experiences.

One of the other things that Charles told me was that as I learned more about casting bullets for rifle cartridges, I would eventually come to the conclusion that the .30-30 Winchester was almost perfect as a cast-bullet rifle cartridge, but that the .30-40 Krag was the closest thing to perfection that I would find as a cast-bullet rifle cartridge. Charles had a number of good reasons for holding this opinion:

- Case capacity is well-suited for cast bullet loads.
- Long case neck to cover up all the lube grooves in bullets with long bearing surface.
- Cartridge operates at moderate pressures, well suited to cast bullets.
- Moderate pressure loads allow the bullet to be introduced to the lands "gently" (important for good cast bullet accuracy).

- Full-throttle velocities are compatible with cast bullets.
- 1 in 10" twist is compatible with heavy cast bullets at full throttle.
- Wide assortment of excellent .30 caliber cast bullet designs available.

As you probably already know, the .30-40 Krag cartridge (aka ".30 US Army") was introduced in 1892 with the Krag-Jorgensen rifle and carbine. According to *Cartridges of the World*, the original military loading had a 220 grain FMJ round-nosed bullet over 40 grains of black powder. Almost immediately after the round was introduced, the powder charge was changed to smokeless. Velocity of the smokeless military load was 2200 fps. As a military cartridge, the .30-40 Krag had a fairly short service life, as it was replaced in 1903 by the .30-'03 (which would later morph into the .30-'06). However, in the 11 years that the .30-40 Krag was the official service cartridge, there were quite a few Krag-Jorgensen rifles and carbine made (all told over 700,000 Krag-Jorgensen's were built, over 500,000 of which were made at the Springfield Armory and chambered for the .30-40 Krag cartridge), and many of these guns are still in service, either sporterized, or in their original military configuration.

Starting in 1893, the .30-40 Krag was added to the chambering's of a variety of sporting rifles, including the Winchester High-wall, the Remington Rolling Block and the Winchester Model 1895 Levergun. More recently, Ruger made a run of their #3 Carbines in .30-40 Krag, and my friend Charles Sharps tells me that it also makes a dandy handgun hunting round for the Thompson-Center Contender as well. The 220 grain soft-point bullet was responsible for establishing the .30-40 Krag as an effective hunting round, but a variety of other bullet weights and designs were available at one time or another over the years. Nowadays, factory ammo for the Krag is usually found loaded with 180 grain soft-point round-nose bullets, generally somewhere around 2400 fps.

And therein lies part of the charm of the .30-40 Krag -- its moderate velocities. At impact velocities of 1800-2400 fps, traditional lead core jacketed soft-point bullets do not tend to get overtaxed, and tend to expand smoothly and reliably. The .30-40 Krag is no flat-shooting long-range magnum, and it would be severely over-shadowed (in terms of effective range) shortly after its introduction by the .30-'06 and .270 Winchester (in fact, in terms of effective range, it was out-classed *at its birth* by the 7x57 Mauser, as testified to by none other than Theodore Roosevelt). However, the .30-40 Krag has always been regarded as a highly *reliable* hunting round. Sectional density, coupled with moderate impact velocity, results in reliable expansion, good weight retention and deep penetration. Effective hunting range is generally considered to be about 200 yards, and within its limitations, the .30-40 Krag is a highly capable killer of deer-sized game. It's not terribly flashy, it just flat works. Reliability is a good thing.

Not owning a Krag at that point when Charles told me that the .30-40 Krag was the perfect cast bullet rifle cartridge, I smiled to myself, but didn't say anything. I would learn soon enough.

A few years later, I was hunting feral hogs with my buddy Bob (aka "fatboy"), and he hinted to me that the sporterized Model 1896 Krag carbine (23" barrel) that he was hunting with might be available for trade, if I was so inclined. I was so inclined. We worked out a trade that left both of us very happy. The stock on this .30-40 Krag carbine has been sporterized and lightened up significantly, and the gun has an ivory bead front sight and the striker-mounted rear peep sight (think "ghost ring peep"), making a short, 7 1/4 lb, quick-handling package. All in all, an excellent "woods gun".


.30-40 Krag carbine.

Over the years, I've spent some very enjoyable sunny afternoons out at my range up in the mountains, "working" with this carbine, and learning to appreciate the fine qualities of the ancient Krag. One of the things I learned was this carbine does its best with cast bullets sized .310" or .311", and it definitely does NOT care for .312" (or larger) cast bullets. Also, I've found that good accurate cast bullet loads are easy to assemble, and that rifle powders with burn rates ranging from 4198 to H450 can be used to make good accurate ammunition (although I generally tend to gravitate towards the medium to medium-slow rifle powders, like 4895 to 4350 and H4831). The Krag-Jorgensen rifles and carbine have a reputation for being chambered rather "generously", so I have adopted neck-sized brass as standard operating procedure in an effort to make cases last as long as possible (and this has worked well). All in all, I've had a lot of fun and played with a lot of powder/bullet combinations. Instead of going through all the sordid details, I'll just touch on a few of the highlights.

I tend to agree with Elmer Keith in preferring heavier bullets for the .30-40 Krag, and so my cast bullet selections have generally been about 175 grains and up. There are many good, accurate cast bullet designs that are suitable for the .30-40 Krag, but there are none more accurate than the 175 grain Lyman/Ideal 311291. This is one of the first GC cast bullets ever designed (introduced in 1906), and it is a very accurate bullet in pretty much every .30 caliber rifle or handgun that I've shot it in. I have never shot any big game animals with this bullet, but when cast to a moderate hardness (so it can expand at 2000 fps), it has a long-standing reputation as a fine hunting bullet. When loaded on top of 30.0 grains of 3031, the 311291 is the most accurate load I've tested in the .30-40 Krag carbine to date (~2 MOA using iron sights). This load generates 1931 fps, and would make an excellent general purpose load.

Similarly loaded, the Lyman/Ideal 311291 HP is also quite accurate, and


311291 RN and RCBS 30-180 FP

expansion testing reveals violent expansion at 1900+ fps. This would make an excellent varmint load for coyotes/badger sized critters, but may be more destructive than some folks want for shooting deer. Personally, I don't think this would be a problem IF the shot was placed in the lungs. When hunting deer or hogs with cast HPs I generally try to wait for broadside ribcage shots, and avoid shoulder shots at all costs. Yes, a cast HP will generate some bloodshot meat, but there's not all that much meat in the ribs, and surprisingly little is lost.

Probably the best all-around cast bullet for the .30-40 Krag that moulds are currently produced commercially is the RCBS 30-180-FP-GC. This bullet drops from the blocks at about 190 grains when cast to a BHN of about 12. There are any number of good loads with this bullet (burning rates from 4895 to H450 seem to work well with this bullet), but my favorite is 35.0 grains of H380 for 1966 fps. This is a very accurate load, and excellent in every way as an all-round load -- flat-nosed hunting bullet, good sectional density, good velocity, excellent accuracy (~2.5 MOA with iron sights), etc. If I was forced to choose one load to use forever with the .30-40 Krag, this would be it. Cast to a BHN of about 12 (i.e. typical WW alloy), this load will do everything that can be reasonably asked of the .30-40 Krag.


.30-40 Krag loaded with the RCBS 180

The 215 grain Lyman/Ideal 311284 is another one of the original GC designs that came out in 1906. It was designed for the .30-40 Krag, and the (then) young upstart .30-03 (followed shortly thereafter by the .30-06). The best load I found for the 311284 in my Krag carbine was 30.0 grains of H4895 for 1821 fps. This result seems to fall into a trend -- in my experience, the 311284 tends to shoot well in .30 caliber rifles with a 1 in 10" twist rate up to around 1800 fps, then accuracy starts to drop off above that. Faster loads were acceptable, but clearly not as accurate as the 1800 fps loads. Rob Applegate was the first to point this tendency out to me, and my experiences with this bullet have fallen in line with his.

The hollow-point version of the 311284 weighs about 203 grains when cast to a BHN of about 12. The same 30.0 grains of H4895 generated 1891 fps with the HP and delivered decent accuracy (~3 MOA with iron sights), although it generally seemed to lag slightly behind the standard 311284. I suspect the reason for this is because my 311284 mould drops bullets with a .301" diameter nose, and the HP mould drops bullets with a .299" diameter nose (making it slightly undersized relative to a .300" bore diameter). I suspect that this accuracy difference is why Charles Graff is so keen on a full diameter bore-riding nose when he's fitting cast bullets to his rifles. As for limiting velocity to ~1800 fps, in this case it is no handicap whatsoever as 1800 fps is a deadly velocity for a cast HP, and the 311284 HP will deliver devastating expansion at this velocity. In the 203 grain 311284 HP, the HP cavity runs roughly 40% of the length of the bullet, so ~60% of the bullet shank is left over after the nose is gone to punch on out the other side, so complete penetration of deer and black bear-sized game should not be a problem.


311284 HP and loaded round.

The 197 grain Lyman/Ideal 311299 HP has a narrower HP cavity, making it well-suited for a more controlled expansion type of load. For this type of load, I generally target velocities around 1600 fps, so I started off using 4198, since previous experience had shown me that a good accurate load should be easy to get with this powder in this velocity range. 22.0 grains of 4198 gave me just what I was looking for -- 1685 fps, and very good accuracy (~2.5 MOA with iron sights). This mould drops bullets with a .304" diameter nose. Informal expansion testing revealed more controlled expansion than with the 1800+ fps 311284 HP load discussed above, offering a complementary and very useful level of performance.

311299 HP and loaded round.

But the bottom-line is that I specifically wanted a ~200 grain cast HP that could be pushed at 1900-2000 fps, expand quickly, and still retain as much weight as possible after the nose sheared off, so that penetration would be maximized. I stumbled across a 2-cavity Cramer mould for a .30 caliber HP (#41B) that a previous owner had ground the HP pins down to where they made a flat-point bullet (a very good-looking flat-point bullet, I might add). I sent this mould off to my friend Erik Ohlen at Hollow Point Bullet Mold Service, (541)738-2479) modify@hollowpointmold.com, with the instructions that I wanted 2 sets of pins made up: 1) to make a HP cavity .100" across at the mouth, and .250" deep (with a tapered pin with a rounded tip), and 2) a new set of pins to make the flat-point bullet (the existing set of pins had been pretty beat up from abusive handling). As usual, Erik's work was superbly done, and he turned the job around in a timely manner. Firing up the lead-pot, the mould starting casting beautiful keepers almost immediately, and

311299 HP and loaded round.

the bullets fell free from the HP pins easily. And boy does this mould cast quickly and smoothly! When cast to a BHN of about 11-12, these Cramer HP's weighed 197 grains, and miked .312" across the driving bands and .300" across the nose. Just exactly what I was looking for! Since this bullet was designed with full-throttle loads in mind, the first load I tested was 35.0 grains of H380 with both the solid form of this bullet and the HP. Decent accuracy was obtained and a muzzle velocity of about 1955 fps. I was sufficiently encouraged that I decided to play around a little more and see just how much I could tweak things to get this bullet to really sing.

Other test loads were assembled using H4831, H450 and H414, all with similar results (velocities in the 1950-2000 fps range, with groups running ~2" at 50 yards with iron sights), but the real winner was found with 40.0 grains of 4350 -- 5 shots went into an inch and a half at 50 yards, with a muzzle velocity of 2065 fps (with very consistent velocities). This is now my preferred load for this Krag carbine.

By simply switching out the pins I can also make the corresponding flat-pointed solid, which should weigh in at a little over 200 grains, and should be a deep penetrator of meat and bone. Sounds like a good project for this summer...

Repaired Cramer #41B mould.

The Cramer HP Cramer solid.

The .30-40 Krag, loaded with cast bullets weighing 190 to 200 grains, both in solid form and HP, leaving the muzzle at 1900 to over 2000 fps, with good accuracy and no leading -- now that is field performance to gladden the heart of any woods hunter! Charles, you know, you just may be right, the .30-40

Krag just might be the perfect cast bullet rifle cartridge. "Well, at least for anything under .35 caliber..."

- Glen E. Fryxell

The Rites of Spring

By: Glen E. Fryxell

I have hunted primarily with handguns now for over 20 years. I have been a hand loader and bullet caster for that same period of time. While I started off handgun hunting with high-performance wildcats, loaded with jacketed bullets, it was only natural that cast bullets would creep into the spotlight in my hunting loads. There is a very real satisfaction that comes from casting one's own bullets, and from assembling accurate useful ammunition from those bullets. It's only natural to start thinking about how a hunting bullet should be configured and making some custom mould designs to try out in the field. That satisfaction grows when highly effective hunting loads are built around those hand-cast bullets, and grows even greater when those hunting experiences are shared with good friends. This is a story of such bullets and such friends.

There are three bullets that play a part in this story -- all three weigh more than 200 grains, all three are cast hollow points (HPs), and all three are routinely loaded between 1300 and 1600 fps. A fine recipe for making meat!

The first of these bullets is made using a custom-made mould that Bruce A. Brandt made for me a while back. Bruce runs BRP Enterprises (LLC) and he makes a wide variety of mould designs (BRP Products, LLC; 616-667-2427). One of the bullet designs that he's made a cherry for is the Lyman 358627, the 215 grain SWC-GC that Lyman made for the .357 Maximum and IHMSA competition. I bought a 2-cavity Lyman 358627 back in the early 90s and have shot that bullet in everything from the .38 Special to the .350 Remington Magnum -- it's a very accurate and versatile cast bullet design. While the 358627 is one of my favorite cast bullet designs for the .357 Maximum, I have always wanted to get a HP version of this bullet, and given that Lyman is no longer making this mould, I am reluctant to modify the original mould I have. This is where Bruce comes into the picture. It turns out that he made a cherry that duplicates the 358627 design AND he offers his moulds in HP form. An order was placed forthwith.


358627 HP mould.

After the mould arrived I sat down and cast up a batch of bullets to a hardness of a BHN of about 11. They dropped from the blocks at .360" and they weighed 209 grains. I sized them .357" (my Ruger has tight throats), lubed them with my home-made Moly lube, and checked them with Hornady crimp-on gas checks. Various test loads were assembled using IMR 4227, Acc. Arms 1680 and Winchester 680. The best load tested was 19.0 grains of 4227, which is very accurate and generates about 1500 fps from my 7 ½" Ruger.


.357 Max loaded with the 358627 HP.

The second bullet in this story is a HP version of the Lyman 33889. Back in '93

JD Jones helped me bring a wildcat cartridge to life. The .338 GEF is based on the .356 Winchester case necked down to .338 with the body taper and shoulder blown out. From a 12” Contender the .338 GEF can launch the 200 grain Nosler Ballistic Tip at 2100 fps and the 250 grain Partition at 1900+ fps. I’ve used the .338 GEF to take mule deer, pronghorn antelope and feral hogs. It works. Quite nicely, in fact. Not surprisingly, I wanted to find a good cast HP mould to feed my pet wildcat with. Well, the answer was found in the form of a single-cavity Lyman 33889 mould that I found for cheap. I took a piece of ½” aluminum round stock and turned a mandrel to fit the mould cavity and clamped the mould blocks onto this mandrel and drilled the channel for the HP pin using the tailstock. I chose to make a .135” diameter pin that extended .500“ into the bullet’s nose, tapered at about 5 degrees, with a rounded tip. When cast to a BHN of about 12-13, these bullets drop from the blocks at .340” and weigh 240 grains. I size them .340”, lube them with home-made Moly lube and check them using Hornady GCs. My favorite load for this bullet is 46.5 grains of H4831, which generates right at 1600 fps (See The 338 GEF Revisited). This is not a maximum load pressure-wise (nowhere near), but this is about as fast as I can go with the 1 in 10” twist and maintain top shelf accuracy with this cast HP. This load is very accurate and 1600 fps is a very useful velocity for a cast HP. I have used this bullet to kill a feral hog and a mule deer and have complete confidence in it for medium game -- it expands well and exits.


33889 HP and loaded .338 GEF

The third bullet of this trilogy is based on the RCBS .44 300 grain GC-SWC. A while back I sent this mould off to my good friend Erik Ohlen; Hollow Point Mold, (541)738-2479) with the instructions to convert it to a 2-cavity Cramer style HP mould (See In search of the perfect bullet), with a .150” diameter mouth, 7 degree taper, a cavity that extended .250” into the bullet. The mould showed up a short time later, modified exactly as requested. Let me tell you, the Cramer system let’s you cast a heap-big pile of HPs in a hurry! These bullets drop from the blocks at 297 grains. I size them .430” and load them over 21.0 grains of 296 in .44 Magnum cases for about 1350 fps (depending on barrel length). I used this bullet to kill a smaller hog last year, and it performed beautifully, but I wanted to try it on something a little larger this year. And it turns out that a very special 7 ½“ Ruger Old Model Super Blackhawk that I bought earlier this spring from my friend Mark just so happens to shoot this bullet to point of aim with the rear sight bottomed out. I love it when a plan comes together!


RCBS 300 Gr. HP and loaded round

Hunting season is a special time for me -- the angry clouds of autumn, the turbulent changing weather, the cold mornings and crisp sunrises, and the promise of seeing game when you least expect it. But I’m a Southern Boy at heart and historically Spring has been typically set aside for slower, more relaxed activities like fishing for catfish or bass. I don’t fish as much as a I used to (the word “pathological” comes to mind...), but I still like to get outdoors and stretch my legs a bit. Anymore, I like to get out and do a little light-hearted hunting. Since there are limited spring hunting seasons for game animals, this commonly means patronizing a fee hunting ranch. And since I’m a Southern Boy at heart, this commonly means hunting feral hogs (I love Carolina barbeque!). This spring I tried to coordinate hunting trips with a couple of my friends, but their schedules turned out to basically be incompatible, so I ended up scheduling two trips down to Clover Creek Ranch in central Oregon.

For the first hunt, I would be hunting with my friend John. I had decided to take a Corsican ram. I’ve always admired the colors, the mask, and the beard of the Corsicans, and I was specifically looking for something with approximately full curl and an outward flair at the tips. Corsicans aren’t very big animals (~100 lbs) and I figured the .357 Max, loaded with the 209 grain 358627 cast HP at 1500 fps would be just the ticket. The scoped .338 GEF Contender, loaded with the 240 grains 33889 HP cast HP would serve as my back-up gun for this hunt. John wanted a meat hog and would be hunting with his .308 rifle, loaded with 180 grain Partitions at about 2600 fps.

We got down to the ranch late afternoon on Friday, and got settled into the Bunkhouse. Dinner that night was a very simple, and very tasty recipe of andouille sausage, potatoes, onions simmered in gewürztraminer with a healthy dash of red pepper. Sweet, hot sausage ‘n spuds. Man, that was good!

The next morning I woke John (that sleep-head!) up with the coffee pot perkin’ and the smell of sausage (from last year’s hog) sizzling’ in the skillet. We added scrambled eggs and bread, and ate like kings at O-dark thirty (I love breakfast in hunting camp!). Well fed, we headed up the hill into the ranch.

We got up on top, into the big pasture, and crossed the muddy drainage to check out the other side, when we looked back over our shoulders and saw a large group of mixed sheep and goats (Corsicans, black Hawaiians, Oregon Dahl, Catalina, Merino, etc.) 600 yards away, up amongst the junipers on the slope behind us. The binocs revealed several good Corsicans in the group. We drove back to the muddy drainage and parked the truck back behind some brush, and got out. John was seriously jazzed as he wanted to see one of these rams up close and personal. I strapped on the .357 Max, loaded with Bruce’s 358627 HP at about 1500 fps and tried to put together a fairly direct stalk up through the junipers. I was able to work my way up the hill up to about 150 yards or so from the group, but they started getting nervous and weren’t going to let me get any closer. Time for Plan B. We went back to the truck, and then ducked around behind the back of the hill and then tried going up the back of the hill around to swing around in front of the group and come over the top of the hill, to surprise them on top. The stalk went very well and we came out in the middle of a broken up rock outcropping near the crest of the hill. The group was about 125 yards in front of us, milling about nervously on the slope in front of us. The stalk went well, the wind was in our favor, we hadn’t been “busted“, but the land-scape was such that we couldn’t get any closer, so I chose to set up behind a rock outcrop and see if they might feed over in our direction. In fact, they did, but a couple members of the group caught a glimpse of me hiding behind the rocks and got real nervous. The group got all bunched up and started milling about nervously. I couldn't get a clear shot, but I did see that there was a very good Corsican in the group that had the curl and outward flair I was looking for. The gun and the load were certainly up to taking a 100-lb Corsican at 125 yards, but it was still early morning, on a gray, overcast morning and I didn't trust middle-aged eyes with iron sights to place the shot with the level of precision that I want, so I called off the stalk and John and I went back to the truck, laughing about Mother Nature's sense of humor.

Given the skittishness of this group of rams, I made an "executive decision" and decided to ditch the .357 Max and go with the scope-sighted .338 GEF Contender and the 33889 HP at 1600 fps. A group of yaks had fed up over the ridge that we had been using for cover for our previous stalk, and a whacky idea occurred to me. Maybe if we made it look like we were interested in the yaks, and paid no attention to the rams, we might be able to work up the hill and get within range for a shot at a nice Corsican. The yaks weren't terribly "spooky" and we basically walked slowly up the hill directly towards them (ignoring the rams off to our right). The rams were still all bunched up. At one point there was a large patch of juniper between me and the rams and I did a smart right-face and marched right up to the junipers. Since most critters key on the upright human form, I laid down prone and belly-crawled around the left-hand side of junipers to a piece of greasewood that I had picked out to use as an impromptu field rest. At this point, the animals were bunched up, about 75-80 yards off. I quickly scanned the group to see which Corsican ram was what I was looking for. Across the front of the group there were three that were virtually indistinguishable (I couldn't help but think "Huey, Dewey and Louie"), and all had the traits I was looking for, but none of them presented a clear shot opportunity. I was not ready for what happened next. Suddenly the entire group started trotting towards me, quartering to my left. In the process one of the three I'd identified earlier broke out on the left side of the bunch and gave me a clear shot. I pulled the gun off the greasewood rest and rolled over into a roll-over prone position, swung the crosshairs onto his shoulder and snapped off a shot at about 40 yards. The 240 grain 33889 cast HP hit the Corsican ram audibly, and he went down hard. As I got up I instinctively reloaded the Contender. As I did, I replayed the shot in my mine and realized that I had rushed the shot and hit him a little higher than I would have liked. He was down, and definitely not going anywhere, but he was still kicking and struggling when I got to him, so I put a second 33889 HP through his lungs and all was quiet quickly after that. He was beautiful, and exactly what I had been looking for. Later, inspection of the wound channel confirmed that the first shot had raked through the chest, from the left shoulder and exited just below the right kidney. It had traversed just below the spine, rupturing the major blood vessels that travel along the spine. The spinal shock was what knocked him off his feet, and the hemorrhage would have ultimately killed him, but the second shot hastened things in a humane fashion. I was one very happy hunter, I had my Corsican.

The fact that I had switched to a scoped Contender for a shot that ultimately could have been done easily with the iron-sighted .357 Max revolver was not lost on John and me, and we laughed about the "Irony of the Hunt" on the way down the


Glen and the Corsican

hill (it's easy to laugh when there's meat in the truck!).

From previous visits we knew of a remote spot up in the woods that was a favorite bedding spot for some of the hogs on this ranch. John and I worked our way through the woods to a spot above this area and slowly snuck into position where we could look over the dozen or so hogs that were bedded down there. John was looking for a good meat hog (about 300 lbs), and wanted to have the opportunity to look over several hogs and pick-n-choose what he was going to take (last year he basically took the first decent sized animal that gave him a good shot opportunity). Several of these hogs were considerably bigger than what he was looking for, and a couple of them were smaller, but there were 2 or 3 that would fit what he was looking for. One was bedded down front and center, with a dirt birm shielding his vitals, and the other two were farther back in the groups and milling about behind the bigger hogs and some brush. We were about 50 yards above the hogs and decided to try to move in a little closer. At about 35-40 yards we got busted, and several of hogs started to get up and stare in their squinty-eyed way at us to try and figure out what we were. It was about this point that the sleeping hog in front of us decided to wake up and stretch his legs. As he stood, John saw to it that he never regained his feet. The 180 grain Partition (44.0 grains of Winchester 748, 2600 fps) hit him behind the left shoulder, and he went down hard, squealing. Most of the hogs moved out, but one of them moved in and started slurpin' up the blood from his dying brother (that's hogs for you…). John's hog died quickly, and we shooed the other hog off and got a few pictures. The 180 Partition had entered in the middle of the left side ribcage and exited a little farther back on the right side, taking both lungs and liver in its travels. There was basically a 1" core removed from this hog, from one side to the other -- he bled freely and died quickly. Clark came in with his 4-wheeler and picked the hog up and got it down to the skinning shed for us. John was very pleased with his hog and got lots of prime pork off of it.

Before we left to hunt that afternoon, I had browned a pound of stew beef, added a can of black beans, a can of whole kernel corn, some diced onions and a dash of red pepper, and threw the whole mess into a crock pot, so when we came back from hunting there was a crock pot full of some un-named mystery goulash waiting for us. It was wonderful! There were no leftovers…


John and his hog.

The next morning we boned out meat and packed it into coolers for the drive home. Later that week, we made some Italian sausage out of part of John's hog and it tuned out really well. I was having a hard time making up my mind what I was going to go after on the second half of my spring hunt, and that Italian sausage did it for me -- a hog's fate was sealed!

Two weeks later, I met Bob down at Clover Creek on Sunday afternoon. Bob wanted to shoot a yak, specifically a cow yak (there was only one left and it was "on sale"). I would be looking for a meat hog in the 200-300 lb range. Bob would be hunting with his Ruger 77 .30-'06, loaded with 180 grain Nosler Partitions over a healthy charge of 4350 for about 2700 fps, and I would be hunting with the Old Model Ruger Super Blackhawk (that I had just bought from my friend Mark earlier this spring), loaded with the 300 grain cast HP that I had my good friend Erik Ohlen modify for me a little over a year ago. It would be loaded over 21.0 grains of Winchester 296 for about 1350 fps.

First night's dinner was Italian sausage (from John's hog, taken 2 weeks earlier) in sweet basil marinara sauce over tri-color rotini pasta served with salad and a bottle of old vine zinfandel. Yeah, we were really roughin' it! We built a campfire in the new fire-pit that Clark had built and then sat back and told hunting stories and listened for the coyotes.

I woke up at 5:30 the next morning, turned on the coffee pot and started a some breakfast sausage on the hot plate (I like sausage and eggs). It seems some old retired folks are kinda grumpy when their morning routines get changed. Soon the bunkhouse was full of the smells of sizzling sausage and fresh-brewed coffee, providing motivation for Bob to drag his carcass out of bed. After breakfast was polished off, we headed up the hill, and into the ranch. We didn't see any yaks at any of the places where John and I had seen them 2 weeks before (Clark had told us that there had been some hunting pressure on the yaks recently and their skittish behavior seemed to bear that out). We moved all over the ranch looking to see where the yaks had moved to and all we saw were 4 big bulls in the big pasture on top (Bob wanted a cow), so we swung down to the big catch basin at the bottom of a big bowl, to look around for the hogs, to see if I could find one in the size range I was looking for. As we worked our way up the drainage, we found one blonde sow, fast asleep, bedded down in the middle of a sandy wash, in a sunbeam. She went 325-350 lbs, and was a little bit bigger than what I was looking for, so we left her sleeping and came back down to camp for lunch.

Bob was the lunch chef, and fixed venison burgers made from one of the coastal blacktail bucks he'd shot over on the Olympic Peninsula. That was some of the best venison that I have ever tasted! As we washed the burgers down with a cold soda, Clark told us that he thought the yaks might be holed up out of the wind (which was really picking up), hiding in some woods on the leeward side of a ridge that abutted the big pasture on top. We made a mental note to swing by those woods and do a little bird-doggin'. We also decided to go and see some other parts of the ranch that we hadn't been to on this trip yet. After lunch, we headed out and went up the rocky road that goes immediately behind the ranch house.. We started seeing rams almost immediately -- Corsicans, Oregon Dahls, Merinos, 4-horns, etc. Then there were a couple of big Texas longhorns, and a shaggy old buffalo bull. This was a relatively sheltered part of the ranch, and the winds were really picking up (the forecast was for 60+ mph winds that afternoon), and the critters were coming down here to get out of the wind. But no yaks, and no hogs. We kept moving.

Eventually, we broke out on the “main road” up near the top. It was really blowin’ now and we decided to follow up on Clark’s suggestion of working the backside of the ridge. I started up the 4-wheeler track, intent on getting Bob established on the right set of tracks, and then dropping back and letting him take the lead, in case we jumped anything. I was no more than 30-40 yards into the woods when I kicked up a big yak bull. Man, did I ever feel stupid! Bob got out in front and followed that big shaggy black bull up the hillside (and I hung back at the truck so as not to interfere with any more of Bob’s stalks). He came back saying that the bull was heading in the direction of the big pasture and that he thought there might be some other yaks up there, so we loaded up in the truck and headed up the hill.

As we approached the big pasture, Bob looked over where he expected to see the yaks, and said, “Yup, there’s the 4 big bulls we saw this morning.” Wait a minute, these animals were all different sizes, and the 4 bulls were all the same size. Bob put the binocs on them and sure enough, this group was composed of a bull, a cow, a yearling and a calf (the calf “belonged” to a different cow that had already been taken, after the calf had been weaned; there was only one cow left and at 3 ½ years old she had never dropped a calf and was “dry“). “Glen, I believe we’ve found my cow.” Now we just needed to figure out how to close the half mile between us.

A direct stalk was out of the question. We would be in plain sight the entire way, and we already knew that these animals were skittish. There was a slight rise above them, and if we continued up the road we were on to the big pasture on top, that rise should shield us until we got on the other side of the pasture. We could then work down a line of trees on that side and get into position for a shot. We were off.

The 4 big bulls were up by the a stand of trees on the fence line, using that as a wind break. We slowly drove past them at a comfortable distance so as not to spook them. We got up to the tree line and parked the truck out of the way (but in the direct line of the wind as it came over the saddle, it was blowing at 40+ mph out of the west at this point). The group of 4 bulls was out about 250-300 yards to the south of us, and the group of 4 yaks were a couple hundred yards east of us, moving into the wind to ultimately join up with the 4 bulls. The original plan had been for Bob to sneak down the edge of the tree line about 150 yards to get in position above his cow, and to shoot from there. With them moving (and covering ground at a deceptive pace), that was no longer an option. I hid in the bushes at the top of the hill, and Bob was able to sneak down to a shielded position about 50-60 yards to my left and set up on the edge of the tree line and let the yaks move into his field of fire. They were about 125 yards in front of us, moving at a steady walk from our left to right, and the wind was blowing 40+ mph from our right to left. Bob was shooting slightly downhill, from an open-legged sitting position, at a moving target, with a 40+ mph crosswind blowing straight out of 3 o’clock. Not the best of conditions to shoot in, but Bob managed to shoot well in spite of the conditions. His first shot hit the cow yak hard and stopped her in her tracks, with her head sagging. The other 3 yaks pick up their pace and started to trot off towards the 4 bulls. Bob quickly racked the bolt on his ‘06 and put a second 180 grain Partition into the cow and she went down hard. Both bullets slammed home loudly from my vantage point off to Bob's side.

With the second shot, the 4 bulls started trotting over to meet the younger bull, yearling and calf that were coming their way. As the two groups merged, they headed back over to the dead cow and started nudging her and kicking her to get her to get up and leave, warning her that there was danger in the area. When she didn't respond, they got more and more intense, eventually to the point of hooking her with their horns and trying to flip her over! This went on for a full 5 minutes with Bob and me watching from the top of the pasture. They didn't actually leave the dead cow until we got in the truck and drove down there and honked the horn repeatedly at them. They were none too happy about losing "the last girl at the dance"!

Later we learned that Bob's first shot had landed a little farther back than he had intended due to the severe crosswind, but still caught part of the liver


Bob and his 400 lb yak. Bob took the shot from the line of trees behind him.

(which is what slowed her down). His second shot center-punched her volleyball-sized heart and literally blew the backside of it off. The elapsed time between the first and second shots was no more than 3 or 4 seconds. Nice shooting!

Clark came up with his 4-wheeler and trailer to haul the yak down to the skinning shed, and Bob and I moved off in search of hogs. So far, the only hog we had seen was the one big blonde sow, so we moved back down to the shelter of the catch basin at the bottom of the big bowl to see if there were any other hogs that had moved down to the shelter of those protected woods. We knew as soon as we parked the truck and started up the drainage that there were hogs in the area as we could hear an occasional grunt here and there. I was working into the wind, but that would put me directly downhill from their bedding spot, a poor position to evaluate size and shot placement. So I swung out parallel to the left so I could get alongside them without giving them my scent, and then I would "play it by ear" after I figured out what I was looking at. From the other side of the drainage, about 50 yards away, I could make out two large sows bedded down -- one dark brown and spotted, and the other a "dirty blonde". Both were in the 450 lb range, and much larger than what I was looking for. Off in some brush a little farther beyond those two were another 6 or 7 hogs bedded down, including the blonde sow I had seen earlier in the day, along with a few more of similar size, as well as a couple that were smaller (one I guessed at about 150 lbs and one at about 250 lbs). This group was bedded down all bunched together, and there was no way that I could get a clear shot at any of them.

The hogs were directly in front of me, with the wind coming straight out of 9 o'clock. I decided to cross the drainage to my left and put myself directly upwind of the two sows (but not the rest of the herd) and see if I could spook them "gently", get them up on their feet, and then get a clear shot at that 250-pounder. The plan worked like a champ -- I quietly snuck across the drainage and as soon as I got up on the other side (directly shielded by several juniper trees so the two sows couldn't see me), my scent wafted down to the sows and they sprang to their feet, using their beady little pig eyes to try to find the threat. The other hogs were off to my left, out in the open, but still crosswind to me. They didn't see or hear me, but noticed that the two big sows were rattled, and so they started to stir and stand. When the hog I'd picked out stood up, he was quartering towards me (facing my right) and I had a clear 40 yard shot. I brought the OM SBH up, drew a bead just behind the right shoulder, and fired. The hog started squealing and jumping around in circles, doing pirouettes like a rodeo bronc. I've seen cases where mortally wounded animals have reacted this way, so my first reaction was that he was probably going down quickly. Such was not to be. After a few seconds, the herd gathered up and started moving off, up the drainage to my left. The wounded pig fell in with them and started trotting off with them, leaving a strong blood trail from his bloody left hindquarter (when I saw that, I thought that was odd as I would have expected my shot to exit at the back of the left-side ribs, but bullets sometimes turn inside an animal so I didn't think too much about it). I ran to catch up with the herd, and got within about 15 yards of them, but they stayed all bunched up in the bottom of the creek channel, offering no clear shot. Suddenly, the wounded hog took off up the opposite creek bank, putting himself in the clear, only about 15 yards away. The Ruger .44 Mag came up and I drew a bead on his left shoulder and fired. Right as the hammer fell, the hog jumped uphill to gain more elevation on his climb, and I called that shot as a clean miss (low). However, the shot had an immediate effect of turning him 180 degrees and motivating him to now run, instead of trot, downhill and away from danger (I figured I must have sprayed rocks and gravel on him with the shot). I ran down the creek channel on the opposite bank. Now separated from the rest of the herd getting a clear shot was easy, and I put a 300 grain HP right through the middle of his ribs, flattening him instantly. He collapsed and tumbled down into the bottom of the creek, wedging himself in between two large rocks. With him down at the bottom of that creek, it soon became apparent that my original estimate of "about 250 pounds" was off by a bit, and this guy was more like 300 lbs. Clark came in with his 4-wheeler, and it took the three of us 30-40 minutes to get that hog out of that creek channel, and loaded up onto his trailer. I shudder to think what that job would have been like without Clark's 4-wheeler and trailer.

Back at the skinning shed we were able to piece together what had happened with my hog. Plain and simple, I jerked the trigger on that first shot, and pulled it low and a little left. It had gone in below the ribs and just creased the belly, then hit the far side (left) hindquarter, where just by pure luck it had hit the femoral artery (hence the strong blood trail). This wound would have eventually proven fatal, but only by random luck. The second shot had indeed gone low (just as I had called), but it had hit a rock and ricocheted straight up vertically into the left "armpit" of the boar, and traveled up in between the shoulder muscles and the ribs, doing substantial damage to a lot of meat in the ribs, but not doing much that would hasten porky's demise. The third shot entered the center of the right side ribcage and exited in the rear portion of the ribs on the left side. The 300 grain cast HP expanded well, did extensive damage to both lungs and punched right on out the other side.


Old Model SBH

Clark had most of the skinning chores done before we got back down to camp (he's fast with a knife!). It got down below freezing that night, so both the yak and the hog chilled down quite nicely. Dinner that night was pan-fried steaks (much too windy to grill over the campfire like we had planned) and salad. Sleep came easily for me that night.

After a hearty breakfast the next morning we got Bob loaded up and on the road, and then I sat down and butchered my hog for the trip back home. On this trip I was using a Dozier Professional Skinner that I had just bought from a friend of mine down in Texas. For many years I have heard of the reputation of Bob Dozier's knives and the exceptional edge retention resulting from his heat treatment of D2 steel to 60-61 Rc. I've always wanted to work with one, but had just never "pulled the trigger" and bought one. Well, Mark offered one up for sale earlier this spring, and it was even the model that I favored, so I just decided that the time had come, and mailed him the check. The Dozier Professional Skinner performed beautifully while I was butchering this hog. I never once had to touch up the edge, and it still shaves after cutting all that pork. This is a magnificent knife!

OK, there is one thing that I'm not real crazy about, and that's the Kydex


Dovier Professional
Skinner and sheath

sheath. I must confess to being something of a traditionalist and preferring a simple leather scabbard for my hunting knives, and Kydex tends to make me think "tactical wannabee". I understand the functional appeal of Kydex, it's just that it lacks the beauty and class of a fine leather sheath. This particular knife is housed in Dozier's Vertical Kydex sheath (the default sheath for this knife is the Horizontal Kydex sheath). I have to say that this sheath has all the esthetics of a rusty bumper-jack that's been rattling around underneath the seat of an old 1967 Ford work truck. But like that bumper jack, it does its job, and does it well. After wearing this knife (and sheath) for 2 days hunting, I can honestly say that it's the best *functional* sheath I've ever used -- the counter-radiused belt loop holds the sheath (and knife) up snug to the body (I don't like "floppy" sheaths), it provides rapid and positive access to the knife, and it provides excellent protection from the razor sharp D2 blade. In short, it works, and extremely well. I guess I can learn to live with its homely looks (besides it's on the backside of my belt, so I don't have to look at it when I'm hunting!).

All in all, it was a great spring -- I got in some interesting hunts with good friends, and I got a chance to hunt with some excellent cast bullets. We ate well and took some very nice animals. Unfortunately I didn't get a chance to put the 358627 HP in the .357 Max to work, but maybe next spring....maybe a black Hawaiian ram...

- Glen E. Fryxell

Hunting with the .40-50 Sharps Straight

By: Glen E. Fryxell

For more on building the 40-50 Sharps Straight, load work-up & load data see "The .40-50 Sharps Straight Contender".

10" T/C Contender in 40-50 Sharps Straight.

The inspiration for this story can be found in J. D. Jones' project back in 1988 with SSK's custom Contender in the .338 Woodswalker. J.D. designed this round for walking around and kicking the bushes to see what came out, then be able to quickly deal a lethal blow at short range. I read that article and liked the idea, absorbed the concept, and wanted to do something similar, except in .40 caliber, built around a moderately heavy cast HP. It has taken a while, but all in all it has come together rather nicely (good things take time...).

Let's back up a bit. The Sharps rifle company is well known for making very accurate, large caliber, single-shot rifles that were used in the 1870s by the commercial buffalo hunters. There were a number of rounds that were used by the Sharps folks, but the last one to be introduced was the little .40-50 Sharps Straight, introduced in 1879, just a few years before Sharps went under. The original ballistics produced a 265 grain lead round-nose at 1410 fps. Not exactly laser-like in its ballistics (but note the similarity to the highly capable .44 Magnum). THIS was what I was looking for -- moderate pressure ballistics that were easily compatible with the Contender frame, along with a simple rimmed straight case with a powder column suitable for a handgun-length barrel. I bought a 10mm Contender barrel (with a cast bullet friendly 1 in 16" twist) and re-chambered it to .40-50 Sharps Straight using a reamer that I rented from Cliff LaBounty. Dies came from RCBS and I managed to find a handful of moulds from Lyman/Ideal. Load development revealed that it was easy to reproduce the black powder ballistics from a 10" Contender, well within the pressure limitations of the Contender frame. A variety of powders were used and the best accuracy and uniformity was found with 3031 and 4895.

One of the moulds I picked up was an old single-cavity Ideal 403149, the old 330 grain round nose with three grease grooves, made for the .40-70 and .40-90 Sharps (both the Straight and Bottlenecked versions of these cartridges). I sent this mould off to my good friend Erik Ohlen at Hollow Point Bullet Mould Service (email @ modify@hollowpointmold.com), (541)738-2479) and asked him to convert it to drop HP bullets with a cavity .120" in diameter and .400" deep, tapered and with a rounded HP tip. The mould came back modified exactly as requested and it cast fine bullets right away. They weighed 315 grains, and were .405" in diameter (just perfect for this particular gun).

I lubed them with 50/50 beeswax/Moly grease and started working up loads. The best combination of velocity and accuracy was found with 35.0 grains of 4895,


403149 HP mould.

for a velocity of 1320 fps. Accuracy was very good, although point of impact was higher than I could accommodate with the factory open sights, so I had to make a taller new front sight blade to bring point of aim to jive with point of impact.


Loaded round and 403149 bullet.

Cast HP's have their limitations. As a general statement, cast HP's tend to work best between about 1000 fps and 1600 fps. 1350 fps should be a very comfortable velocity for the 403149 HP. In addition, I asked Erik to give this HP a cavity that was roughly 1/3 of the bullet's length, so that way there would be lots of residual weight (shank) should the nose be lost during expansion. Expansion testing was carried out by shooting these loads lengthwise through a 2L pop bottle full of water, into a stack of dry newsprint. The fibers of dry newsprint are very hard on a bullet, and if it survives these conditions it will most likely perform beautifully in the field. These tests revealed that expansion was positive with the 403149 HP at 1350 fps when cast to a BHN of about 12 -- mass retention was better than 70% under in this tough test. It was time to go shoots some pigs!


Recovered bullet.

Due to some complications (which can be blamed on the airlines), I was running late, and John and I didn't make it down to Clover Creek until almost 10pm the night before our hunt. We met Rick and Moose, who had beat us down there by several hours. Not surprisingly, as seems to always happen when you get a group of hunters together with the goal of making meat, we stayed up later than we should have talking about guns, hunting, knives and cast bullets. Good stuff! We hit the sack well after midnight.

I woke those sleepy-heads up a little after 5am with the smell of freshly brewed coffee and sizzling breakfast sausage (from the boar I shot last year). I tell you, it didn't take long to get the crew up and moving with that sort of motivation! We polished off breakfast in no time, packed up and headed out. We parked on top of a favorite finger-ridge and moved out. We found the pigs quickly (or more accurately, I should say they found us). It seems that the wild hogs have pretty much been hunted out on this ranch and the hogs that were there for our hunt weren't terribly wild (having been removed from the barnyard by only about a month and a half). Well, the hogs may not have been very wild, but the countryside was, and the weather was beautiful, and all in all it made for a lovely setting to teach a couple of first-timers the fine art of making pork. This scenario didn't appeal to Moose and he dropped out, not wanting to shoot something that wasn't sprinting away from him. Rick and John each wanted to shoot their first pig. Me, I had a .40-50 Sharps Straight Contender loaded with a 403149 HP that I wanted to field-test, and besides, I'm a Southern boy and I love barbequed pork! The pursuit was on!


Dennis (Moose) Edwards.

Rick took the lead. He was hunting with a .44 Magnum Ruger Super Blackhawk loaded with a modified 429640 HP (in place of the wide-mouthed cavity of the Devastator, Rick had Erik Ohlen make a new pin profile to duplicate the cavity I used on my RCBS 300 HP (*HP cavity of .150" diameter at the mouth, cavity with 7 degree taper and extended .250" into the bullet with a rounded tip. Erik also removed the gas check shank to cast a plain base bullet)* -- a bullet I had used a few months earlier on a hog and it had expanded beautifully and punched right through and exited). After trailing the herd for a while, Rick was able to line up a 35-40 yard broadside shot on a 250-lb sow, and he placed the shot perfectly -- just behind the shoulder, about halfway up. The shot knocked the hog down, but it regained its feet and trotted off into the bushes. Rick followed her through the junipers and was able to eventually get a few more shots off. He hit her twice more (both low in the throat), but didn't stop her. She went down into a drainage and holed up in some brush. He was able to line up a shot and put a SWC through the top of her head, putting an end to the chase.


Rick and his sow.

Later, during the gutting and skinning, we learned that in spite of the excellent shot placement, the bullet had failed miserably, fragmenting badly and not even penetrating the ribcage (less than 2"). There was about 8" of "hamburger" surrounding the entrance wound, and much bloodshot meat. We couldn't find any fragments, but it was obvious from the shredded meat that the bullet had come unglued, and quickly. The lungs were bruised, but still intact, and in fact the ribs weren't even broken! I would have thought that a 285 grain cast bullet out of a .44 Magnum cast out of WW alloy and traveling 1320 fps would have punched right through a 250-lb hog (I have shot several hogs with cast HP's and these bullets routinely punch right on through), but not this time. I still think that the bullet design is a good one (good weight, good meplat, shallow HP cavity), but I don't have an explanation for the failure. My best guess is that it has something to do with the alloy, but Rick did the "hammer-smash test" on some of his bullets and they held together nicely and did not shatter, so I am at a loss to explain it. The bottom-line is that Rick stuck with it, put himself in a place to apply a finisher, and the animal was not lost.

John has just gotten into shooting in the last year, and I've been working with him over the course of the spring to introduce him to the basics of handloading. He has a .308 bolt-gun, and we had worked up a load of 44.0 grains of Winchester748 underneath a 180 grain Speer Hot-Cor (Winchester cases, Fed 210 primer), which produced good accuracy and right at 2600 fps, and he used this load to practice with this spring. For the hunt, he was using the same load with the 180 grain Nosler Partition. After Rick had his pig down, we left Rick and Moose with Rick's pig and John and I followed after the retreating herd. There were a couple of shot opportunities that almost gelled, but something about them didn't feel right, so John brought his gun down, and worked to get himself in a better position (that kind of patience in a new hunter is unusual!). Soon thereafter, the herd moved out onto an open grassy meadow and John dropped down into a kneeling position and lined up a 50-yard broadside shot on a spotted sow. The .308 barked once and the 180 grain Partition went in just behind the right shoulder, about halfway up. The 250-lb sow jumped slightly at the impact, then her front legs stiffened and her back legs went out from underneath her, and she collapsed without taking a step. I was a couple of steps behind John (just in case he needed help tracking, etc.), and couldn't have been more pleased with both his patience and shot placement. I gave him a quick congratulatory pat on the back and then moved off to get my own pig.


John (right) and Glen (left) with John's spotted sow.

I worked my way out to the right in order to get a clear shot, and picked out a nice-sized meat hog that had circled around to give me a broadside presentation at 35-40 yards. I brought up the 10" .40-50 Sharps Straight Contender and the front sight settled in snugly behind the left shoulder. The 250-lb sow was standing broadside, facing my left (slightly uphill), and the 315 grain cast HP (403149 HP converted by Erik) went right where it was told. She turned in a tight spiral and walked quickly away from me, making it only 10-15 feet before collapsing, with a geyser of blood coming up out of her right side, so I knew right away that the cast HP had punched out the far side. Later, I found very little bloodshot meat surrounding the bullet hole, consistent with the modest velocity of the .40-50 Sharps Straight. There was a 1 1/4" hole shredded through both lungs, with 6" of bloodshot tissue surrounding the hole, and the holes on the inside of the ribcage were both the size of a 50 cent piece. The exit wound in the offside hide was about the size of a nickel, and had bled freely. During the gutting and skinning process, I found no bullet fragments (not that that means much). Clearly, expansion of the 403149 HP was positive, and it seemed to hold together well. All in all, the .40-50 Sharps Straight Contender lived up to J. D. Jones' vision of the Woodswalker concept very nicely, and the 315 grain cast HP had performed very well indeed.

On a side note -- at this point in my life I am well into the Age of Bifocals, which means that shooting iron-sighted handguns takes on new challenges. A buddy of mine told me how much he liked no-line bifocals since the "transition zone" between the two different lenses allowed him to get a workable (not perfect) sight picture, but still have enough resolution on the target for precise bullet placement. During my last eye exam, I had opted for no-line bifocals and this was my first time

Glen with his hog.

hunting with them. I was delighted with how quickly I could get a good clean sight picture and precise shot placement with them. It was *almost* like I was 35 again...

OK, so now we had three hogs on the ground, time to get to work. I showed Rick how to field dress his hog, and then coached John through his while I gutted mine out. Shane hauled the pigs down to the skinning shed for us and got them hung up, and then I demonstrated how to skin a hog, and coached Rick and John through getting their hogs skinned and into the chiller. That night we had grilled steaks and sausage and stayed up past midnight telling stories around the campfire.

The next morning we were up early, had a big breakfast and went out to look over the animals. We saw yak, bison, 4-horned rams, Merinos, Catalinas, watusi, Corsicans, Black Hawaiians, and more. We came back down to camp and I showed Rick and John how to cut up a hog. As a result of showing two new hunters how to gut, skin and butcher a hog, I did a fair amount of knife-work on this trip, and had the opportunity to work with several different knives. While all of them did good work, there were two that really stood out and turned in exceptional service -- the A. G. Russell Loveless drop-point hunter made out of ATS-34, and the Gerber Gator with the drop-point blade made out of 154CM. Both are easy to sharpen (on a 600 grit diamond stone), both will readily take a shaving edge, and both will hold that edge very well indeed. Both John and Rick were using versions of the Beretta Loveless drop-point hunter (a personal favorite of mine, made out of AUS-8), and those knives also did fine work.

It was a sunny couple of days, and two new hunters took their first hogs and learned how to use their knives. We learned some things, saw some beautiful country, some spectacular animals, and enjoyed a campfire and the grilled meat that came off of it. These are the things that have taken hunters back to hunting camp for centuries. On top of all this, I had the pleasure of meeting new friends, of watching a young man I've known since he was 4 years old be patient and make an excellent shot, and I learned that the .40-50 Sharps Straight makes a dandy hunting round in the Contender, especially when it's loaded with a heavy cast HP at BP speeds. Yes, it was a good hunt.

Some of the knives used.

You'll have to excuse me now, I have to go turn the sausage.

- Glen E. Fryxell

The Birthday Present

By: Glen E. Fryxell

Birthday cards are nice, and birthday cake is mighty sweet, but neither has very much substance, and in the final analysis *substance* is what life is all about. It's the sum total of our life experiences -- our successes, our failures, lessons learned, lessons taught, damages suffered, damages repaired, relationships built, and relationships lost -- our substance -- that ultimately defines who we are. We have a choice in determining what this definition will be. We have a choice in determining who we are to become, simply by the choices we make today and have made in the past.

Recently I had another birthday (#49, if the numbers matter to anybody). I didn't need any more ties, and I don't wear aftershave, or boxers with cartoon characters on them, so the birthday presents typically given to middle-aged men have little value to me. Not wanting to clutter up my home with such "stuff", this year I asked for no presents, preferring instead to focus my energies on my family and my passions. I simply don't feel that my family has an obligation to buy me presents on my birthday. As the man of the family it is more important to me to focus on providing leadership, guidance, and support than it is to be showered with frivolous gifts. The only person who can really understand my motivations, my goals, my wants and needs, and therefore know which tools I need to achieve them, is *me*. I have always felt that the person who whines about not getting what they wanted for their birthday is an idiot because they were too stupid (or proud) to get a present for themselves.

Yeah, I know, I could always buy myself a gun for my birthday, or maybe another bullet mould, or perhaps another hunting knife. Been there done that. No, I didn't want *stuff*, I wanted activity, I wanted to add the sights and sounds, the colors, flavors and textures of real-life experiences -- I wanted to go hunting! My birthday is in the spring, and an off-season spring hunt would be just the ticket. A couple of months in advance, I made arrangements for a hog hunt starting the day after my birthday, and invited a few friends to join me. Now it was time to start thinking about which gun, load, etc. was going to get put to use.

Bullets from the RCBS/Cramer 44 300 Gr mould.

I hunt primarily with handguns, and primarily with cast bullets. I am fascinated by cast bullet metallurgy, physics and terminal performance. For many years I have been studying cast bullet performance in the hunting field and I am always interested in learning more. For years, I have been impressed with the performance of cast hollow-points (HP's) on game, and I have been working to better understand how they work and refine the design to fit my vision of ideal bullet performance. Recently, I had Erik Ohlen (proprietor of Cast Bullet Hollow Point Service, phone (541)738-2479, email Erik, convert an RCBS .44-300-GC SWC mould to a Cramer-style 2-cavity HP mould, with the HP pin cut with a 7 degree taper, .150" cavity mouth, extending .250" into the bullet, with a rounded tip. Erik returned the mould, modified just as I had requested. It casts beautiful bullets, and I was able to cast very quickly with it (200 bullets in less than half an hour!). Tests revealed that it was an accurate bullet out of the .44 Magnum at about 1325 fps (21.0 grains of Winchester 296), and that it expanded very nicely at that speed. But tests are one thing, how would it perform on game?


RCBS/Cramer Style 44 300 Gr HPGC.

The off-season spring hog hunt mentioned above would be the perfect opportunity to find out. After trying this load out in several guns, I decided to take an accurate 8 3/8" S&W Model 29-5 along for this hog hunt. 5-shot groups typically ran right at 1 1/4" from this gun and this gun had sufficient sight adjustment to get point of aim and point of impact to jive with this heavy bullet. Preparations were made, and the hunt was upon us in no time at all.

Four of us (Bob, Erik, Steve and myself) met up at the cabin the night before we were to start hunting. The weather was kind of topsy-turvy and conditions were cool, wet and muddy. It started snowing on us before we even finished unpacking. We had a nice chat with Shane and Angie (the ranch managers) and found out that the roads were sloppy enough that we weren't going to be able drive any further than a few hundred yards into the interior of the ranch. This was clearly a hunt that would conducted entirely on foot. The stormy weather had concentrated the animals down into a sheltered basin, out of the wind, at lower elevations, where the overnight lows weren't as extreme, and the freezing precipitation wasn't as severe. They also had a permanent water supply in the pond at the bottom of this bowl, and for the hogs, there were also some shaded slopes that tended to stay muddy this time of year, so they had some mud to root around in.

Spirits were high that night as we feasted on white chili and talked of guns, bullet moulds and knives. We told hunting stories and compared notes on bullet performance and favorite cartridges and loads. Erik told us about some of the bullet moulds he had modified, and we discussed some of the new ideas that he wanted to try. We stayed up chatting around the fireplace longer than we probably should have, but the conversation was so productive, and so much fun, that none of us were thinking of bed.

The next morning got started with coffee, bacon, sausage and scrambled eggs. The light snow that fell the night before was still there, and the ground was frozen hard, so the mud wasn't much of an issue early in the morning. We saw a group of hogs on the way into the ranch, but passed them up since it was so early in the hunt, and because each of us had specific types of hogs that we were looking for in terms of size, color, etc. and while this group had some nice hogs in it, we wanted to look around at a few more before pulling the trigger. We parked the rigs up on a nearby finger-ridge and fanned out to sweep the hillside on our way down to the pond. This maneuver came up with nothing. We swept a saddle, a nearby ridgeline, and then walked up another road. Nothing.

We went back to camp for a lunch of venison stew, and to mull over our options. We ran into Angie and told her what we had seen, and she told us that the group of hogs we ran into first thing in the morning was all there was at the moment (there had been some heavy hunting pressure over the last couple of months). After lunch, Erik and Steve decided to hike up and check out some of the upper hills, and Bob and I decided to stay closer to where we had seen the hogs and try to ferret them out of the woods. Bob had decided to go for the larger sow we had seen that morning, while I was looking for a smaller meat hog in the 150-250 lb class (due to freezer space limitations). As we worked our way through the woods, Bob and I found the group of hogs about a quarter mile in front of us, feeding along the edge of the woods, with the blonde sow front and center. Suddenly, she just started wandering across the field, straight towards us, heading for the catch-basin below us to get a drink of water. Bob looked at me with a big grin on his face and said something about "meeting a blonde for a drink", and started down the hill towards the catch-basin. He got into position just as the blonde sow reached the edge of the woods. She stopped momentarily to look things over, and then wandered into the shadows towards the small pool of muddy water. Bob's 1894 Swedish Mauser 6.5x55 carbine (aka "Bubba") snapped to his shoulder, and seconds later barked sharply. The 325 lb blonde sow simply collapsed in her tracks, and then slowly rolled over onto her side. The sow had been facing him almost dead-on, angled only slightly to his left. The 140 grain Remington PSP had entered in her left cheek, raked down her neck along the spine, ruptured tissues in both lungs and the major vessels over the heart, and came to rest in her lower abdomen. That's almost 4 feet of penetration -- none too shabby for a moderate velocity (~2400 fps) load that 's over 110 years old!

When Bob shot the sow, the rest of the herd scattered off into the woods. Bob settled in to the gutting chores with his pet Bark River hunting knife (with the blaze orange scales so he can't lose it!), while I went hiking over hill and dale to establish radio contact with Angie (to get Bob's hog picked up), and to find the rest of the herd. After making contact, I swept back through the basin and checked out the pond, only to find that there had been no animal traffic through the area since that morning. I went back to help Bob and got back to him and the blonde sow about the same time that Angie got there with the truck and trailer. Angie got the sow loaded up onto her trailer and took her back to the skinning shed, where she got right to work. It dropped down into the 20s that night, so Bob's pork was chilled very nicely.

Bob, Bubba and the 325-lb blonde sow.

That night Bob fixed us an Italian dinner with raviolis in marinara sauce, salad, and red wine. The fire box was stoked and the story telling started anew. It was another good evening of guns, hunting stories and such.

The next morning Bob and Erik needed to get an early start, so they headed out right after breakfast. Steve and I headed into the ranch and parked just inside the gate. The sun was out, and things were thawing quickly so the mud had gotten pretty bad, and we didn't dare drive any further without 4-wheel chains. The hogs were back in the meadow again, along with a 4-horned ram and a shaggy merino ram. I swung wide and slowly worked my way up the edge of the meadow, slowly angling my way sideways towards the hogs, without looking directly at them. There was a little black boar that I had my sights on, and eventually I got into position for a shot, and missed him. At the shot, the rest of the herd milled about nervously, and the little black boar ran a tight circle, eventually slowing down and trotting uphill, to my left. I snapped off another running shot at him, and missed again, and this time he lit the after-burners and sprinted all out for the woods 150 yards away. I watched him closely as he ran away, and he showed no signs of being hit. Steve and I followed his trail up into the woods, and found no blood, hair or other indications of any kind of hit. As I worked my way back down to the meadow, I found part of the herd still feeding alongside the edge of the woods. A nice little 175 lb boar worked his way alongside the edge of the woods, about 25 yards off, and gave me a good broadside presentation. The Model 29 came up and barked once. The 300 grain cast HP hit the little tan meat hog hard, just behind the left shoulder, and knocked him forcibly off his feet. He kicked a few times, then all was quiet. Steve went off to try to find the hogs, and I radioed in to Shane that we had one down. Rolling the tan boar over, I saw that the 300 grain cast HP had indeed exited (as expected), right through the middle of the far shoulder.

44 Mag w/RCBS 300 Gr HPGC & expanded bullet (recovered after being shot through a gallon jug, into dry newsprint and both are tough on a bullet, this HP held up very well).

I got a good look at the wound channel during the skinning and gutting chores. The wound channel revealed that the 300 grain cast HP had expanded well, and that the front half of both lungs were shredded and bloodshot. The bullet had just missed the heart, but had cut some of the major vessels above the heart, and passed just under the spine. Both of the holes inside of the ribcage clearly indicated excellent expansion, as did the 6" of damage done to the both lungs. There was a moderate amount of bloodshot meat in both shoulders, but nothing extreme (like you might see with say a .30-06). All in all, the 300 grain cast HP had performed superbly, and I was very pleased with the cast HP design that Erik's handiwork had made possible.
All of this was happening "in the 11th hour" as I needed to hit the road by noon for the 4-hour drive home. As a result, I got so wrapped up in getting the hog taken care of, getting cleaned up and packed, etc. that I forgot to take pictures!

The trip home was something else -- I drove through rain, sleet, hail, and snow, and then I hit high winds on the bridge over the Columbia river. When I pulled into the driveway, I was glad to be home. It had been an eventful day.

A couple of days later, I got the hog cut-n-wrapped. I boned out the shoulders, ribs, etc. to make spicy breakfast sausage, peeled out the loin roasts, and cut out the hindquarters for Carolina barbeque. That weekend I made some Carolina barbeque with one of the hindquarters to celebrate Carolina beating Duke in Tyler Hansbrough's last home game in the Dean Dome. Man, was that good!

All in all, it was a good couple of days. Yes, I missed twice, but I still ended up making a good shot, and "bringing home the bacon". I spent quality time with good friends, and I learned some new things about cast bullets. We ate well, hunted well, and shared many stories. When it's all said and done, good friends, good bullets and good tools combine to make a hunting camp with real substance, the kind of hunting camp that you find your mind wandering back to long after you've left. It is a very satisfying feeling to build memories with quality folks in such a hunting camp.

In the final analysis, Birthdays Past don't really matter much because we're no longer that 8 year-old kid who wants a black Sears 3-speed bike, a pony ride, or that fire-engine red Matchbox 1965 Mustang for his birthday. And birthdays future are fun to think about, but we don't really know what they will look like, and perhaps they might not arrive for us. The only birthday that matters is the Birthday Present, and it just makes sense to celebrate it in such a way that makes our lives richer, and helps us to achieve whatever goals we have set for ourselves, and shapes the substance that will ultimately define each of our lives. Happy hunting and happy birthday!

- Glen E. Fryxell

Why We Hunt

By: Glen E. Fryxell

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Why does Man hunt? That is not a simple question, and the answer is neither simple, nor singular. There are many good answers, and with some hunters those answers may change over time. There are several reasons that I hunt. I enjoy being outdoors. I enjoy being with animals in their natural environment. I enjoy the pursuit, crafting the stalk, the "thrill of the chase". I enjoy pitting my observational skills and reason against the challenge of finding the game, and working to get within range, unobserved and undetected. I enjoy learning from my mistakes, knowing that they will make me a smarter hunter. I enjoy working for my meat, and the sense of satisfaction that comes from having earned the meat that I put on the table. I enjoy spending time with people that set goals, and then work to make those goals happen. I enjoy using, and fine-tuning, quality tools -- like guns, knives, cast bullets and handloads. As a young man, I looked forward to the killing, as if it somehow offered proof of my virility as a predator at the top of the food-chain; but as more and more gray creeps into my beard, I have come to accept the killing as just a part of the equation -- no longer a highlight, just another step in the process. Hunting is at the core of human history and human progress, and I would no more deny myself the opportunity to be a part of that experience than I would deny myself any of the other basic human needs. In short, I hunt because I'm human.

Last fall was unusual because a number of events conspired to keep me out of the hunting fields by and large. Oh I got a little bird-hunting in, and I made one trip for elk, but rather than spending virtually every free moment outdoors, gun in hand, I was trapped inside civilization for those magical months of autumn. A spring hunt was called for! I have lived in the Pacific Northwest now for over 20 years, but in many ways I am still a Southern Boy, and boy do I love barbecued pork! I hadn't hunted wild hogs in a couple years, so I decided to treat myself to a spring hunt for wild hogs.

A group of us have been getting together in the mountains of central Oregon for a "Sixgunner Rendezvous" every summer for a number of years now. We've got all types that show up for this gathering -- engineers, machinists, preachers, consultants, and a couple of grizzled old retired coots thrown in for spice. We set up a large camp up in the mountains and spend a few days plinking, hiking in the mountains, socializing, and cooking all sorts of yummy stuff (biscuits-n-gravy just don't get any better than freshly baked Dutch oven biscuits with elk sausage gravy!). Every so often a few members of this group get together to do a little hunting. For this hunt I would be hunting with Steve, and Rob Applegate would be dropping in on us for a visit (but he wouldn't actually hunt). We would be hunting on Clover Creek Ranch, a rocky, hilly 2200-acre ranch in central Oregon, with elevations ranging from 2700 feet to over 4200 feet. Basalt outcroppings and junipers dominate the undulating landscape. It had been a long, cool, wet spring, and the hills were greening up, and the catch basins were full of water. The game trails showed heavy use.

Steve and I met up at the cabin and were chatting when Shane (the ranch manager) pulled up. We got acquainted and Shane brought us up to date on recent happenings around the ranch. Steve and I were both looking for meat hogs (can't you just smell the barbeque?), and Shane filled us in on where the hogs had been seen recently. Then we went in, fixed a quick dinner, told a few hunting stories and hit the rack.

The next morning we were up at 5am, and pretty quickly the skillet was sizzling with sausage (made from the boar Steve shot last year), with the coffee pot gurgling in harmony. After a hearty breakfast, we headed out to hunt. We drove up onto the top of a nearby finger-ridge, parked the truck, and got out to devise our plans. We knew there was a catch-basin about a quarter mile down the hill through the junipers, and Shane had told us that the hogs were hanging out in that general area. I knew from previous experience that there was a shaded hillside above that catch basin, where the soil stayed moist and the hogs liked to root around in the soft dirt. So the plan was to send Steve down on a fairly direct route down to the catch-basin, while I would swing wide to the west and make loop down through the drainage and see if I couldn't kick anything out of the bushes. After side-hilling to the west about a quarter mile, I started to work my way down into the drainage. I broke into a small clearing and there was what appeared to be a massive, sun-bleached log, roughly 18" in diameter, lying beneath a cluster of junipers on the far side of the clearing. That "log" looked very much out of place since the entire hillside is forested with junipers that are no more than 15 feet tall and 6" in diameter, so I brought up the binocs to get a closer look. Yup, it was a hog alright, a white sow that would easily go over 500 lbs. Since Steve was hunting with an iron-sighted revolver, and wanted to get good and close for his shot, I made note of the location in case he wanted to take this sow.

It was about this time that the ruckus started. Down at the water hole below, there erupted a cacophony of grunts, squeals, snarls and popping jaws. It was obvious that there was a group of hogs down below us, and that some of them weren't in the best of moods. Now things were getting interesting! I saw Steve through a break in the junipers, about 200 yards to my right. We looked at each other and waved, and started down towards the noise. We found a group of 6-8 hogs milling about around the catch-basin, most of which were in the 150-lb class. It became apparent that a couple of them were sows in heat, and that the randy young boars in the group were giving them no peace, hence the foul moods and snapping jaws. There was also a larger boar, around 450 lbs, but since both Steve and I were looking for meat hogs in the 200-300 lb class we looked this group over and ultimately decided to pass them up.

We met up and discussed our options. I took Steve by and showed him the bedded white sow, but he decided to pass since she was much larger than what he was looking for. I had seen a few other hogs rooting around in the shadows below the dam, and our group had moved off in that direction, so we decided to follow them into the shadows.

We found the hogs down in the woods. Our group had picked up a few stragglers and had grown in number. The 450-lb boar was trying to convince the young sows that he was the boar of their dreams and that they really wanted to bear his piglets, but they weren't buying it. The younger boars were also trying, but having even less success. As the herd was drifting through the woods, they eventually came to a stop at what was obviously their favorite mud hole/wallow. During this whole time, the hogs were staying tightly bunched, and it was hard to get a real good look at them to judge size and body type (and impossible to get a clean shot). Once they reached the wallow, and it was clear that they weren't going any further, we were able to move into a position on the hillside about 35 yards above them, where we could study them at our leisure.

After careful observation, we decided that there were 3 that were in the size range we were looking for -- a red sow, a black boar and a black boar with a thin white stripe behind his shoulder. Steve had a hard time deciding which one he wanted, so he asked me to pick which one I was going to take. I chose the black boar. Steve was hunting with his Ruger Bisley Vaquero ("Bisquero") .45 Colt, and I had a scoped Contender, so I had more flexibility in terms of what shots I could take. As a result, we had decided earlier that Steve would take the first shot. Eventually, Steve decided on the red sow, and started to move down the hillside to get into position for a shot. His 5.5" Bisquero was loaded with the RCBS 45-270 SAA (a 285 grain SWC) over enough H110 to generate 1200 fps. His first shot hit her low in the shoulder, went though the brisket and exited low through the far side leg. She was hit hard, but the wound was not going to be immediately fatal, and she was still on her feet. His second shot drove through her neck and put her down quickly. It was obvious from the way that the exit wound was bleeding that

The .338 GEF loaded with the MM 235 (left) and the 33889 HP (right).

the major vessels had been cut. During all this, the herd had looked up, but instead of spooking, they had just gone back to rooting around in the hillside and wallowing in the mud (that must have been some really good mud!)

Eventually, the 300-lb black boar worked his way out from the herd and gave me a clear shot presentation. He was walking downhill away from me, angling towards my left, so I lined up for a raking shot, to enter at the last rib on the left side and break the front right leg upon exit. I was hunting with my Contender, chambered in a wildcat cartridge that JD Jones and SSK Industries helped me put together back in 1993. The .338 GEF is based on the .356 Winchester case, necked down to .338, with the shoulder angle blown out to 40 degrees. I had had Mountain Molds make a bullet mould specifically for this cartridge/gun combination, a lovely 235 grain GC-FP with a .250" meplat, and I was hunting with the most accurate load that I've found for it so far (44.5 grains of 4350 for 1700 fps), not a maximum load in terms of pressure/velocity, but it's very accurate and I figured it was more than enough to hammer a hog. At the shot, he started trotting downhill, obviously hit fairly hard, but still on his feet and not showing any signs of going down soon. As I reloaded, he crossed the creek and turned to the right to climb up the earthen slope out of the creek bed. I was above him, shooting down, at a rather odd angle. I snapped the action shut and touched off the shot as soon as I saw ribs underneath the crosshairs, in an effort to keep him from escaping. This second shot hit him hard, and he lost his footing and slid down, backwards, into the creek below. I scrambled down the hillside, and dropped off my pack and Contender on the bank of the creek. As I stood over the boar lying in the creek, admiring him, there were several things that I noted -- a) the entrance wound for the first shot (last rib on the left side) was not bleeding because it had some fat and meat pushed out through the hole, plugging blood flow, b) that there was no blood coming from anywhere on his body that I could see, only a little bit from his mouth and nose (consistent with a lung shot), and c) that he was still breathing. By all outward signs, he was unconscious and dying, but I drew my 629 just the same. About this time, he started to wake up, and started to struggle (meekly) to regain his feet. I cocked the hammer of the .44 Mag and sent a 429421 HP though both of his lungs (23.5 grains of W296, 1350 fps). Again, there were several things that were immediately obvious after the shot -- a> that this shot hit him much harder than the first two, b> there was a geyser of blood coming out of the entrance hole, c> that the shot exited, as I could see the blood coming from the exit wound under him in the creek, and d> that he was dead moments later.

As we waited for Shane to arrive with the 4-wheeler to haul these hogs out, Steve started telling me about my second shot hitting a branch that was hanging down in front of the black boar, and watching wood fragments shatter in all directions with the shot. I had no clue that I had hit a branch, I had fired in a hurry to keep him from escaping, and then lost the sight picture in recoil. Steve assured me that I had, and that it had been quite dramatic. He even poked around on the creek bank and found the piece of branch that had a fresh .33 caliber bullet hole in it to prove it!

Shane came back and found us with his 4-wheeler, and got my hog pulled up and out of the creek so we could take pictures, then he got him loaded up on the trailer and hauled back to the skinning shed. Then he came back and repeated the performance with Steve's red sow. We hiked back to the truck and drove back down to camp for some lunch. It had been a good morning!

When we got back to camp, we found Shane and Angie working on our hogs, and Rob was playing "stick" with their dog. As we stood around and got caught up with Rob, Angie found one of my cast bullets, lying flat against the hide, underneath the belly, about halfway between the sternum and the pelvis.

From the oblong shape of the hemorrhaged tissue surrounding it, it was obvious that this bullet had come to rest going sideways. A little while later, she pipes up, "Found another one!", this time in the right "armpit" of the boar. This one was point-on, run headlong into the leg bone. After she finished skinning the boar out, it was possible to track what had happened with each of the shots. The first shot had gone right where I had told it to, entering at the last rib on the left side, raking forward through the lungs, plowing into the right shoulder just as I had intended. I would have expected this bullet at 1700 fps to break the offside shoulder and exit, but there it was, you can't argue with the facts. It is possible that this

Glen and the black boar.

bullet may have clipped the paunch and that slowed it down (the stomach had been hit, but it wasn't clear which bullet hit it). The first shot penetrated about 30", and would have ultimately proven fatal, but it wasn't doing its job all that quickly. The second shot entered *sideways* in the upper rear portion of the right ribs, clearly destabilized from its impact with the limb. The line of the second shot would have led it to exit low in the center of the left ribs, but the tumbling bullet instead turned left and down, coming to rest under the belly hide. The second shot penetrated no more than about 18" before coming to rest. The 429421 HP finisher turned in its usual stellar performance, leaving large entrance and exit wounds, both of which bled freely. I really like the 429421 HP.

Steve's red sow being skinned.

The first shot traveled in a straight line and had gone exactly where I wanted it to go. The recovered bullet weighed 201 grains. The second shot had been a tumbling buzz-saw, and had turned and gone in oddball directions because of this tumbling. The recovered bullet weighed 224 grains, and the nose shows scarring from where it hit the limb.

I am convinced that if my first shot had been with a cast HP (like the 33889 HP that I used in the .338 GEF to shoot my last hog with) that this boar would have gone down quickly and none of the other shots would have been necessary. I have also done some experiments with the Mountain Molds 235 GC-FP cast nice and soft to promote expansion (BHN = 9), and I think they would have done a faster job than the moderately hard bullets I was using (BHN about 13). I guess .33 caliber is just a little too small to be using "solids".

After lunch, we headed back out to go check on things up in upper parts of the ranch. We found the buffalo, yaks, sheep and goats up by the catch-basin up in the big meadow on top. Some of the buffalo bulls were really massive, and we got some good pictures to take home with us. There were also a couple of really handsome Corsican rams, and one nice Black Hawaiian ram that we got to look over, any of which would look really nice hanging in my gun room. Maybe next spring...

Recovered bullets -- fired .338 GEF cases, the MM 235 as-cast (left), recovered first shot (center), and second shot (right)

The next morning, we had a lazy morning, with more of Steve's sausage sizzlin' in the skillet, scrambled eggs, toast and jam. We got out and hiked around the ranch to see what we could see. It was an absolutely bluebird day! We learned a few more things about the ranch and found hogs, Russian boar, water buffalo, fallow deer and jack rabbits. It was one fine morning! Then we went back down to camp, fixed lunch, packed our gear, and settled up with Angie. After the meat was loaded up, we said our goodbyes and hit the road. It was a good couple of days. We had hunted hard and hunted well, we had taken a couple of fine animals that would make excellent table fare, we had spent quality time with good friends, we had talked guns, knives and cast bullets with fellow outdoorsmen who knew how to appreciate such things, and we had enjoyed the beauty of Creation in ways that only a hunter can understand. In short, we had once again refreshed our souls and reminded ourselves of why we hunt.

- Glen E. Fryxell

Of Old Rifles, Old Friends, and Cast Bullets

By: Glen E. Fryxell

Old friends come in many flavors. As more and more hunting seasons pass, I have come to realize that what makes special hunts really special isn't always a spectacular setting, or some exotic species, or a great shot, or a big rack.....what makes a special hunt really special are the old friends. The hunting partners who can work the woods together with just a few sidelong glances, or well-understood hand gestures, and know where the other hunter is going, and what he will do. The old hunting knife whose blade is but a shadow of its original profile from years of gutting and re-sharpening, but still holds a fine edge and makes short work of each deer. The work-worn carbine that was old way back when it was handed down to you, and time has fogged the count of exactly how many seasons have passed with that rifle cradled in your hands, but you still think of the man that gave it to you as you caress the patina, sitting beneath your favorite "deer tree". These are friends that have stood the test of time for a very simple reason, they work and they are trusted. You know exactly what they will do when called upon. These are some the things that make hunting special.

Rob Applegate, Bill Gilson (aka "El Cazador") and I originally met through the online hospitality of Jim Taylor's sixgunner.com and John Taffin's sixguns.com discussion boards. Over the last decade, we (and our wives) have become good friends. Rob and I have hunted together, we have plinked together, and we have spent hours out in the shop fiddling with little chunks of metal, discussing cast bullets, the making of bullet moulds, and what makes cast bullets fly accurately. Rob understands (and shares) my fascination with bullet moulds, and their history, like no one else I've ever met. He understands how a cast bullet works, and what it needs to best do its job. Caz and I have also hunted together. He is a pistol-packin' preacher and a serious elk hunter ("El Cazador" is Spanish for "the hunter"), and he has an almost pathological fondness for leverguns. It was inevitable that the three of us would hunt together. Given our nostalgic tastes, there is little surprise that this trip would find us hunting with older rifles. Equally unsurprising is the fact that for Rob and I, these old friends were loaded with cast bullets, specifically tailored for the hunt.

I was hunting with an older Marlin 336 .35 Remington that Rob had given me a while back as a birthday present (Rob and I are both big fans of the .35 Remington cartridge). This rifle has a 24" barrel and 2/3 magazine. It pre-dates Microgroove rifling, and has 6-groove "cut" rifling. The bore is in superb condition, and it shoots cast bullets very nicely indeed. The serial number is "G55xxx", indicating that it was made in 1950, so this rifle was made during the first year that Marlin chambered the Model 336 in .35 Remington. For this trip, it would be loaded with the RCBS 200 grain GC-FP, cast to a BHN of about 13, and loaded to 2100 fps with 38.0 grains of H335 -- an accurate and reliable thumper of a load.

My back up rifle for this trip was a Marlin 336 chambered in .32 Winchester Special. This carbine was made in 1949, the first year that Marlin made the Model 336. This 20" carbine also has 6-groove "cut" rifling, and a mint bore. The ammo was loaded with the RCBS 170 grain GC-FP (also BHN of 13), over 27.0 grains of H335 (inspired by Jim Taylor's pet .30-30 load) for almost 2000 fps and excellent accuracy.

In an interesting sense of symmetry, Caz had brought along his 1948 vintage Marlin 36 .30-30. This was the last year that Marlin made the Model 36, so we had "the changing of the guard" represented in our hunting camp -- his gun being one of the last of the 36s, and my two being among the first of the 336s. In addition, we had a suitable selection of calibers represented (.30-30 Winchester, .32 Winchester Special and .35 Remington).


Winchester 86 .45-70 (made in 1901) that Rob used to shoot his buffalo. Knife by Marbles used to field dress the buffalo and the ammo belt is an original US Gov't issue ammo belt for the .45-70. The revolver is an early S&W .44 Mag.

Rob brought some very special leverguns along for this hunt. For a "coyote gun" he brought a very nice old Savage Model 99 (made in 1937) that was chambered in .303 Savage. The .303 ammo was loaded with Lyman 311291 HP's (the HP version of the classic, and very accurate, old round nose GC Ideal bullet, dating from 1906), seated on top of 30.0 grains of 3031 powder for 2150 fps. Just in case the critters got big and bristly, and needed lots of killing, he also brought his trusted old Winchester 86 .45-70 that was made in 1901. Rob shot his first buck with this rifle, many years ago. Ammo for this beautiful old rifle consisted of a 393 grain plain-based round-nose cast bullet (Lyman 457124, that dates back to the 1800s), cast of WW alloy (air-cooled), loaded on top of 50.0 grains of 4895 for about 1650 fps or so (readers of Elmer Keith might recognize this load). He also brought along a recently acquired Winchester 95 chambered in .405 Winchester, made in 1922.

Yup, this was a levergun hunt, and we were going to be hunting for feral hogs at Clover Creek Ranch in central Oregon. You might say that we were loaded for boar...

We met up at the bunkhouse on Monday evening, a little before sunset. After getting unpacked, we decided to work out a few of the kinks from the drive over by taking a little hike into the hills. Caz and I showed Rob the pig pen and wandered up the fence-line to the west to get a better look at a bull elk that was a little over half a mile up the canyon, watching over his harem and bugling occasionally. As we worked our way up the road, soaking in the country, the colors of the sunset and the bugles echoing off the canyons, I heard an ominously familiar sound, just a few feet in front of Rob. I was just about to say something when Rob said, "Whoa!" and jumped back, alongside me. There, 15 feet in front of us, was a 2 1/2 foot long rattlesnake, crossing the road.

"Fire in the hole!" I blurted out, as my favorite 3" round-butt S&W 624 .44 Special came out of the holster and came to bear on the rattler. 10.0 grains of HS-6 sent the Lyman 429421 HP on its way, almost cutting the rattler's head off. (OK, so I "cheated" a little bit... since the snake was lying on a hard-packed jeep track, I aimed about 1/2" low to skip the bullet along the ground, making sure that I hit him -- much the same sort of way that the old Kentucky squirrel hunters would "bark" their squirrels). Rob mumbled to nobody in particular, "I hate snakes...", whipped out his old Ka-Bar Marine issue knife (that his Dad had carried through the Marianas campaign) and finished cutting off the head. We stood there for a moment, watching the headless body slowly writhe on the road in the fading twilight, then we slowly wandered back to camp for a snack of chips and salsa, seasoned with a liberal splash of hunting stories.

Breakfast the next morning was cooked on the griddle that Rob's great Grandmother had used to feed the Applegate men and threshing crews in years gone by. We had a big breakfast and got off to a lazy start. We drove up the hill to the broken down Cat bulldozer, and then worked our way through the thick stuff up the hill and through the woods to the fence-line half a mile to the south. As I got out of the scrub and into the woods, I kicked up a nice looking Russian boar that high-tailed it out of there so fast I never got a chance to see if he had a red tag hanging out of his ear (red tags are how the meat animals are differentiated from the trophy animals). We then swung around and followed the fence line up to the ridge, where we met up with Caz, and the three of us were overlooking the big pasture on top, with the water hole and mud wallow. There were three massive buffalo bulls grazing away, off in the distance. Rob was transfixed.

"You guys didn't tell me there were BUFFALO!"
"Yes, we did."
"No you didn't!" (really, we did)
(Glen and Caz, the smart-aleck choir, in unison) "Rob, there are buffalo on this ranch."

We kept looking for hogs, in various places, and with little luck. We found a few isolated stragglers here and there, but generally either out of range, or no shot opportunity presented itself. As we were glassing from one ridge looking for hogs, Rob kept going back over to this nearby spot where he could see another trio of buffalo (small, medium and large) that were watching us from a ways off. Kinda like the guy at the gun show who contracts a case of "the-gotta-have-its" and keeps returning to the table that bears whatever bauble has caught his eye. Rob has wanted to shoot a buffalo since he was a boy, and he was thinking real hard about this opportunity to shoot one at Clover Creek.

I left Rob and Caz to do some more scouting, and I ran down the hill the fetch the lunch fixin's and talk to Clark. By the time I got back, Rob had pretty much made up his mind that he was going to shoot a meat bull. We ate lunch, and then headed up the hill to the big pasture where the small/medium/large trio was currently grazing and napping. I positioned myself in a brush-pile to photograph the event, and Rob slowly approached, with his Winchester 86 at the ready. At about 75 or 80 yards, the young meat bull stepped clear of the other two and stood broadside. Rob hammered him with the big 400 grain cast bullet, through the front half of both lungs. From my vantage point 150 yards away, the bullet's impact sounded like Babe Ruth had his Momma's rug-beater, and was swinging with all his might to clean her rugs. All three buffalo just stood there.

Rob's .45-70 hammered him with the big 400 grain cast bullet, through the front half of both lungs.

The young bull, mortally wounded, took a couple of steps and turned to face away from us. Rob repositioned himself in an effort to get another shot. The opportunity presented itself when the bull took another step or two, presenting his other side. Rob tried to spine him, but a buffalo spine takes a few twists and turns, and is deceptively placed with all that shag and hump, and his second shot passed a couple of inches below the spine. Once again, the impact was resounding, and once again, there was little or no reaction from any of the three buffalo. The young bull slowly turned back to face in his original direction, and Rob's .45-70 roared once again. The third shot also hit him in the lungs and this time knocked the dying bull decisively off his feet. At this point, the other two turned away from us, and slowly started to walk off, towards the woods in the distance. The fallen bull still had a little life left in him, so Rob quickly placed a finisher into the back of the neck, and all was quiet. A mature bull can tip the scales at over 2000 lbs, but this "youngster" probably weighed "only" 800-1000 lbs. His hide was beautiful. After we took a few pictures, Rob set about field dressing his first buffalo and I ran down the hill to get Clark and his winch and trailer for hauling the carcass down to the skinning shed.

When I got back, Rob had gotten much of the gutting chores done, but had hit an impasse at the buffalo's hefty sternum. I loaned him my bone saw and he made short work of that, and soon had the gutting chores completed (a buffalo generates an impressive gut pile!). Rob saved the volley-ball sized heart, and Clark winched the field-dressed carcass up onto his trailer and hauled it down off the mountain to the skinning shed. As they were skinning it out, Clark found one of Rob's lung shots under the hide, expanded into one of the most perfect mushrooms you've ever seen. This was a WW bullet at 1650 fps, after it had gone through about 3 feet of buffalo.

The unfired bullet weighs 393 gr. The recovered bullet weighed 385.6 gr.

Caz and I continued to hunt for hogs for the remainder of that afternoon, but all we saw were buffalo and fallow deer.

We were up before dawn the next day and quickly up the hill. We kicked up a group of 25 or 30 hogs in the field near the hog pen, and they scooted into the woods as we came through the gate. We had a pretty good idea as to where they were heading, so we drove up onto the ridge line, then got out and snuck around to get into position where we thought we might intercept the herd. A few minutes later, we could hear the grunting of the hogs and knew they were getting close. We had to adjust our position by side-hilling about 100 yards, as the herd was now clearly headed for the saddle to our right. I found a good spot and dropped into an open-legged sitting position, with the Marlin held at the ready across my knees, and waited for the hogs to appear. It didn't take long. About a minute later there was a veritable sea of pork flowing through the trees below me. I picked out a nice sized meat hog (about 250-300 lbs) and followed it with the sights. It stopped, giving me a clean broadside presentation in one of my shooting lanes, so I locked on for a spine shot on the right shoulder and fired. Pre-dawn pandemonium broke loose -- there were squeals and grunts of every tone and pitch imaginable, and hogs running everywhere. I thought I saw the hog I shot at stagger for a step or two, but then I lost sight of it in the stampede and the trees. Caz and I followed the herd in an effort to get a second one for him, but they had pretty much cleared out. I went back to field dress my hog, but it wasn't there. I found where I was sitting when I fired the shot. I found where the hog was standing when I fired the shot. I even found where my bullet had hit the ground and ricocheted. I searched all up and down that porcine highway, but there was no carcass, no blood, no hair, no "stuff" to indicate any kind of a hit. The bottom line is I missed. This really bothered me because this was a well-planned, well-rested shot, at a standing target only 45-50 yards away, and I checked the zero of the rifle with that exact load less than 48 hours earlier. Hhmmm... (we'll come back to this in a minute)

A little while later I caught up with Caz and we continued to work our way down to a watering hole to see if any critters were watering. We worked the area over, seeing lots of sign, but no animals (the water hole was dry, they've had very little rain this year). We ran into Clark, and he told us that he had just come from up by the Cat and that there were 7 or 8 hogs up there right now feeding and drinking out of the creek and rolling in the mud. We piled into the truck and drove up the ridge, parking well short of the meadow with the broken down bulldozer. As we approached the watering hole from behind the Cat, the first thing that became apparent was the pair of mature buffalo bulls that were standing there, 25 yards distant, scratching themselves (rather forcefully) on the brush pile adjacent to the creek bed. The older bull seemed to be completely unconcerned about our presence (he knew we were there), while the younger bull seemed mildly curious, and stared at us for quite a while (10+ minutes). I suspect that the older bull had the younger bull's favorite scratchin' post and the youngster didn't have anything better to do than watch us while he patiently awaited his turn. There were indeed a handful of hogs milling about in the area, but unfortunately most of them were in the bushes on the far side of the creek and therefore hard to make out. There were also a couple of young shoats milling about in the brush pile that the big buffalo bull was scratching himself on (if that old 2000 lb bull had lost his footing and taken a tumble, that little 25-30 lb shoat would have been in a world of hurt!). I tried to get a better look into the bushes by climbing up on top of the Cat, but that didn't help. I went back to the rear of the Cat, where Caz was watching all of the goings on. Suddenly, Caz's hand was on my shoulder, "Look! There's one in the bushes on this side of the creek!". The shadows were dark, and so was the pig, so I had some trouble picking him out at first, but eventually I figured out what I was looking at, and that was a 150 pound black pig, broadside, facing my right, at all of about 20 yards. There was a wrist-thick branch covering his heart/lung region, so I rested the Marlin on the back of the Cat and held just over the top of the branch for a spine shot. When I dropped the hammer, that hog shot out of his hiding place as though he had been fired from a cannon. The first thought that went through my head was "How did I heart-shoot him with that branch in the way, and when I was holding for his spine?". Once again, there were squeals and grunts as the other hogs milled about, trying to figure out where the shot came from. And once again, the buffalo didn't really do much. Another 150 lb hog wandered out on the left hand side of the brush pile, out into the dust wallow, giving me a clean 30 yard broadside shot, so I racked another round into the .35 Remington, held for his heart and fired. The RCBS 200 grain GC-FP hit home audibly, and smacked the meat hog off his feet, in a cloud of dust. I told Caz to go check the creek bed for the first hog (expecting him to find it dead a few feet from its hiding place), while I went and checked on the one in the dust wallow. The dying "dust wallow hog" still had a little life left in him, so I put a finisher down between his shoulder blades, and all was quiet.


The Author's Marlin 336 in .35 Remington. The RCBS 200 grain GC-FP hit home audibly and smacked the meat hog off his feet, in a cloud of dust.

At about this point, Caz spoke up, "Uhhh, Glen, there's no pig down here. Are you sure you hit him?". I looked down at the dead hog at my feet and saw that my first shot had landed several inches above my point of aim, missing the heart entirely, and instead taking out several inches of his spine. I had been using several thousands of pounds of Caterpillar steel as a bench-rest (you can't get much more solid than that!), and a very easy 30 yard shot had still landed about 4" high. I looked at my rifle and the story became apparent, at some point during the past 48 hours, the elevator on the rear sight had gotten bumped and it was holding the sight in a much higher posture than it should have been (the spring tension of this rear sight leaf is a little light, and as a result the elevator slides more easily than most -- this rifle has a Lyman peep sight in its immediate future). Now I understood why I had missed earlier in the morning and why Caz couldn't find a hog down in the creek. On both of those hogs, I had held for spine shots, but since the rear sight had the rifle shooting high, both of those shots had simply sailed harmlessly over those hogs' backs. When I held lower, for a heart shot, the cast bullet smashed into the "dust-wallow hog's" spine, dropping him on the spot. The first shot had passed right behind both shoulders, took out a chunk of spine, and exited. The second shot entered between the shoulder blades, smashed more of the spine, ranged down through the chest, punched out just to the left of the sternum, stayed under the hide as it ranged down the left foreleg, and it exited just above the foot. We found a couple of minor lead fragments in the region of the spine, but it was impossible to tell which shot they had come from. The bottom line is that both bullets clearly held together and exited.

We had arranged to let the Buffalo-killer sleep in, and Caz and I would return to camp for a late brunch. Right on time, we came toolin' into camp at 10:30 to drop off the hog at the skinning shed and found that Rob had his Great Grandmother's griddle up on the old antique gas burners, cooking sausage and eggs. The coffee was fresh-perked and hot (in Uncle Gus's old pre-war coffee pot that had been all over Alaska and the Yukon), and scrambled eggs and maple sausage was just coming off the griddle. How's that for a buddy? Thanks Rob, that was one of the best breakfasts I've ever had. The food was almost as good as the company.

Clark got the meat hog gutted and skinned out while the rest of us ate. By the time we finished, the hog was split and hanging in the cooler. We sat around digesting and drinking coffee for a while, then I headed out for one last shot at getting a second hog. On Clark's recommendation, I headed for a series of "benches" in the hills, where there were some remote shaded areas where the hogs would bed down and get out of the mid-day heat. I climbed into the hills and could see lots of sign of hog traffic, but no hogs. The woods were too open, and there wasn't enough shade on the slopes. Once I got on top of the bench, the story changed dramatically. Every tree that had 20 feet or more of canopy had the shaded ground beneath it thoroughly torn up from all the rooting around and bedding by the hogs seeking the cool moist earth in the shade. There were hogs here, I could smell them. I worked my way slowly across the top of the bench, with a very accurate 6" S&W 629 held at the ready (just for the record, it was loaded with Ray Thompson's Lyman #429244 HP, BHN 13, seated over 23.0 grains of Winchester 296 and a CCI 350 primer, for 1400 fps). Suddenly, I heard a grunt. I looked to my right and 45 yards uphill I saw a tail lazily swish a fly away. Peering into the shadows, I could make out a back line just above the earthen berm. A few seconds later, I caught the flick of an ear, several feet to the right of where the tail had flicked. There were at least 2 hogs bedded down and sleeping in under that shade tree above me. Had I gone another 25 yards along the path I was following, I would have been directly upwind of them. I slowly and quietly backed up about 50 yards to get behind a juniper tree and back out of the wind. I quickly evaluated the lay of the land -- there was a line of trees that led uphill to a spot where I would be directly downwind of the hogs. The angle of the sun was such that I would be in the shade the whole way uphill (if I stuck close to the trees). I started climbing as quickly, and quietly, as I could. About halfway up, I felt the one sensation that every hunter deplores -- that of a renegade gust of wind on the back of the neck. Seconds later came a cacophony of grunts as 14 or 15 hogs stood up as one, and started milling about. They quickly headed uphill, away from my scent stream. About 65 or 70 yards up, they crossed over an open patch of rocks, but they were moving fast enough that I had no chance for a well-aimed shot. The last hog (about 150 lbs) to cross over stopped on the rocks and I brought the revolver up, but with their unexpected exodus and my fast scramble up that caliche slope to get into position, I was huffing and puffing enough that I couldn't keep the front sight on his shoulder, so I lowered the hammer and wished him "bon voyage". I'll be back again next year, after he's packed on a little more pork, and next time I'll know where he takes his siestas.

It's hard to imagine how we could have crammed more quality into just two days. The old rifles, the meticulously tailored ammunition, the carefully crafted cast bullets, and the desire of trusted friends to hunt together. The kind of hunters who offer the handshakes and backslaps of congratulations when game is harvested, and at the same time feel reverence and sadness for the death of a noble beast. These are some of the things that make hunting special for me. Old friends are special indeed.

- Glen E. Fryxell

Of Old Guns, Old Friends, and Cast Bullets: Verse 2

By: Glen E. Fryxell

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Glen E. Fryxell and leverguns.com

I like hunting with people I know I can trust. Good judgment is a valuable character trait when loaded firearms and killing are involved. I would be hunting with just such men on this trip. It was early March, and we would be hunting feral hogs in central Oregon, on Clover Creek Ranch. Rob Applegate was supposed to join us on this trip, but a late winter storm had closed the passes over in his neck of the woods and he wasn't able to make it. Caz and Bob had beat me to the bunkhouse, which had them worried....not that I was out stuck in a snow bank somewhere, but because I had the fixin's for supper and they were gettin' hungry! Shortly after I got there, the skillet was sizzlin' with andouille sausage, potatoes and onions, simmering in chardonnay with a healthy dash of seasoned pepper. As the cast iron skillet got hot, so did the "hot stove league" and the hunting stories, tall tales and show-and-tell cranked up full swing. Knives and guns were showed off and bragged about, gifts were exchanged and soon the BS was flyin' in fine fashion. Front and center in these discussions were various knives, as each of us had brought along new acquisitions for field testing on this trip -- Bob had a new Bark River hunting knife that he was very excited about, Caz had a Swamp Rat Knife Works blade that he was all lathered up over, and I had a new Beretta Loveless drop point hunter that I wanted to put to work (I have always been a fan of the basic Loveless design). Dinner was served and a grand time was had. I tell you, I could listen to Bob tell stories all night.

Beretta's version of the classic Loveless drop-point Hunter.

As we were cleaning up after dinner, Caz went outside to throw the garbage away and came back in and matter-of-factly announced "It's snowing boys." Sure enough, there was a white dusting on everything, and it continued to snow lightly for the next hour or so. (The snow was not unexpected, remember that Rob had had to stay home because of a winter storm moving through the area.) We got everything ready for the next morning and hit the sack.

The next morning, the coffee was perking, the sausage was frying, and once again the snow was falling, not hard, but steadily nonetheless. We ate breakfast and headed up the hill to hunt. As we worked our way into the interior parts of the ranch, it started snowing harder. We climbed the hill up to the broken down Cat bulldozer it was snowing even harder, and we found no sign of recent animal activity in the snow. We continued up to the pond and pasture up on top and once again, found no sign of animal activity. The pond was full, frozen solid, and there were no tracks in the snow or any evidence that anything had tried to break through the ice for a drink. By this time the snow was coming down hard enough that visibility was getting limited, so we decided to head back down the hill to a basin we knew about that was relatively sheltered. There were no critters up on top.

The sheltered basin was a different story however. We found signs of recent activity, we found hogs (including one HUGE old sow), we found Russian boar (very fast Russian boar), and we found fallow deer. All three of us were specifically looking for meat hogs in the 200-300 lb range, so we decided to sweep this one hillside and work our way down towards the pond at the bottom of the basin. Bob and Caz took paths that swung to the outside part of the hillside, and I took more of a direct beeline to the pond. As I got towards the bottom, I saw another couple fallow deer, and then a couple of hogs. They were all behind a wall of juniper trees, so I couldn't get a real good look at them, but the hogs looked to be roughly in the size range that we were looking for. As I slowly worked my way down to the last of the juniper trees, the fallow deer sensed something was amiss and slowly exited stage left. The hogs were more interested in rooting around in the mud. I laid down in the snow (the only way I could snake a shot past the overhanging juniper branches) and got my first good look at the black boar 40 yards in front of me. He was about 250 lbs, just exactly the size I was looking for. However, the shot presentation was not good, so I laid in the snow and waited.

Allow me a brief caveat at this point -- I was hunting with a T/C Contender, chambered for the .338 GEF, a wildcat that I put together back in the early 90s with the help and guidance of J.D. Jones of SSK Industries. My goal on this trip was to test out a couple of cast bullet designs that I had put together specifically for this gun. The first was a Lyman 33889 that I had modified to drop a 246 grain HP, and the second was a custom 235 grain GC-FP made by Mountain Molds (www.mountainmolds.com). I had worked up loads for both of these bullets that were giving me very good accuracy (5 shots into 1" at 50 yards), and wanted to see how they performed on critters. The 33889 HP load was going right at 1600 fps (a very useful velocity for a cast HP), and the Mountain Molds bullet was going almost 1750 fps. Conveniently, both loads shot to the same point.


The .338 GEF. the 235 grain Mountain Molds GC-FP (left) and the Lyman 33889 hollow-point (right).

After several minutes of watching the black boar's backside, he turned and faced me. If I had had the deeply penetrating Mountain Molds 235 grain FP in the chamber, I would have simply placed the crosshairs on his forehead and dropped the hammer. But with a hog's hard, sloping head, and a soft cast HP, I wasn't sure if the bullet would simply flatten and ricochet (probably not, but I wasn't sure), or kill him cleanly, so I held off. A few minutes later, he turned broadside to me, giving me the presentation I was looking for, so I put the crosshairs on his ribs and fired. There was no reaction to the shot, he simply turned away from me and trotted briskly away for about 15 feet, then he stopped, staggered, fell over and rolled back downhill towards me. As he came to rest, there was a large, pink frothy geyser erupting out of his right (i.e. exit) side, so even before I got up out of the snow I knew that he was lung shot, that the cast HP had expanded well and that it had exited.

As I got up to go over and inspect my hog, I got my first good look at the hillside farther up the drainage -- there were several other hogs in this same size range rooting through the mud and melting snow. Not wanting to spoil the chances for my hunting partners, I snuck back into the junipers quickly and quietly, and started heading back up the hill towards where I had last seen them. I ran up the hill and met them halfway and (huffing and puffing) told them that I had my hog down and that were a number of other hogs down there for them to look over. Bob took his Krag and slowly snuck down to more or less the same spot that I had shot from. He had a nice brown and black spotted hog (with some amazing red-orange highlights) wander out onto the flats and Bob put the bead front sight on his forehead and let the .30-40 Krag speak. The pig simply went rigid, and fell over, and quivered slightly. It never squealed, grunted or kicked. It just lay there stiff-legged. Head shots work.

A .30-40 Krag and head shots, a fine recipe for making pork!

Cast hollow-point at 1600 fps killed this hog quickly.

Bob came back to us and told us that there was another bigger spotted sow a little farther up that Caz should be able to get a shot at. Caz snuck his way up to where Bob and I had shot from and sure enough, there was a nice brown and black spotted sow that walked out onto the flats broadside, and Caz took his 5.5" USFA Shootists .44 Special (loaded with Skeeter's load, the Lyman 429421 over 7.5 grains of Unique), lined up on her and fired. His first shot crushed her spine and she went down hard, squealing, well, like a stuck pig. He walked up close and finished her off. The three of us stood there with our three hogs on the ground, all shot from basically the same spot, within about 15 minutes, and all three had died within about 20 yards of each other. It had been a good morning!

Time for the field dressing. Long story short, all three knives made a good showing for themselves, each making short work of "their" hog. My Beretta Loveless Hunter is made from AUS-8 steel, which has gotten to be popular as a knife steel in recent years. This knife takes an edge nicely, but some have criticized AUS-8 for not being able to hold its edge with continued use. Well, let me just state for the record that after dressing this hog, it will still shave with ease. I paid $40 (new) for this knife and in my opinion it is one of the best values in the hunting/skinning knife market, period. Bob and Caz were also quite pleased with their new Bark River and Swamp Rat knives (respectively).

The .44 Special single-action is a very classy way to hunt for hogs.

Inspection of my hog's carcass and innards revealed that the entrance wound was a .338 caliber hole and only had a small circle of bloodshot meat around it (about the size of a nickel). Both lungs had a hole through them about the size of a quarter, with about 6" of severely bloodshot lung tissue surrounding the hole. The far side of the ribcage had an irregularly shaped hole through it, roughly the size of a half dollar, and the exit hole through that tough pigskin was about the size of a quarter. While there was some bloodshot meat in the far side ribcage (the expanded bullet hit two ribs on the way out), there was notably less than I'm used to seeing with higher velocity jacketed bullet loads. The Lyman 33889 HP at 1600 fps had done everything that could possibly be asked of it. I guess that's why I like cast HP's so much.

After I got the hog's skinned/split carcass home, I boned out the pork for the freezer. The long upswept blade of the Chicago Cutlery meat cutter's knife that Bob gave me performed these chores superbly. I cut the back straps into 2-lb roasts, boned out the shoulders and ribs to make sausage with, and cut the hams (bone in) off the pelvis. I marinate the pork loin roasts in chardonnay with a splash of Worcestershire sauce, and then roll them in chopped herbs and garlic and bake them (covered) for several hours at moderately low temperature, and they come out delicious! I got 20+ lbs of breakfast sausage off of this guy (had some this morning in fact) and it's so lean that no grease collects in the pan when you fry it. Whooeee! I like wild pork! Lean and tasty.


Chicago Cutlery meat cutter's knife did an excellent job boning out the pork.

This was a really good couple of days -- good friends, interesting guns, and some very useful cast bullets. And at the end of the day, there was good food, fine wine and excellent story-telling. But there were some new friends too -- each of us had brought a new hunting knife to try out, Caz brought his new USFA .44 Special, etc. Each was new, but clearly destined to become an old friend. In short, those two days were filled with good men and good tools, and I thoroughly enjoyed spending time with both. That's the kind of stuff that make hunting special for me. Old friends, and making old friends, is something special indeed.

- Glen E. Fryxell

Variations on a Near Perfect Theme

By: Glen E. Fryxell

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Mozart was a genius in his ability to take a theme, build upon it, twist it slightly, and embellish it, creating beautiful music based on variations of that central theme. Many other musicians, like Scott Joplin, Bob Wills, Duke Ellington and Al DiMeola, have mastered the art of theme variation in more recent years, and the world is a richer place for their efforts. All have made a joyous noise.

The concept of variations on a theme is hardly isolated to the composer's creative itch. One of my favorite examples has far less etheral origins. Elmer Keith was an earthy genius. He was a simple Idaho cowboy who understood the inner workings of a sixgun far better than most. He was smart enough to solve some of the problems encountered with those early sixguns and ammo, and vocal (and persistent!) enough to get the industry to manufacture some of his better ideas. The Keith SWC is the landmark by which all other revolver bullets are judged.

I like to tease some of my shooting friends who favor GC bullets about shooting bullets that need training pants. This is all meant as good-natured ribbing, of course, but Elmer Keith didn't care for GC bullets and I tend to share his opinion. Not that there's anything wrong with GC cast bullets, I have a fair number of GC moulds and do periodically shoot GC bullets, I just don't see an overwhelming need for them for routine sixgun shooting (up to say about 1600 fps). Mr. Keith designed his SWC's to be plain-based, have one large, square-cornered grease groove, a wide, beveled crimp groove, a full-diameter wadcutting front driving band, an ogive that would allow for long-range stable flight and a meat-crushing meplat. The fact that his designs are as widely used (and as widely copied) as they are today, three-quarters of a century later, is thunderous testimonial to how well his design achieved his stated goals -- accuracy at all ranges, cut clean holes through both paper and meat, and be able to shoot all day with no leading. Simple, pragmatic and deadly. He took his basic design and once he was convinced that it indeed lived up to his vision, he commissioned variations on that theme, in different calibers and configurations. More recently others have taken Keith's concepts and put their own refinements on his designs. Taken as a whole, this group has proven itself to be some of the greatest sixgun bullets of all time.

The Lyman numbering scheme is pretty straightforward. The first 3 digits are the nominal bullet diameter, and the second group of 3 digits are the sequential model number for that design (there are a few models numbers that are out of sequence, but we'll ignore those for the current discussion). So a 429421 is a bullet with a diameter of .429" and is the 421st design adopted by Lyman (or Ideal), and 429421 is where the Old Master started his glorious theme back in 1928. Mr. Keith knew he wanted a 250 grain, plain-based semi-wadcutter. He drew up the now famous meplat and ogive for his SWC, gave it 3 equal width driving bands, a deep square-cut grease groove and a hearty, beveled crimp groove, and the perfect .44

Special bullet was born. Driven to 1200 fps (and later, much faster), this bullet became a cornerstone of handgun history, and has been directly responsible for the genesis of generation after generation of .44 fanatics over the years. From bullseyes to bull elk, Keith did it all with this bullet loaded to 1200 fps with 17.0 grains of 2400.

Enter stage right, one lawman from the dusty, desert southwest. Skeeter Skelton tried Elmer's unprecedented .44 Special loads and found them to be excessive for his use in law enforcement. Skeeter set about performing his own series of experiments with the 429421 and settled on a very practical (and economical) load of 7.5 grains of Unique for about 900 fps. Both of these loads are as good today as they were 50 years ago.

My favorite .44 Special load with the 429421 is 10.0 grains of W540 or HS-6. This load delivers almost 900 fps from my pet 3" Lew Horton S&W 624, and as much as 100 fps more from longer barrels. Very accurate, very reliable, very useful, and very, very much fun.

With the solid SWC having proven itself a success, Elmer later tried a variation on the Keith SWC theme to see how an expanding version would perform on game. Thus the 429421 HP came to pass. After much experimentation, Mr. Keith settled on an alloy of 16-to-1 (lead to tin) for his HP bullets, and he drove them to 1200 fps with 17.0 grains of 2400 (when loaded in modern solid head cases), sparked with a standard primer.

So cast and launched, expansion and weight retention were excellent, and the 429421 HP proved itself a killer of the first order. When the .44 Magnum came along in 1956, he promptly loaded this bullet over 22.0 grains of 2400 and declared it Good. Elmer Keith shot, and hunted with, both the SWC and HP versions of his beloved 429421 for roughly 60 years. No stronger endorsement of a handgun bullet can ever be made.


The Lyman 429421 family. The original SWC, the 429422 Hollow-Base and the 429421 Hollow-Point.

My own experience with the 429421 HP is somewhat more limited, I've only been shooting it for about 10 years. When I shoot it in .44 Magnum, I cast it with wheel-weight alloy with about 2% added tin and the bullets weigh about 235 grains. Loaded over 23.5 grains of W296, it's good for 1350 fps from a 6" S&W Classic Hunter and expansion is positive. Anymore, I shoot this bullet mostly in .44 Specials. For these velocities, I generally cast these HP's from 25-to-1 alloy and load them over 10.0 grains of either W540 or HS-6 for 950 fps from a 7 1/2" custom Blackhawk. Big varmint medicine!

Now keep in mind that when Mr. Keith was designing his bullets, manufacturing tolerances were a little looser than they are today, particularly in the area of a revolver's cylinder throats. A fairly common practice in that day was to make bullets with a hollow base so that the expanding gases of the powder charge would force the bullet's base to obturate in both the throat and the bore, even if those diameters didn't exactly match up. Viewed in that light, it comes as no surprise that his next design was simply 429421 with a hollow-base (something that would not be possible with a GC design). Thus, the 429422 was born. This bullet was mentioned briefly in Sixguns, where it was described as weighing 235 grains. Bullets drop from my mould closer to 225 grains when cast of wheel-weight alloy (the difference is likely due to the different alloys used). In my experience with this bullet, it absolutely drives tacks loaded on top of 6.5 grains of Unique for about 750 fps. On top of that, this load makes a great practice/plinking load for the delightful little S&W 696 -- and it shoots to the same point of impact as the Cor-Bon duty load.

The next number in the Keith SWC line was the 454423, the cute little 238 grain SWC made for the .45 Auto-Rim and .45 ACP. Elmer liked to load this stumpy bullet rather stiffly for the N-frame Smiths, commonly up to about 1100 fps. I don't shoot this bullet much in either .45 AR or .45 ACP (but Charles Graff has, and I recommend you read his story), but I do like it very much in .45 Colt, where I generally shoot it over 8.5 grains of W231 for 1000 fps from a 6" S&W Model 25. Accuracy is very good and with my homemade Moly lube, there is no leading at all. This is a dandy plinking and varmint bullet.

Mr. Keith wanted a SWC like the 429421 for the sixgunner's sixgun -- the .45 Colt. He kept the weight about the same, thereby compressing the bullet and driving bands somewhat. The result was the 454424, nominally 255 grains in weight (mine weigh closer to 250 grains). At whatever weight, this bullet is a classic thoroughbred. The time-honored load for the 454424 in the .45 Colt is 7.5 grains of Unique for 800 fps. Elmer also liked 18.5 grains of 2400 for 1100+ fps (again, with standard primers). My own tastes with this bullet run much simpler -- I load it over 9.0 grains of Universal Clays for 900-975 fps (depending on barrel length). This bullet was designed to be an accurate and humane killer, and it lives up to its progenitor's vision beautifully.

A little while later Mr. Keith commissioned a HP version of this SWC, the 454424 HP. This bullet was only mentioned in passing in Sixguns, but in that brief reference it was described as ripping big, deep holes in meat.

I generally cast this bullet of 25-to-1 alloy (where it weighs 242 grains) and load it over 9.0 grains of Universal Clays (950 fps) or 9.0 grains of W231 (1000 fps). It is a very accurate and hard-hitting hunting bullet.

It can be argued that with a meplat as large as it is on the .45 Keith SWC,

why would any expansion be necessary? But then again, why not? Is there such a thing as too much frontal surface? Methinks not. I like dancin' with Big Mama Meplat!

In recent years, the .45 caliber Keith SWC design has been copied, modified and made-over by several mould-makers. Some of these newer designs are simply wannabees, some are real winners. One of the more notable to my eye is the RCBS-255-SWC, which took the basic 454424 design and gave it a thicker base band, and hence more weight (about 266 grains when cast of wheel-weights). I never really understood why Elmer Keith designed a shorter bullet for the .45 Colt than he did for the .44 Special, but then Taffin explained to me that it was because of the longer case length of the .45 Colt over the .44 Special and the need to make the 454424 fit in the Colt SAA cylinder. The RCBS SWC makes up much of this length difference and just might be the best all-round bullet for the .45 Colt.

Any of the .45 Colt loads previously mentioned also apply here, but another one worth mentioning is 14.0 grains of HS-7 with a magnum primer (not for Colt SAA's or clones). This load is good for about 1050 fps from a 7 1/2" Ruger Blackhawk, and is very accurate. A real thumper!

An assortment of .45 caliber SWC's of the Keith style: the Lyman 454423, the 454424, the 454424 HP, the RCBS 45-255-SWC, and the RCBS 45-270-SAA.

Dave Scovill (of Handloader Magazine) took this evolution one step further and took the .45 Keith SWC back to its roots -- full-length and 3 equal width driving bands. Thus was born the RCBS 45-270-SAA. My mould drops bullets that weigh 282 grains when cast of wheel-weight alloy. Now THIS is a real hunting bullet! Editor Scovill likes to shoot his bullet over either 16.5 grains of 2400 or 13.0 grains of Blue Dot. The most accurate load I have found to date is 13.0 grains of HS-6, which generates 1050-1100 fps from my Blackhawks (do not shoot this load in SAA,s, I would guess this load is probably running around 22,000 psi, which I consider to be maximum for the S&W N-frame .45 Colts, obviously the Rugers can handle these pressures with ease). A Keith meplat, coupled with over 280 grain of bullet metal, traveling at the speed of sound -- there are very few critters in North American capable of stopping a bullet of that description. I really like this bullet.

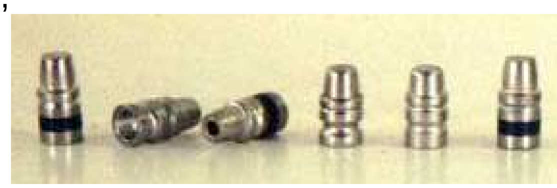
Next up on Elmer's design list was a Keith SWC for the .38 Special and .357 Magnum. Here's a big surprise, he designed it to be full-length and have 3 equal width driving bands! (OK, so maybe you're not surprised...).

The 358429 has something of a mixed history since it wouldn't function in all revolvers (the long ogive made it too long to fit in some revolvers when crimped in the crimp groove, requiring that the crimp be placed over the forward driving band). In spite of this hurdle, it became one of the all-time classic .357 Magnum bullets. In addition, this was the bullet that Elmer Keith preferred for the .38/44 Heavy Duty, loaded over stiff charges of 2400 in .38 Special cases. For regular .38 Special loads, he favored 5.0 grains of Unique (about 850 fps), and for .357 Magnum loads he tended to use 14.5 grains of 2400 (the current recommended max is 13.5 grains of 2400). Weighing 170 grains when cast with wheel-weights, I generally load this bullet over 13.0 grains of H110 in .357 Magnum cases for about 1200 fps. So loaded, this makes one of the best long range plinking rounds available. This bullet displays remarkably stable flight over a 1/4 mile or more. If you want to learn long range sixgunning as taught by Elmer Keith, this is an excellent bullet to start with.

As with its .44 cousin, a hollow-based version of the 358429 was quickly drawn up, and that is exactly what the 358431 is. In Sixguns, Keith refers to this bullet as weighing 160 grains, but they drop from my mould at 153 grains when cast of wheel-weight alloy (again, the difference is likely due to the different alloys used). Some of the older revolvers chambered for the .38 S&W cartridge have a reputation for having somewhat oversized bores (commonly .360‰), and I picked up this mould as a way of dealing with such a barrel, should one ever follow me home. In the mean time, I've tried this bullet with a variety of loads in .38 Special cases, and they all seem to shoot well. Not surprisingly, 4.0 grains of Bullseye performs quite well in this application, followed closely by the usual cast (W231, HP-38, Unique, etc.). The hollow-base of the 358431 obturates very effectively, making this a very clean shooting bullet. In fact, it seals the bore so well that it even cleaned out light leading left by my previous test loads!

Not surprisingly, the hollow-point version of this Keith SWC wasn't far behind. This bullet was offered in two slightly different variations -- the 358429 HP, which weighs 160 grains cast from wheel-weight alloy, and the 358439, the 154 grain version that was eventually serialized with its own unique mould number (the difference between these two bullets is in the diameter and depth of their cavities). These two variations on the Keith SWC define the perfect handgun varmint bullet (in fact, this bullet was Mr. Keith,s first HP design and it proved to be such a tremendous success that he went back and designed the HP versions of his .44 and .45 SWC's discussed earlier). Mr. Keith liked this bullet loaded over 5.3 grains of Unique in .38 Special cases (for about 950 fps) and 15.0 grains of 2400 in .357 Magnum cases (for over 1300 fps), and it,s easy to share his enthusiasm for these loads. At 950-1000 fps, expansion is positive and even big-bodied, husky Montana jack rabbits just fold up right now when hit with this bullet. At magnum velocities, well, rodents just explode. I generally load either of these two HP,s over 8.5 grains of HS-7 in .38 Special cases (1050 fps) and 14.0 grains of H110 in .357 Magnum cases, for about 1300 fps.

One last design to come down the pike that merits inclusion with its .38 caliber brethren is the enigmatic 358477. Now Elmer wouldn't care for its radiused grease groove, but the 150 grain version of this bullet has 3 equal width driving bands, a hearty grease groove, a right proper crimp groove and the classic Keith SWC ogive. This is one of the best .38 Special bullets that's ever been made. There is also a 158 grain version of the 358477 in which the grease groove is significantly smaller, the driving bands are wider and of unequal width, the crimp groove now is nothing more than another radiused grease groove, and the forward driving band is pushed forward, shortening the ogive and forcing more of the bullet down into the case (see photo). The 150 grain version has proven itself to be more accurate in my guns. When loaded over 5.4 grains of Unique it delivers right at 1000 fps from a 6" K-38 Masterpiece and makes an exquisitely accurate small game/varmint load. Also quite accurate is 4.5 grains of Red Dot, for slightly less velocity.



The family of .38 Keith SWC's: the Lyman 358429 SWC, the Hollow-Base 358431, the Hollow Point 358439, the 358477 (150 grain version), the 358477 (158 grain version), followed by another 358429.


A close up showing the differences between the 150 grain version of the 358477 (left) and the 158 grains version of 348477 (right).

And then there are the .41's, the .40's, and the .32's; and now there are .475's and .50's to add to the list. There are light Keith-style SWC's, heavy Keith-style SWC's, and the list just keeps on growing. The variations on this theme seem to be virtually endless. The Keith SWC's are truly great bullets. We are indeed blessed to have had such a teacher as Elmer Keith.

I believe I'll take the fruits from these variations on this near perfect theme, and go out to a remote, sunny stretch of BLM land and make my own kind of joyous noise. That should be music to the Old Master's ears.

- Glen E. Fryxell

The Summer of 38

By: Glen E. Fryxell

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Ah yes, those were the days! Those barefoot days of dusty scrub-oak freedom, pocket cover-alls, a dime-store fishing pole, a pocket knife, a little wad of chewing tobacco stashed in the back of the "traveling" tackle box (that's the little one that fit on that rack on the back of my black Sears 3-speed), a sling-shot and maybe a little something to read by Jack London or Mark Twain in between naps; this was a sure-fire recipe for a lazy Southern summer afternoon. Blue-gills, bass and maybe an unlucky bullfrog or two cooked over an "Indian" campfire in a dented, old Army surplus mess-kit in a dollop of butter made the perfect preamble for a Texas sunset.

Well, the times have changed, the boy has grown and the world just isn't that simple anymore. The dusty backwoods trails to "secret" fishing holes have given way to high-speed, rush-hour interstate commuting. The simple stories of Huck Finn were displaced by scientific journals, technical reports and research proposals. A small-town, weekly allowance evolved into research budgets, investment leveraging and retirement annuities. "Toto, I don't think we're in Kansas anymore..."

The care-free innocence of a dusty, denim-draped youth just doesn't compete very well against the demands of a technically-oriented, responsibility-ridden adulthood. That's not to say that the bean-pole boy with the scraped up knees, dirty jeans and an armadillo skull in his back pocket is no longer with us ... it just means that he's been squeezed into that musty closet in the back room with Grandpa's old waders and doesn't get to come out and play very often.

I will take the liberty of assuming that everyone who is reading this is a gun-crank. There are certain guns that take me back to those simpler days as soon as I pick them up (you too, I'm sure), an old bolt-action Stevens .22, a battered old single-shot 16 gauge, my beloved Marlin 39A. In the last couple of decades, my own interests have centered around handguns and handloading for same. We were all avid bow-hunters back then, so we didn't have too many handguns around as we were growing up (only a few shotguns and .22s), so there aren't really any handguns that have been with me since those days in central Texas. Nonetheless, there are some special handguns that take me back...

If there was ever a timeless handgun, the S&W K-frame .38 has got to be it -- it has been in continuous production since 1899, so it is now entering its third century. These revolvers have spent the last 100+ years serving our country, serving our constabulary, and serving our citizenry: a most honorable service record indeed, and one that will no doubt continue for many years to come. I have a personal favorite 5-screw K-38 Masterpiece that was born in the middle of 1954 that takes me back to those simpler times in scrub-oak woods of central Texas. It would have been just the ticket for armadillos, bull-frogs, jack-rabbits, starlings and head-shooting cotton-tails.


S&W K-38 5 Screw.

One of the beauties of the .38 Special is the ease with which good accurate ammo can be assembled. As most of you are probably aware, a little bit of minor tweaking with cast bullets and fast pistol powders and just about any combination can be made to shoot well out of a good K-38. A compendium of accurate small game field loads for the .38 Special could easily fill volumes. Relax, my list is somewhat shorter. When I come across a new .38 mould and want to find out how well the new bullet shoots in standard pressure .38 Special loads, I load it over Bullseye, Red Dot, AA #2, W231, PB and Unique. If .38 +P loads are on the menu, I load them with HS-7. Period. Sure, there are other suitable powders, but these are the proven powders that have given excellent accuracy with cast bullets in past load development.

The .38 Special will be forever linked with the 148 grain wadcutter. Many shooters subscribe to the mindset that the wadcutter is good for punching paper, but these saucer-faced projectiles are basically too wimpy for much of anything else. As the old song goes, "It ain't necessarily so ..." -- the .38 wadcutter constitutes an excellent, and deadly, form of vermin control.

I have a deep-seated disdain for starlings. As I was growing up in central Texas, our next-door neighbor had a lovely war-bride from Tokyo, and she worked very hard to create and maintain an ornate Japanese garden in her backyard. Every year the starling migrations would come through central Texas and her bamboo gardens would be destroyed by the sheer mass of starlings roosting in it. Everything would be crushed to the ground and blanketed with a whitewash of droppings. Where there was once beauty, there was now devastation, filth and disease. I have hated starlings ever since.

A starling doesn't put up much resistance, and a revolver bullet doesn't get much of a chance to expand before it runs out of starling to expand upon. But who needs expansion when you've got a wadcutter? And what a .38 wadcutter does to a starling! (I recommend you see for yourself.) The perennial favorite of 2.7-2.8 grains of Bullseye under a 148 grain wadcutter works OK for smacking starlings (600-650 fps), but a little more velocity is useful to flatten the trajectory and increase the force of impact. The late John Zemanek reported in *Handloader* (#161 Jan/Feb 1993) that he got excellent accuracy with a 148 grain wadcutter over 4.0 grains of AA #2 for right at 900 fps. I've tried this load and found it to be every bit as accurate as Mr. Zemanek reported. A faster, and even more accurate, load (in this particular K-38 Masterpiece anyway) is the Lyman 358091 over 4.6 grains of W231, for about 950 fps. Both of these make excellent field loads for vermin and small game. We have some swamp-land just outside of town with levees that run through the middle of it, so one is above the brush (and starlings), shooting down into the thicket and mud (i.e. there's a good, safe backstop).

This area is not too far from civilization, so a big booming magnum would be un-welcome, but the mild-mannered .38 wadcutter is downright neighborly. When winter starts to thaw and the days start to get longer, "wadcutting" starlings makes an excellent cure for a bad case of cabin-fever.

As a general-purpose, small-game load for the .38 Special, good service has been consistently delivered by Lyman's 150 grain SWC (358477) launched by 4.0 grains of Red Dot for 900 fps (6" barrel). This is also an excellent load for ventilating the elusive pop can (not one of them has ever gotten away!). RCBS makes a very similar mold that is every bit as good as the Lyman (but I just haven't been able to squeeze out the same level of accuracy from the Lee 150 SWC). Lyman has produced this mold in more than one version. I have a 358477 mold which drops 150 grain SWC's, that have a true, well-defined crimp groove, and I have a 358477 mold which drops a 158 SWC with a radiused "crimp groove" that looks more like a grease groove. The latter mould has also been slightly re-designed for longer driving bands, pushing the shoulder slightly forward and shortening the ogive. Of the two Lyman molds, I prefer the older, lighter version (although at this point the RCBS mold is probably easier to find). More recently, I've been shooting both the Lyman 150 grain SWC and the RCBS analog over 5.4 grains of Unique. This combination is extremely accurate and generates about 950 fps or so. These loads are favorites for small game, it provide excellent accuracy at reasonable pressures, it's a good, clean killer, but not terribly destructive. It basically bores a big, bloody hole straight through the vermin *du jour* without a lot of fanfare or fuss. The critters don't complain, the gun doesn't complain, the shooter doesn't complain -- a solid recipe for varmint hunting happiness.

Recently, I came across a factory hollow-pointed version of the Lyman 358480 SWC. It drops cute little bullets that weigh about 128 grains and are quite accurate in the K-38 Masterpiece. In this case, experimentation with a variety of powders and charges led me to settle on a load of 4.6 grains of Bullseye underneath this little pill (4.7 grains of PB also turned in exceptional accuracy). This load is extremely accurate and at just over 1000 fps constitutes a surprisingly hard-hitting form of rodenticide. When cast of 25-to-1 alloy, expansion is positive and it's quite flat-shooting out to about 75-80 yards. The more I shoot this load, the more I like this little dimpled bullet.

Several years ago, I had some very positive results using the Federal FBI +P load (158 grain swaged lead SWC-HP going 915 fps from a 4") on jack rabbits. That load flattens big Montana jacks with surprising authority. It was deemed worthwhile to duplicate this load with home-grown cast HP's from the Lyman 358439 mold (162 grains when cast of WW alloy). After trying a variety of faster powders in various charges, I settled on 8.5 grains of HS-7 (this is a +P load and should not be used in small frame or alloy frame revolvers). A magnum primer seems to increase the consistency of this powder in .38 +P loads, especially in colder weather. This load generates right at 1000 fps out of a 6" tube and is quite accurate.

By the way, I got both of the above mentioned hollow-point molds from Western Bullet Company (P.O. Box 998, Missoula, Montana, 59806;). Jon deals in just about anything to do with bullet casting and has a good selection of used molds available. If you're looking for an unusual, obsolete or hard to find mold (or cast bullet), check with Western Bullet Co. I've bought about a dozen molds from him so far and have been satisfied with the condition of them all (i.e. he doesn't sell junk).

Anyway, this +P HP load was involved in one of the more comical shots I've taken in recent years. We were in Arizona, not far from the Mexican border. I had decided to spend an hour or two in pursuit of jack rabbits with the 5-screw K-38 and the 358439 HP load. I kicked up the first jack less than 200 yards from the truck. He jack-knifed through the sage in that way that only a jack rabbit can, and then snuck to a stop, spying on me from beside a clump of sagebrush, about 35 yards off. He was standing in the classic broadside bunny stance, facing my left. The Partridge blade came up black and dark in the late afternoon Arizona sun and tucked itself into the jack's armpit, for a mental sight-picture of a 6 o'clock hold to center-punch the rabbit's shoulder. The hammer fell and fluff erupted everywhere! It looked like somebody had tied a firecracker to a cat-tail and launched its fluffy seeds to the four winds. It was then (and only then) that I remembered that I had the gun sighted in for a 6 o'clock hold with target load wadcutters (650 fps) and that it shot this HP +P load exactly to point of aim! Scouring the area closely revealed that there was no blood or meat at the site, but lots of fluffy off-white fur spread out over a 6 foot circle. Basically I had shaved this rabbit's armpits! I kicked him up another 3 times (he was easy to identify), but never got a chance for another shot at him. He was clearly unhurt, just fashionably coifed. He didn't even tip his barber...

A little while later, I kicked up another larger, darker jack. After executing many of the same escape maneuvers, this somewhat wiser wabbit stopped and hid *behind* a very large piece of sagebrush about 35 yards away. He was quite well-hidden, but still committed one fatal mistake -- there was about a 4-inch window through the sage that I was able to line up with his shoulder. This time I remembered how the gun was sighted and held for "center of window". The cast HP "threaded the needle" and center-punched the hidden rabbit's shoulder. Expansion was positive, and the big jack never even twitched. The exit wound was about 3" in diameter. That's pretty much the way it goes with this bullet. I *like* cast HP's.

Bottom line is, I spent most of that summer with that old 5-screw friend in my hands enjoying the sunny simplicity of a summer afternoon, the joys of getting my jeans dirty, the simple honesty of being a predator participating in the intricate workings of Nature, much the same way as I did around those Texas fishing holes so many moons ago. It felt good. That Special .38 spent so much time in my hands, it just kinda felt right to refer to it as "The Summer of 38" giving credit where credit was due and adding the somewhat nostalgic sentiment that the 5-screw provided its owner. The Summer of 38, those were the days indeed. May every summer be the Summer of 38.

- Glen E. Fryxell

Floyd's Mould

By: Glen E. Fryxell

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It was a gun show just like any other small-town gun show. Located at the county fairgrounds -- outside the air was heavy with the aroma of fresh manure, and inside the air was scented with grilled sausages and fresh brewed coffee. The gun people inside were sociable and polite. There were about 100 tables or so, with offerings from all of the major manufacturers; some brand new, some "rode hard and put away wet" and some showing the glow from years of tender loving care. This was a good gun show in that I had some money to spend, but didn't have anything in particular that I was looking for -- that fun kind of anticipation that comes from stalking a good deal down the aisles, and never knowing which box of rusty parts that special find is hiding behind.

There were some pieces at the show that caught my attention; a 3 1/2" Model 27 in like-new condition, a 5-screw .44 Magnum in about 95%, a 6 1/2" Model 24 (that I used to own!) in like-new condition, as well as several .41 Magnum Blackhawks (both 4 5/8" and 6 1/2"). There was a rather unusual S&W 1917 .455 that had had the barrel re-lined and bobbed to about 3", and the chambers lined and everything bored to .32 S&W Long, and the whole mess nickel-plated. There was a 1911 from 1918 that was in 95+% condition and all-matching (gorgeous!), and a Colt SAA 7 1/2" .44-40 shining in its nickled splendor.

There were a number of dealers there that I've known for years, and Lyle and I stopped and had very pleasant visits with Mark, Jim, and the rest of our friends as we passed down the aisles. There were also a couple of guys that experience has taught me are known shysters. I made a point of quickly skirting around their tables, no need to even look. I've been attending gun-shows in this area long enough (both as a dealer and a customer) that I can usually recognize most of the faces at these small-town gun shows. There's the president of such-n-so club, there's the police sniper instructor, and Joe over there's the owner of that little shop over in Olde Towne, and such. But there are always new faces that I don't recognize. Sometimes it's the newbies with all their new-found enthusiasm, high-capacity mags and cammies; sometimes it's a wide-eyed gingham-clad young lady, intimidated by the massive display of weaponry she's suddenly in the middle of; sometimes it's the freckle-faced 7 year-old little boy with his Red Rider BB gun, gazing wistfully at the guns that someday he hopes to own. Every face tells a story.

As I came round the bend towards the back of the room, I came upon a face that I didn't recognize. It belonged to an older gentleman, a tall lean man, with a shock of white hair. He was folded uncomfortably into a small folding chair behind his table, reading quietly amid all the bustle of the show around him. His table was piled high with every manner of old gun-related stuff you could imagine -- barrels, triggers, sights, scopes, dies, moulds, etc., in addition to a handful of rifles and shotguns standing in his rack. There was nothing less than 20 years old that I could see, and most of his stock was considerably older than that. As I stopped to inspect his wares, he put his book down, and looked up. There was no polished sales schtick, only solid eye contact and a polite "Good morning."

"Good morning, Floyd." I replied, stealing a glance at the name tag he wore, boldly printed with a black magic marker in the shaky hand of advancing age. As we chatted, I soon learned that this soft-spoken gentleman didn't shoot as much as he used to, and he had all this stuff that had accumulated over the years that was just taking up space and getting in the way, and the kids had all grown up and moved away, and well they didn't shoot much anyway, and he just thought that the time had come for a little house cleaning.

During our conversation, a bright-eyed, chipper young lady came walking up, "How the heck are ya Floyd? Where's Mary?"

"Well, she's not feeling too good today. You know how her medication can slow her down some days... I'm going to call her after lunch and see if she wants to get out of the house and come sit with me down here this afternoon."

"Oh that would be nice for her. What all are you selling?"

"Junk, it's all junk. Time to clean house." came the terse response.

"I see. Well if I miss Mary, you make sure to give her all of our love, won't ya Floyd?" and with that the bouncy young blonde was on her way. It wasn't too hard to read between the lines -- Floyd wasn't getting rid of his shooting stuff because he wanted to. After all, shooting had clearly been a major part of his life for decades. He was selling it off because he had to. It sounded like there may have been medical bills and the money had to come from somewhere.

As Floyd and the blonde had been chatting, I was digging through his goods. Now there's nothing that quite catches my eye like used bullet moulds, and Floyd had several. Hollow-based Minie balls, some .30 cal stuff, and a couple of .45s. Back in the back there was a 2-holer on a pair of handles that I almost didn't pick up because of how trashed it looked on the outside -- the sides of the blocks were badly dented, the sprue plate was gouged and the adjustment screws were all loose -- this mould had obviously been used, and used hard. But something told me to pick it up anyway. On the outside it was marked "Geo. A. Hensley, San Diego", and it's stamped with the number "51358 160". Clearly, this was a Hensley mould that pre-dated his partnership with Gibbs, and it was a design for a 160 grain .357 SWC (design #51?). Swinging back the sprue plate and opening the blocks revealed that the faces, alignment pins and cavities of this mould were in pristine condition. The price tag read $30.

Very interesting, but the last thing I need is another .38 mould (I have a couple dozen already), so I carefully placed the mould back on the table, placing the price tag so it would be clearly visible to the next customer who happened by. I thanked Floyd for his time and for letting me browse through his goods, and then I worked my way on down the aisle. Running through the rest of the show, there was really nothing notable, and I found Lyle back at the front of the room. Neither of us had bought anything (quite unusual, to say the least). Lyle asked if anything had piqued my interest. We compared notes on a couple of interesting guns that we'd seen, but the bottom line was the only thing that had really caught my eye was Floyd's mould.

I realized that this mould incorporated all of those features that I like in a bullet and that while I had a bunch of .38 moulds, I didn't have this particular mould design, and when would another opportunity arise to buy a Hensley mould with handles at Lee mould prices? Especially one with faces, pins and cavities in the pristine condition that this one was in? Yeah, it looked horrible on the outside, but the bullets come from the inside. I told Lyle to wait for me and headed towards the back of the room.

Floyd was in the middle of a conversation with another man when I got back to his table. I checked -- the Hensley mould was still there, tucked away in the back. I pulled out my wallet and dug out a pair of 20s. As Floyd turned his attention to me, I asked if he had any change. He did and the sale was consummated with a handshake. This wasn't a salesman's "Hi-how-are-ya handshake", or a politician's "working the crowd handshake", this was a handshake that meant something, an old world handshake. A handshake with eye contact, with firmness, with respect. A handshake that too many today have forgotten the meaning of. "Thank you Floyd. I look forward to casting with this mould." He nodded acknowledgement, and smiled gently as he waved goodbye. I think we both understood one another as I walked off with a little piece of Floyd's past.

That night as the lead pot warmed up, I tweaked and tightened the sprue plate, etc. and found that everything tightened up right nicely. After burning the oil out of the pores of the metal, Floyd's mould started dropping exquisite bullets time after time (smoother and rounder than some of my new moulds, in fact). It quickly became obvious that this battered old mould had many, many years left of producing excellent bullets.

Thanks for taking such good care of your mould, Floyd. I promise that I will also take good care of your mould, at least until it's my turn to put on a name tag boldly printed with a black magic marker in the shaky hand of advancing age and sell off all of my "junk" to a younger shooter. I hope they appreciate it as much as I do...

- Glen E. Fryxell

John's Mould

By: Glen E. Fryxell

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Glen E. Fryxell and HANDGUN HUNTERS INTERNATIONAL

Over the years, I've had my share of feeling awkward. Not surprisingly, most of those feelings came during my teenage years and involved girls. Anymore, awkwardness is a thankfully rare sensation. But occasionally an awkward situation can transform into something special. Recently a friend of mine had bid on an online auction involving an unusual bullet mould that I was interested in. I casually asked him to let me know if the bidding got too high for his comfort, and to let me know if he was going to drop out, so that I could start bidding, as I did not want to bid against my friend. This auction was for an Ideal 358446 HP mould, one that I have been looking for several years. My fondness for cast HP bullets is no secret, and this particular mould occupies a unique spot in the rich history of the .357 Magnum. I had all of the other significant .357 HP moulds and was interested in adding this one to complete the story. In the end, John ended up winning the auction. He then turned around and gave me the mould as a gift. This made me feel a little awkward, as it made me feel as though I had inadvertently shystered the mould out from under my friend. But the bottom line is he steadfastly refused to let me pay him for the mould, and insisted that I accept it as personal gift (so I sent him some bullets cast from it, as a thank you gesture). Yes, John is a gracious man.

Back in the late 1920's Elmer Keith was exploring the use of high-pressure loads in the S&W N-frame .38 Special, the Heavy Duty and the Outdoorsman. Given the thick cylinder walls of these revolvers, he was able to safely work with much higher pressures than were the norm in those days, and consequently, obtain much higher velocities. At first he was using 12.0 grains DuPont #80 powder and getting about 1100 fps with his 173 grain SWC (the Ideal 358429). Later, in 1933 when 2400 was introduced, he switched over to this powder and raised velocities to 1200 fps. His fondness for 2400 would last for the rest of his life. S&W took note of these experiments and decided to offer this new level of ballistics to the shooters of the day. Working with Phil Sharpe, they developed a new cartridge (made 1/10" longer so that it could not be loaded into smaller, weaker guns) that operated at 35,000-40,000 psi peak pressure. Sharpe's load development encompassed a wide variety of plain-based cast bullets, but focused on the H&G #51 (the so-called "Sharpe solid", this was before the SWC term was in common usage), a 160 grain SWC designed by Sharpe and inspired by Keith's 358429, and the 146 grain HP version of the H&G #51 (the "Sharpe HP"). Using hefty doses of 2400, Sharpe was able to achieve velocities that were unheard of for handguns (1500-1600 fps) with these bullets, along with excellent accuracy. Thus, the .357 Magnum was born.

Keith's 358429 173 grain SWC is an excellent bullet, but it was designed for use in .38 Special cases in the .38/.44 Heavy Duty loads. Unfortunately, the nose turned out to be too long to work in the longer .357 Magnum case (when chambered, the nose would stick out past the front of the cylinder of the S&W Magnum and prevent rotation). Sharpe had gone to George Hensley for his moulds, so when the .357

Magnum was unveiled in 1935, Lyman/Ideal didn't have a bullet that was really suitable for "The Magnum". Early reports talked about the leading problems associated with factory ammo (which turned out to be due to marginal lube quality), and so Lyman designed their .357 Magnum bullet to have an unprecedented (for handguns) *three* lube grooves. If they were going to stick with a "standard" bullet weight, this didn't leave much room for a crimp groove, so they put in an itty-bitty one in the middle of the forward driving band. The nose was made short enough to allow use in the new S&W Magnum, and the bullet was named the Ideal 358443 (cataloged at the last minute in 1936).


The Ideal 358443; the first bullet Lyman designed for the .357 Magnum.

With its small meplat, deep seating, and wimpy crimp groove, the 358443 never was very popular. Keith continued to promote his 358429 (either loaded into .38 Special cases, or seated deeply into .357 brass and crimped over the forward driving band). George Hensley teamed up with James Gibbs and started machining bullet mould history, making high quality moulds, many for "The Magnum". Cramer and Modern-Bond were also making well thought-out moulds for the .357 Magnum. Lyman, the dominant bullet mould manufacturer in America, was losing the Magnum race.

Market pressures clearly indicated that the American shooting public wanted a flat-nosed SWC with a moderately large meplat, but with a nose that was short enough to function in the S&W Magnum. So, Lyman responded by fattening up the nose/ogive of the 358443 to something along the lines of the Sharpe solid, converting the upper lube groove to a beveled crimp groove, moving the bottom two lube grooves forward to create a thicker base band (to seal the Magnum's high pressure gases more effectively) and eliminating that miniscule vestige of a crimp groove. Thus was born the 358446, a 160 grain plain-based SWC, first cataloged in 1940 and promoted as "the standard bullet for the .357 Magnum". It was an excellent, and popular, bullet for the .357 Magnum cartridge for many years.


The Lyman 358446, "the standard bullet for the .357 Magnum".

It was standard practice at the Lyman factory to offer, at the customer's request, any non-HB mould design in HP form (sadly, this is no longer true). Some HP designs (like the Keith 358439 and Gould 457122) were added to the catalog as standard fare, others were offered on a special order basis. I have found no evidence in the Ideal Handbooks of the period to indicate that the 358446 HP was ever listed as a standard offering, however it does pop up from time to time in the gun press of the times. For example, in the early 1960s Skeeter Skelton wrote of using the 358446 HP in the .357 Magnum (his article was reprinted in "Hunting for Handgunners" by Larry Kelly and JD Jones). He described how the HP cavity was larger in the 358446 HP than it was in the similar gas-checked 358156 HP (.150" vs. .125"), and the result was that the PB bullet opened up faster than did the GC bullet.

My appreciation of cast HP's began with Elmer.


The Lyman 358446 HP mould.

Keith's 358439, a 154 grain HP version of his .38/44 Heavy Duty bullet. Expansion of this HP is explosive at magnum velocities, with excellent accuracy and no leading. As a result of the superb performance of this bullet, I have had a fondness for PB cast HP's in revolvers for many years. Knowing that the 358446 weighed about 10 grains less than Keith's 358429, the idea of a 358446 HP was intriguing, as this bullet would be very close in weight to the 146 grain Sharpe HP used in the original development of the .357 Magnum, and the nose would be short enough to function in all .357 revolvers. The search for the mould was on. It would be several years before one found its way into my hands.

Casting with the 358446 HP mould, the bullets drop from the blocks at 146 grains when cast with WW alloy and have a measured BHN of 12. Previous experience has shown that WW alloy allows for very good expansion at magnum velocities, but is too hard to allow expansion at "standard" velocities (i.e. below 1000 fps). For .357 loads operating at magnum velocities, WW alloy is just the ticket. These bullets were sized .358", lubed with my homemade Moly lube (50/50 by weight Moly grease and beeswax) and loaded on top of 14.5 grains of 2400 and sparked with a CCI small pistol magnum primer (#550). This combination delivered 1597 fps from an 8 3/8" S&W 586, with very good accuracy (6 shots into 1 1/2" at 25 yards), and minimal leading. Expansion testing in water (2L pop bottle filled with water, penetrated lengthwise, backed by a bale of newspapers) revealed complete fragmentation of the 358446 HP at this velocity. This is an excellent varmint load. Expansion of the 358446 HP is every bit as violent as Elmer Keith's 358439 (perhaps even more so), and the 358446 HP definitely expands more rapidly than does the somewhat more staid 358156 HP designed by Ray Thompson. The key is found in the cavities: both the 358446 HP and the 358439 have cavities with mouths of about .150", while the Ray Thompson designed 358156 HP has a cavity with a mouth of only .125". Thus Thompson's bullet provides more controlled expansion relative to the two plain-based designs. The 358446 HP is about 8-10 grains lighter than is Keith's 358439, and so it can be driven faster, and since it's velocity that makes HP's expand, this added speed makes for added spectacle!

Being a PB HP design, this bullet is also very well suited for usein the .38 Special. However, the lesser velocities of the .38 Special dictate that this bullet must be cast of softer stuff in order to expand. This batch of .38 Special bullets was tailored specifically to function at normal .38 velocities (including snubbies), and was cast from very soft alloy (about 40-1, lead to tin). These bullets weighed an average of 151.5 grains and had a measured BHN of about 6. These bullets were sized/lubed as above and loaded over 4.1 grains of Bullseye. Test firing in a 2" S&W Model 637 and a 3" S&W Model 60 revealed velocities of 824 fps and 909 fps, respectively, with decent accuracy and no leading. Expansion testing (as above) showed that these bullets expanded modestly, even from the short barrels of thesebelly guns. From an 8 3/8" S&W Model 14, this load generated1012 fps and put 5 shots into 1 3/4" at 25 yards. When fired into water, expansion was excellent. From a 6" K-38 Masterpiece, this load generated 974 fps and fine accuracy(an excellent summertime varmint load).


Lyman 358446 HP loaded into .357 Magnum cartridge.

I also cast up a batch from recovered range scrap. I knew from previous experience with this particular source of bullet metal that the cleaned up alloy had a BHN of around 8, making it very well suited for cast HP's in the 1000 fps (i.e. +P) range. These bullets weighed an average of 149.5 grains and had a measured BHN of about 7.5. These bullets were sized/lubed as above and loaded over 8.5 grains of HS-7, sparked with a CCI 550 primer, and test fired in a lovely old 1949 vintage 5-screw K-38 Masterpiece that I got from my good friend Rob Applegate. This +P load delivers about 1050 fps from this 6" barrel and expands just fine (however this alloy is too hard to expand at snubby velocities).


The 358446 HP, loaded into the .38 Special and similar bullet recovered after being fired into water at 1000 fps.

Summarizing the observations above, it can be seen that by simply by varying the alloy, this fine bullet can be tailored to perform well at snubby velocities, .38 +P velocities and full-throttle .357 Magnum velocities. Cast HP's are versatile indeed.

This was not a popular mould design (which is why it took so long to find one). The Keith 358439 was more commonly written about and more commonly encountered since it was the original .38/.357 cast HP and was promoted by none other than Elmer Keith. The gas-checked Thompson 358156 HP was a better seller, in part because of it's GC and in part because of Skeeter's fondness for it, but the 358446 HP is nonetheless an excellent bullet with it's own unique place in history. It provides the original weight of cast HP that Phil Sharpe used to develop the .357 Magnum load data 70 years ago, which is a very useful (and commonly overlooked) weight for both of these perennial classic cartridges. And each time I cast with this mould, I hold a tangible manifestation of my friend's generosity in my hands. I will cherish this mould, and the bullets that drop from it, for the rest of my days.

Thank you John!

- Glen E. Fryxell

A Love for the Classics

By: Glen E. Fryxell

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The year was 1988; I had a shiny new job, with a shiny new paycheck and I decided that I needed a shiny new .44 Magnum to commemorate the event. Up to that point, I had never owned a revolver made of stainless steel and I figured that it was time to see what all the hoopla was about. I walked into my favorite neighborhood gun shop one day at lunch and described my dilemma to Rick. A wry grin came across his face (a sure-fire danger sign) and he said, "I've got just the thing. Just came in this morning." He walked over to the pile of boxes that UPS had recently delivered, picked one out of the cardboard mountain and brought it over to me. Opening the blue cardboard box, he laid it out on the counter in front of me. Inside was one of the most beautiful revolvers I had ever seen -- a S&W 629-1 with a non-fluted cylinder, 6" full-lugged barrel, wide target hammer, smooth trigger, black ramp front sight, fitted with a black rubber Hogue Mono-grip on a square-butt grip-frame; the black sights and grips crisply offsetting the brushed stainless finish. Today we see stainless revolvers with rubber grips all the time, but this package was quite striking to my eyes at the time "They call it the Classic Hunter, Glen. It's a limited edition, a run of only 5000, and then they're not going to make any more. I ordered 3 but could only get one. This looks like it's going to be the only one that I can get." I was hooked -- handling the revolver only set the hook that much deeper and harder. I *had* to have it.

It turns out that those 5000 Classic Hunters sold so fast that S&W also brought out an 8 3/8" model (2500 made), followed by a 3" (3200 made), and a few other variations on the theme. They then reintroduced the 6" Classic Hunter in 1991 with another limited run of 2000. All of these sold so quickly that they finally just broke down and added the Classic Hunter to regular production. I guess I wasn't the only one who was so instantly enamored...


S&W Classic Hunter's

Also in 1988, S&W made 5000 L-frame 686s in the Classic Hunter guise -- 6" full-lugged barrel, unfluted cylinder, "semi-target" hammer, smooth trigger, Hogue mono-grip on a square-butt grip-frame, with the stamped barrel reading ".357 Magnum". Not surprisingly, the 686 didn't make quite the splash that the 629 did -- the .44 Magnum has been the mainstay of the S&W line for 3 decades running now. And while the 686 is a handsome and accurate revolver, the little Classic Hunter just didn't have the sales stamina that its big bore brother had. I found mine sitting unwanted in a pawn shop, priced well below what the regular 686s were selling for (huh?).

In an effort to capitalize on the excellent sales of the 629 Classic Hunter, Lew Horton contracted with S&W to produce a run of 2000 .41 Magnum Classic Hunters in 1991. These 657s had a 6.5" full-lugged barrel stamped ".41 Magnum", wide target hammer, smooth trigger, black ramp front sight, non-fluted cylinder, and a black rubber Hogue Mono-grip on a square-butt grip-frame. This is a fine, fine hunting revolver, but the bottom line is Americans want .44s and the .41 Magnum has always been the runt of the litter in terms of sales activity. This run of Lew Horton's came and went with modest fanfare. When I turned 41, I figured what better way to mark the event than with stainless steel stamped .41? A friend of mine had a 657 Classic Hunter for sale, we negotiated a fair price and shook hands. A matched set was taking shape

The original run of 5000 S&W 610s was made in 1990-1 with a fluted cylinder and wood grips on a round-butt grip-frame (shown on the back cover of "Hunting for Handgunners" by Larry Kelly and J.D. Jones). This revolver quickly established a reputation for exceptional accuracy as a result of the tight tolerances that S&W employed in its manufacture. However, this reputation was offset by the fact that this was a revolver that was chambered for a rimless semi-auto cartridge, required full-moon clips, and folks weren't sure if the cartridge would still be around in 10 years due to it's checkered past. Sales figures for the first run of 610s were rather ho-hum, but the funny thing is, they were rarely seen on the used gun market (at least in my neck of the woods). The people who had them seemed to be mighty fond of them. In the spring of 1998, S&W brought back the 610 in the Classic Hunter format, with a few changes -- the 6.5" full-lugged barrel was now laser engraved (instead of stamped), the Hogue square-butt grips were now molded around a round-butt grip-frame, the trigger and hammer were color case-hardened (instead of in the white), and the front sight was now a red-ramp. But it still had the non-fluted cylinder, the full lug, the wide target hammer and smooth trigger. Most importantly, it still had the same tight tolerances as the original 610, delivering the same level of exquisite accuracy.

A decade has come and gone since that shiny new .44 magnum followed me home, and it along with each of it's little brothers, has spent much time in the field, repeatedly proving its meddle and living up to its moniker. The vast majority of my .44 Magnum shooting is done with 23.5 grains of W296 sparked by a CCI 350 primer underneath a Lyman 429421 cast of WW alloy with 2% added tin and water quenched straight from the mould (in my guns, the CCI 350 primer delivers better accuracy and an average of about 75 fps more velocity in the .44 Magnum). I lube all .44 magnum cast bullet loads with my homemade 50/50 beeswax/Moly grease lube. This load delivers 1310 fps from the 6" Classic Hunter with excellent accuracy. The full-lug and non-fluted cylinder add extra weight to help attenuate recoil, and the black sights make for bold, solid sight picture. All in all, a very deadly and versatile hunting package.

On those days when vermin and the .44 Magnum share the day's agenda, the same powder charge and primer are used to launch the HP version of the 429421, usually cast of air-cooled WW alloy. It's way more power than needed for prairie dogs and ground squirrels, but so far I haven't heard any of them complain.

In general I prefer to shoot plain-based (PB) cast bullets, but on those occasions when GC bullets are on the list I substitute Ray Thompson's GC-SWC (429244 -- 258 grains as they drop from the blocks) also shoots quite well with this combination, running 1258 fps from the 6" Classic Hunter. It's hollow-pointed kid brother (the 429244 HP) is also very accurate with this combination but I've never gotten around to chronographing this load (should be about 1300), I just don't shoot that many GC loads if I don't have to (and the PB Keith bullets do just fine, thank you). I also have heavier bullets (290s, 300s, 310s and 340s) that I shoot in the .44 Magnum, but I save those bullets for my Rugers. The Keith bullets just seem to fit the N-frame, and they shoot so well ... I guess I just like Elmer's ideas.

One fall while hunting mule deer in the rocky crags of the Snake River, I happened across a crippled buck while the 629 Classic Hunter rode on my hip. His was a rather bizarre wound, involving a missing antler, a large tattered hole in one ear and a ragged surface wound crossing the spine at about his kidneys. His remaining antler was a short, twisted stub a little over a foot long, that looked more like a weather-worn piece of driftwood than the 3-point mule deer antler that it was. We later learned that this buck had been crippled a little before 8 am that morning, and by 11 am (when I ran across him) he had finally stiffened up to the point that his back legs no longer worked. He tried to lie down as I approached.... he couldn't. He had been in pain for hours. It was a very sad sight indeed. He knew I was going to kill him and there wasn't anything he could do about it, but stand there and accept his fate with dignity. He watched me as I aimed carefully and put a bullet through his shoulders, hitting him hard enough to spin him in a full circle and knock him to the ground. The blood-splattered wheat stubble surrounding him was straight out of a Sam Peckinpah movie. Even hit that hard, mortally wounded, and having lost that much blood, his 3 hour adrenaline surge had him trying to get back on his feet. A second 429421 through his neck ended his misery as I watched the life drain from his eyes. Killing doesn't bother me, seeing an animal suffer bothers me immensely. We usually view our hunting guns as recreational icons that allow us to participate in the timeless traditions of the chase, but sometimes they are tools of a higher calling. A Classic Hunter indeed...

The 686 Classic Hunter is one of my favorite plinking guns, usually with cast bullets. But while it shoots cast bullets well enough, this gun is truly spectacular with jacketed bullets! Lots of powders and bullets shoot well out of this gun, but 14.5 grains of 2400 underneath the Hornady 158 grain XTP HP delivers 1373 fps and stellar accuracy (it has turned out 12 shot groups under an inch at 25 yards more than once). For long-range plinking, it's hard to beat the Lyman 358429 Keith SWC over 14.5 grains IMR 4227 with a CCI 550 primer for 1256 fps. This load is very accurate and delivers superbly stable long range flight. Quarter mile plinking with this load is great fun! Some of the finest handgun varmint loads ever can be made by assembling the Lyman 358429 HP (cast of air-cooled WW alloy, 162 grains) over 14.0 grains of 2400, or the Lyman 358156 HP (same alloy, 153 grains checked and lubed) over 16.3 grains of W296. Both of these loads deliver about 1300 fps from the 6" Classic Hunter, with explosive, rodent wrecking accuracy. The most accurate cast bullet load I've shot from the 686 Classic Hunter to date is Ray Thompson's GC-SWC (358156) over 14.5 grains of IMR 4227. This load is a little slower than the others (only running a little over 1250 fps), but it's very accurate.

Have you ever had a rodent thumb his nose at you? You know the attitude -- where you can almost hear the Woody Woodpecker laugh as he ducks and dodges around the stumps and clumps of bunchgrass, just to peak around at you from the one angle you least expected, give you one last "raspberry" and disappear just as the front sight settled on his nose. Well, I had been playing these games with one particularly abusive rodent for several minutes, the embarrassment being compounded by the fact that I was introducing a new hunter to Pacific NW high country varminting. It seems I was providing entertainment for both the quarry and the student. The ground squirrel snuck around underneath and behind his fallen log, and into the backside of its upturned root mass, taking up a hidden, shaded position where he felt safe, whereupon he proceeded to rain rodential insults and profanity upon my tender ears (fortunately I always wear good hearing protection while varmint hunting...). Ah, but I could see his beady little eyes staring back at me from the darkness! The 686 Classic Hunter snaked a cast Keith SWC-HP through that snarled root mass at 1300+ fps, quickly putting an end to the vulgarity (actually, considering the mess it left behind, one might argue otherwise...). This is a great varmint hunting gun, and over the years has accounted for many hundreds of rodents while in my hands.

The 610 Classic Hunter appears to be every bit as accurate as its predecessor's (the Model of 1990) reputation suggested it would be. I broke the 610 in with a trip to the varmint fields (what a surprise!). It was stoked with handloads carrying the Speer 165 grain Gold Dot HP over 12.0 grains of AA #7, which had been shown to print delightfully close-knit groups at a shade over 1300 fps. This is a flat-shooting, hard-hitting varmint load, not quite as explosive as the .357 Magnum loads described above, but dramatic nonetheless. Recently, I've acquired a Lyman 40388 HP mould, whose 165 grain Keith-style SWC HP bullets come out of the 6.5" Classic Hunter at 1277 fps when launched with 10.5 grains of HS-7. I haven't had a chance to hunt with this bullet yet, but I'm very much looking forward to summer varminting with this combination. For edible small game and just plain plinking, a real winner is found in the Lee 175 grain truncated cone paired with 7.5 grains of HS-6. This combination delivers reasonable accuracy at a sedate 925 fps, so my hasenpfeffer doesn't get sprayed all over the sagebrush. The 10mm is smack in the middle between the .357 and the .41 Magnum ballistically, making it well-suited for both small and medium game (as well as self-defense). I keep meaning to take the 610 Classic Hunter deer hunting, I just haven't done it yet. The ammo is loaded up and ready to go though -- 200 grain Hornady XTP's over 12.5 grains of AA #9. Groups run just under 1 1/2" at 25 yards and velocities are about 1200 fps -- should handle deer and antelope sized game rather nicely.

This particular 657 Classic Hunter has the interesting quirk of printing different bullet weights to different *windages*. I've seen this before, but never to this degree. When sighted in for the 210s, this gun prints the 170s a full 4-6" to the right, and a tad low. While it shoots the lighter bullets just fine, I primarily stick with the 210s just to keep from having to re-set the sights every time out. Loading for this revolver is quite simple -- 21.0 grains of W296 teamed up with a CCI 350 primer and whichever 210 grain bullet I'm playing with that particular day (jacketed or cast). Just as with the .44 Magnum, the CCI 350 delivers better accuracy and about 80 fps more velocity for me than do other magnum pistol primers. This revolver absolutely dotes on the Lyman 410459 SWC (213 grains) with this combination, delivering one-hole accuracy at 25 yards at 1332 fps. The RCBS SWC (211 grains) is almost as accurate out of the 657 Classic Hunter, and has a broader meplat to boot, so this might be the better hunting bullet of the two. My gun doesn't care for GC bullets at all, but as well as it shoots PB cast bullets, who cares?

I guess that's what I like about the Classic Hunters -- they shoot cast bullets as well as they shoot jacketed bullets, and they deliver power with precision and style. The clean, simple, straight lines of the full-lug barrel and non-fluted cylinder, along with the understated brushed stainless finish make for a handsome, and practical, package. It has been a pleasure to spend the last decade hunting with S&W Classic Hunters. Truly, I do love the Classics...

- Glen E. Fryxell

Something Old, Something New, Something Borrowed...

By: Glen E. Fryxell

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A while back I had an idea that sounded pretty clever to me, so I went to work on it, had success with it and was pretty proud of myself. I figured that something like this had probably been done before, but couldn't remember seeing anything in print about it. Then, as the project was winding down, the prior art re-surfaced. My only consolation (aside from the fact that I had developed some pretty useful loading data) was that the man that beat me to the punch was none other than Elmer Keith. Perhaps my inspiration for this concept came from some dim, dark recollection of his writings (I'm certainly not going to rule that out), maybe it was indeed original. Who cares? Anyway, I thought I'd share some of the results that will be of interest to the handgun hunting community.

I've had some rather androgynous concepts for putting together a 40+ bore wildcat in an iron-sighted 10" Contender for the lazy "stroll through the park" kind of hunting where you just kinda kick the bushes and see what comes out, and the shooting tends to be close, quick and not necessarily from the best angle. Penetration was to be the key performance parameter. Not surprisingly, the concept generally revolved around a .416 diameter bullet weighing 400 grains, usually just above the speed of sound for up close and personal thumping.

If this scenario sounds familiar to members of Handgun Hunters International, it should -- the inspiration for it came from a hybridization of J.D. Jones' "Woodswalker" and "Whisper" concepts -- a useful union of portable hunting power and heavy bullets (particularly cast bullets) at modest velocity. Penetration par excellence, sans belligerent recoil and bloodshot steaks.

You're probably thinking "Why not go with a .44 Magnum?". Well, basically 'cause I wanted to go with heavier bullets than were then available for the .44. The idea of 400 grains of bullet metal had real appeal (and besides, I was looking for something different to experiment with).

In any event, various case designs for this .416 came and went. Unfortunately, each had its own problems and was thus difficult to get enthused about, so the idea coasted for a while. As a brief philosophical aside, an excellent way to design a hunting cartridge is find an outstanding hunting bullet, identify its optimal velocity, and then construct a case capable of launching that bullet at that speed in such a way as to stay within the design limitations of the firearm in question (for example, the 120 grains Speer SP in the 6.5 JDJ, or the 200 grain Hornady FP in the .338 GEF). I'd really love to say that I followed this logical, systematic approach with this project, but I'd be lyin' through my teeth. In reality, I just stumbled across some truly excellent hunting bullets with a long history of killing game, and the rest just kinda fell into place. Definitely a case of this blind hog stumbling onto this particular acorn.

Many years ago, John H. Barlow designed three different cast hollow point bullets for hunting deer-sized game with the .45-70. The middleweight slug was a beautiful 330 grainer that was chosen by A.C. Gould and cataloged by Ideal/Lyman as their mould number 456122 (now listed as 457122). This mould design has henceforth been known as "The Gould Bullet". Paul Matthews details many of his experiences with this bullet (and several others) in his fun little book "40 Years With the .45-70". These bullets were commonly cast using a 16-to-1 lead-tin alloy so that they would be soft enough to expand positively at modest velocity. They were, and still are, deadly. Reo Rake, a friend of mine who is a certifiable cast bullet and .45-70 nut, was casting some Gould bullets awhile back in my garage. I picked one up and started muttering about the "walkin' around gun" concept. What about the Gould in a .45 Colt? The bullets dropped from the mould at .457", sizing them down to .454" didn't distort them significantly and left them .002" oversized (sizing them all the way down to .452" in one fell swoop proved disastrous in terms of distortion). The hunt was on for a 10" .45 Colt barrel. Eventually one was secured, and yours truly was getting all wet and wild-eyed, and yet another hunting handgun project was underway.

Good idea? Yes. Original? No. It turns out that Elmer Keith had the very same idea about 75 years ago. He took .45-90 flat-pointed bullets, sized them .454" and loaded them over a heap of black powder for use in his Colt SAA. He killed a fair number of critters with these loads before he decided that they were just a bit too much for the thin-cylindered Colts. So this idea is hardly new, but the combination of smokeless powders, .45-70 bullets sized .454" and seated long for use in a Contender does put a bit of a fresh shine on an old gem.

As I was writing this project up, I bought a copy of the Handloaders Digest 1996, in which I found a somewhat similar project dealing with heavy cast bullets in a .454 Casull revolver, written up by P. A. Widegren. The Freedom Arms revolver allows loads to be pushed to much higher pressures than the Contender can handle, but the revolver's cylinder also requires deeper seating of the bullets than is allowed by the throating of the single-shot. Similar in concept, but very different in terms of pragmatic load development.

Before we get into the meat of the loading data, there are a few points that must be borne in mind. The loads discussed below require that the bullets be seated long. To the best of my knowledge, my .45 Colt barrel (note: this is not a .45/.410) has the T/C factory standard throating and will allow seating these cast bullets to an OAL of about 1.9" (a .45 LONG Colt indeed!). Seating the bullets more deeply to more typical .45 Colt OAL's will reduce case capacity and increase peak chamber pressure to the point of being dangerous. Traditional .45 Colt loads commonly use some of the faster burning pistol powders. Do not use the faster pistol powders to try to duplicate these velocities. These are big, heavy bullets and slow powders are absolutely necessary to keep pressures reasonable. Don't use any .45-70 jacketed bullets (.457" to .458" in diameter) in a .45 Colt Contender (.452" groove diameter). A cast bullet that is .002" oversized is OK, but a jacketed bullet that's .006" oversized is going to jack pressures up to Contender wrecking levels. Likewise, don't use any .458" cast bullets in a .45 Colt T/C, size them .454" and both you and your gun will be much happier.

Anyway, with a fresh supply of .454" Gould HP's on hand, I started load development with Accurate Arms 1680 since it had performed very well in other loading projects involving straight-walled pistol cartridges launching heavyweight cast bullets from a Contender. Eventually, I tried powders ranging all the way from HS-7 on the fast side to BL-C(2) on the slow side. Three powders were found to give the best combination of velocity, pressure and accuracy -- they were AA 1680, IMR 4198 and Re 7.

Velocities of 1200+ fps were easily reached with all three and 5-shot groups generally ran about 1.5" at 25 yards with iron sights, with the best loads running right at an inch. There was no advantage to crimping or not crimping the loads, so I settled on no crimp so the brass might live longer.

Expansion testing was performed with a 12" water bath, backed up by a "bale" of dry newspapers. Expansion of the Gould HP (I prefer to cast these with about 7 lbs WW, cut with 2 lbs of lead, with a couple of ounces of tin added) going 1200 fps was positive, to say the least. For those of you concerned with downrange performance, the Gould HP will still be traveling at about 1030 fps at 150 yards, when launched with a muzzle velocity of 1200 fps. This is fast enough to induce modest expansion, if the alloy is reasonably soft (e.g. 20-to-1). With a 100 yard zero, they strike 2.7" high at 50 yards and 10" low at 150; ideally suited to iron-sighted handgun hunting ranges.

To keep this loading data distinct from my other .45 Colt data, I have been referring to the combination of a .45 Colt case with a .45-70 cast bullet sized .454" and seated to an OAL of about 1.9" for use in my Contender as the ".45 KGF" (for Keith-Gould-Fryxell, to recognize the contributors in the order of their contributions). Reo likes to call this my "Backdoor Springfield" in reference to the fact that these loads are ballistically reminiscent of the original trapdoor Springfield black powder loads. Not bad company to be found in, by the way. The Lyman Manual claims a 1 in 24" twist is used by T/C, but my barrel has exactly one half twist in the rifled portion of the barrel (which amounts to a shade over 8"), so I'm thinking 1 in 16" (or thereabouts) may be a little closer to reality. Either way, the twist is fast enough to stabilize heavier bullets and the original concept was a supersonic 400 grainer. So (sigh...), I was forced to explore the use of heavier .45-70 cast bullets (sized .454") in the .45 KGF. There are such sacrifices for the Grail of Ballistic Experimentation.

Grier's Hardcast of LaGrande, Oregon (phone number (503) 963-8796) recently added a few rifle bullets to their line, one of which is a beautiful 350 grain flat point for the .45-70. I got my hands on some of these and sized them down to .454". In the .45 KGF, it's no problem to run these FP's at 1200 fps. This is a very accurate bullet, and with its man-sized meplat it should make a truly outstanding hunting load.

A traditional favorite for the .45-70 is the Lyman 457193. This mould is listed as a 405 grain flat point, but bullets drop from my mould weighing 415 grains when cast of wheel-weights spiced with a pinch of added tin. The .45 KGF can comfortably launch this heavyweight at 1100 fps. This combination just might be the most pleasant, comfortable to shoot deep-penetrator available to the handgun hunter. The recoil is there, to be sure, but it's more of a slow shove than a sharp, wrist-wrenching jab.

The 457193 is a remarkably efficient projectile -- according to the Lyman Manual, launching this bullet at 1100 fps will have it flying at 1000 fps at 150 yards, and still chuggin' along at 900 fps at 400 yards! A 100 yard zero has it 3.5" high at 50 yards and 12" low at 150. Accuracy with this bullet was fair, with groups running 1 1/2" to 2" at 25 yards with iron sights (a significant portion of these group sizes could have easily been due to the shooter as it was cold and windy during the test session -- a stable sight picture and effective trigger technique are indeed difficult when shivering!). From my particular barrel, these loads shot to point of aim with the rear sight bottomed out.

OK, OK, I just had to play with the 500+ gainers, just to see what could be done with them without getting into trouble. The Lyman 457125 round nose drops out of my mould blocks at 520 grains when cast of the same alloy as mentioned above. 750 fps is pretty much maximum for the 520s, based on reasonable pressures. Yes, they do stabilize at this twist rate and velocity. No, they won't shoot to the sights (these slow heavy bullets still shoot high with the rear sight bottomed out). Accuracy was uninspiring at about 2.5" for 5-shot groups at 25 yards. However, these loads are probably useless for any real world applications (unless you happen to have some really fearsome saber-toothed bunnies ransacking your rutabagas, in which case these just might make the perfect "stopping loads"). If you insist on lobbing these spinning Winnebago's, you might as well shoot light loads at 500-600 fps, which are just too much fun! They are quiet, have modest recoil, leave a big hole and land with a big thump!

I freely admit that this is nothing more than a very crude bastardization of J.D. Jones' "Whisper" concept, but I'm not selling anything, or making any money off of this project, and the .45 Colt chambering and .45-70 cast bullets have been around even longer than J.D. has, so I don't think I'm "stepping on any toes" here. The main difference is that J.D.'s Whisper cartridges achieve this level of ballistic frivolity with sleek, shapely, aerodynamic match bullets (and tracers!) for serious (?) long-range plinking fun, as opposed to garden-variety, blunt-nosed bricks, suitable for spittin' distance bludgeoning.

Sheriff Jim Wilson coined the phrase "professional plinking" to describe the die-hard, get-brass-up-to-your ears, burnt-powder-in-the-gravel-pit-good-times. The .45 KGF with 520s just might qualify as a professional plinker's load. And while it's not a silhouette load by any stretch of the imagination due to it's mortar-like trajectory, even the most stone-faced crotchety ol' curmudgeon (Wes, is that you?) will crack a smile when that low-flying lead mine smacks the steel. Momentum it lacks not.

You can shoot these loads in the popular .45/.410 barrels (with the choke tube removed!), but I wouldn't expect very satisfactory results due to the excessively long bullet jump and the stone-age sights. One of these days I'll have to try a few of these and see...

The hunting loads for the .45 KGF are the 330 grain Gould HP and the Grier 350 FP at 1200 fps, and the 415 grain FP at 1100 fps. The 520s are just for fun. AA 1680 consistently gave the highest velocities with the various cast bullets, but with only so-so accuracy. The best accuracy across the board was provided by IMR 4198, followed closely by Re 7. Calculations suggest that the maximum loads reported here develop chamber pressures on the order of 26,000-28,000 psi, which is acceptable for this cartridge in the T/C Contender.

I really like this "walkin' around gun". It's rather different than the original .416 concept, but it lives up to that vision quite nicely. Sometimes these neat "new" ideas that come along have solutions that are generations old. Ah, the joys of re-discovery!

- Glen E. Fryxell

Loading data for the .45 KGF

This cartridge is a simple .45 Colt case with a .45-70 cast bullet sized .454" and seated to an overall length of approximately 1.9" for use in the T/C Contender.

Barrel -- 10" T/C Contender .45 Colt
Primers -- CCI 350
Brass -- W-W
*(designates the most accurate load for that bullet)

	Powder	Load	Velocity
Lyman 457122 (the Gould HP) 330 grains - OAL = 1.94"	AA 1680	27.0 gr.	1251 fps.
	IMR 4198	27.5 gr.	1200* fps.
	Re 7	28.0 gr.	1225 fps.
	H322	33.0 gr.	1215 fps.
Grier Hardcast 350 grain FP OAL = 1.87"	AA 1680	26.0 gr.	1200 fps.
	IMR 4198	27.0 gr.	1185* fps.
	Re 7	27.0 gr.	1175 fps.
Lyman 457193 -- 415 grain FP OAL = 1.96"	AA 1680	23.5 gr.	1120 fps.
	IMR 4198	24.5 gr.	1090* fps.
	Re 7	24.0 gr.	1085 fps.
Lyman 457125 -- 520 grain RN OAL = 1.98"	AA 1680	16.0 gr.	750 fps.
	IMR 4198	12.0 gr. / 16.0 gr.	550* fps. 755 fps.
	Re 7	15.0 gr.	740 fps.
	H322	18.0 gr.	733 fps.

The Levergun Catalyst

By: Glen E. Fryxell

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In chemistry, a catalyst is defined as something that facilitates or accelerates a process that would proceed slowly, if at all, in its absence. Catalysts play a very important role in creating the quality of life that we enjoy today -- whether we're talking about producing life-saving pharmaceuticals, high-tech composites for lightweight fly-rods, skis and bicycle frames, or more durable rubber compounds for longer-lasting safer tires for your work truck. Catalysts make important contributions to our everyday lives. What does all this have to do with leverguns? Well.

A number of years ago Bob bought a Rossi .357 Magnum levergun. He wanted to learn more about it's care and feeding, so he did some searching online. One of the resources he found was sixgunner.com (hosted at that time by Jim Taylor), as well as the related sixguns.com (hosted by John Taffin). Bob asked his questions and got some good answers, and was generally pleased with sort of people he found frequenting these sites. He hung around and adopted the nickname "fatboy" as that was his nickname among his cycling buddies (Bob is an avid bicyclist). He was one of several "regulars" at these sites who hailed from the Pacific Northwest.

A certain element of camaraderie started to gel among the PNW regulars and it was decided that we needed to get together to shoot, talk guns, tell tall tales and maybe have a barbeque. The first of these gatherings was organized by Caz, down in Albany, Oregon. As I pulled up to the gate on that cool, foggy Saturday morning I found Bob was the first person there, eagerly waiting at the gate to be let in to the range -- his enthusiasm was contagious, and soon the whole crew was laughing and shooting and telling tall tales and eating Caz's delicioso carne azada. We had about 15 people show up for that gathering and a grand time was had by all. These gatherings have since become tradition, held every summer, the weekend after the 4th of July weekend. The company and the food are excellent.

Over the years, we have become good friends, and we have had Bob and his delightful wife Audrey as guests in our home. We have hunted together, we have plinked together, we have made a few trades, and we have cooked together (Bob is a *good* cook). Bob had taken a fair amount of game over the intervening years, but he still hadn't blooded that little Rossi .357 -- the levergun that had taken him online and led him to a new circle of friends. It was time, and Bob decided that bustin' a big feral hog would be just the way to do it.

The trip was planned for late February. There would be three of us hunting on this trip -- Bob, Steve and myself. Steve had joined the PNW Sixgunner gatherings over the last few years and is fascinated by classic old rifles, powered by classic old cartridges (i.e. he has good taste!). He has recently taken up the timeless art of bullet casting and this trip would mark the first time that he would be hunting with bullets he made himself. It promised to be a memorable trip!

The three of us met up at the hunter's cabin on the Clover Creek Ranch in central Oregon. The weather had been rainy and cool, so the area around the cabin was quite muddy. We got a fire crackling in the fireplace, and the cabin warmed right up as we off-loaded our gear into the mud-room. We had appetizers around the wood-burning stove and then had a dinner of grilled German sausage, sauerkraut, coarse-ground mustard and salad. After dinner, we had a show-n-tell of guns, knives, and all the other stuff that hunters tend to go ga-ga over, then settled in for some serious story-telling and world-class pontificating. A most enjoyable evening!

The next morning started early with Steve cooking breakfast of home-raised ham and bacon, eggs, juice and coffee. We were out of the cabin and hunting before sun-up. We started off by working our way down a finger-ridge where Bob and I had found some bedded hogs on our last trip to this ranch. Sure enough, there were a couple of nice black-n-white boars nestled in their beds in these juniper woods. We decided to pass them up since we weren't sure if they were the size we were looking for, and besides it was the first hour of the first day and we didn't want the hunt to end so soon. We moved on. We hunted the bottoms, we hunted the highlands, we saw Asiatic water buffalo, we saw fallow deer, we saw bison, and we saw myriad colors, sizes and varieties of goats and sheep (including one old Ibex ram that had real character). We saw lots of critters, but we did not see the size of hogs that Bob and Steve were looking for, so it was back down to camp for lunch and Bob's home-made bean soup.

After lunch, Bob decided he wanted to go back and take a closer look at the black-n-white boars we had seen that morning, so we headed back to the top of that finger-ridge. We worked out way through the junipers, and eventually Bob worked his way back out into the open, where he found a group of hogs, of many different sizes and colors, including one big ol' black-n-white boar that weighed 650-700 lbs. He got himself into position and from close range used the little Rossi levergun to plant a 180 grain WFN cast bullet into that boar's brain, entering just behind his left eye. The boar went down quickly. This was a well-muscled boar, with a nice set of tusks. Bob had been given orders by his wife to shoot a pig that was "big enough to have some bacon". He was successful in achieving his directive!

We had an early breakfast the next morning and got started hunting right away. Steve and I went out to find him a good sized hog to take home. Steve was hunting with an 1880s vintage Phoenix rifle, single-shot .45-70. The Phoenix is similar to the Remington Rolling Block (very similar frame), except that instead of having the breech-block roll backwards to open the action, on the Phoenix it flips over the right side of the action. Steve's rifle is in nice shape, and has a very good bore. He was hunting with the Gould hollow point (Lyman/Ideal 457122), loaded to about 1500 fps. The Ideal 457122 was designed by John Barlow back about 1890 for A. C. Gould, who was the editor of "Shooting and Fishing" magazine (Barlow actually designed 3 different HP bullets and Gould chose the middle one, which weighed 330 grains, and it has been known as the "Gould bullet" ever since). In recent years, a number of sources have criticized the Gould bullet as being too destructive and expanding too rapidly to be useful as a big game bullet. I disagree. It must be kept in mind that the Gould bullet was designed as a black powder express bullet, and was intended for velocities on the order of 1300-1500 fps. The fact that it *can* be driven over 2000 fps from a modern levergun (e.g. the Marlin 1895) doesn't make it structurally well-suited for such velocities. The Gould bullet is a fine bullet for hunting big game, but it does its best work at moderate velocities, where it is a killer of the first order. Driving it faster is counter-productive. Steve was using it properly, at moderate velocity.

Having passed up some hogs the day before, Steve was eager to find a good pig on the second morning and see how well his carefully hand-cast bullets would do their job. As we worked out way down towards a small pond below where Bob had shot his pig the day before, we heard some deep grunting coming from the creek channel above the pond. I took Steve's pack and waited back, out of the way while he stalked this deep-voiced hog. Several minutes later, I heard the report of Steve's .45-70, immediately followed by a loud squeal. As I worked my way down the hillside, there was some loud thrashing coming from a thicket off to my left. As I moved in to help out, I see a large black-n-white boar, hit hard, struggling to move through the thick stuff on three legs. The next thing I see is Steve moving in from the opposite side, peering into the brush trying to see where his boar is so he can finish him off. Oops! My mistake! I am directly in Steve's line of fire and he doesn't know I'm here. I should have been calling out to Steve my whole way down the hill so he could keep track of where I was, but I hadn't done that. "Steve! Don't shoot! I'm directly behind your pig. He's right in front of me, hit hard, but still on his feet. Do you want me to shoot?"

"Thanks for calling out Glen. I didn't know you were back there. Yes, shoot him. I can't see him from here" came Steve's response. The boar hobbled around to my left (so I wouldn't be shooting towards Steve), so I drew my .44 Special

and shot him twice through the lungs, and he went down hard. Steve came up through the thicket and put a finisher in, just behind his ear. This was a BIG pig! It was estimated that he weighed a little over 700 lbs (hanging weight of the meat went over 350 lbs).

Steve's first shot had entered low in

the boar's left shoulder, breaking the leg and passing low through the chest cavity, just cutting the heart and damaging

the first couple of inches of both lungs before it exited through the far-side ribcage. The Gould bullet had expanded nicely, and punched right through, leaving a large exit hole in its wake. My .44 Special was loaded with the Lyman 429251 hollow point (BHN = 8), loaded over 17.0 grains for 2400 for 1235 fps. One of my lung shots exited. We found the other under the hide on the far-side, expanded to approximately .60 caliber and weighing 194 grains (original weight was 241 grains). Steve's boar also sported a nice pair of tusks.

On this particular tip, I wasn't looking for a hog. I had been inspired by my good friend Rob Applegate when he shot his buffalo a couple of years ago. It was time for me to shoot a buffalo. The first group of 14-15 buffalo that we tried to stalk were very spooky and took off for the horizon when I peaked over the hill to see if there were any young "meat bulls" in the herd. They had been hunted before and were not going to have anything to do with any human that was trying to sneak up on them. Oh well, keep hunting. Later that afternoon we happened across another group of 14-15 buffalo, this time bedded down in some thick juniper woods. I made a stalk that got me within about 30-35 yards of the herd when we reached a stand-off -- they were all tightly bunched together, looking at me, and there I stood with my Freedom Arms 454 Casull, looking at them. There were several meat bulls of the appropriate size/age in this group, but with them all bunched together, I couldn't shoot for fear of shooting through one and hitting a second animal. Finally, the lead cow (who was HUGE!) slowly sauntered off into the thick stuff off to the left, and the herd slowly started to follow. Eventually, I got an unobstructed shot opportunity at a young meat bull. The Freedom Arms revolver came up and the front sight blade settled on the young bull's shoulder. The 454 roared and the young bull reared up on his hind legs, like a stallion. All of this played out for me in slow motion, with my attention focused on the clearly visible bullet hole, low in his left shoulder. He came down on three legs and charged forward to re-join the departing herd. Then a strange thing happened, the herd gathered around him and neighboring animals leaned in to hold him up. I have read of elephants "shouldering" a wounded comrade up to aid in their escape, but I have never heard of this happening with buffalo.

Anyway, after about 10 seconds, as though someone had flipped a switch, the herd turned as a unit and walked away from the wounded bull, as though to say, "Sorry, we can't help you.". As the solitary bull stood there with his head sagging, I snuck into position and from about 25 yards away put a second shot though his lungs. He raced forward for about 20 feet and then went down for good.

The 454 was loaded with the Lyman 454629 GC-FP (water-quenched WW alloy, BHN of about 18), loaded over 30.0 grains of H110 for about 1650 fps. The first shot had entered low in the left shoulder, breaking the leg, cutting the heart and damaging both lungs before exiting the far-side ribcage. The second shot had center-punched both lungs and exited. Study of both wound channels revealed that neither bullet had expanded appreciably. This bull was 3 to 3 1/2 years old, weighed about 800 lbs, and was in beautiful shape.

All in all, this was a muddy couple of days, and we covered a lot of ground in order to find the animals we were looking for, but when it was all said and done, it was a great hunt with good friends. And Bob's little Rossi was the catalyst that started it all!

- Glen E. Fryxell

The Old Man of the Mountain

By: Glen E. Fryxell

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Clover Creek Ranch is located in central Oregon, 6 miles south of the isolated little hill-country hamlet of Ashwood. It is a 2000+ acre ranch specializing in exotic game, including various sheep, goats, fallow deer, bison, yak, Russian and feral boar. The bunkhouse is at about 2700 feet elevation and the hills of the ranch stretch up to over 4200 feet elevation. The scenery is classic mountain West; the rugged countryside is littered with junipers, rock outcrops, grass, and lots of animals. Clark and Nancy Couch own Clover Creek ranch (541-489-3344) and offer year-round hunting. The bunkhouse comfortably sleeps 4 or 5, and has a hotplate, microwave and coffee maker. Indoor bathroom facilities are available in the adjacent outbuilding (including a hot shower!), which even has a washing machine if you need to do some laundry. There is a covered picnic table and a fire pit nestled in next to the bathhouse under some shade trees. Right next to the picnic table is a very well-outfitted skinning shed, with chain hoists, block and tackle, gambrels, meat hooks, knives, butcher steels, and a walk-in meat chiller. All in all, a very comfortable and well though-out permanent hunting camp.

This was to be a special hunt for me on several levels. I was hunting with a Ruger Super Blackhawk that I had converted to .45 Colt with the guidance of my good friend Dave Ewer. This revolver has .480" chambers, .452" throats, a cylinder gap of .003" and a 7 1/2" barrel with a .4515" groove diameter). It shoots very nicely (good teachers are a blessing indeed). While I have worked with this gun a fair amount, and am very pleased with how my handiwork turned out, I had never killed anything with it. It was time. Over the course of a number of conversations with Rob Applegate, another good friend and one of the most knowledgeable experts in the field of cast bullets, I have pieced together a vision of what the perfect cast hunting bullet should look like. To be honest, there's really nothing new in this design, it's just a collection of features that Rob and I liked from other designs, proven through years of testing, all captured in one bullet. I had a .45 caliber version of this vision made up by Mountain Molds, specifically for the .45 Colt (I would have liked to have Rob make this mould for me as he makes the finest moulds I have ever seen, but medical issues in his family have severely limited his shop-time, so I turned to Mountain Molds and have been very pleased with the results). So, I had an excellent revolver, loaded with an excellent bullet, both of my own hand, but both also representing the contributions of dear friends. I also had the pleasure of making this hunting trip with another good friend, Bill Gilson, who I met through our interactions online at Sixgunner.com. Bill (aka "El Cazador", Spanish for "the hunter") is a pastor in Oregon and has been one of the organizers of, and regular contributors to, our annual Pacific Northwest Sixgunner rendezvous. Caz is a good man, a serious elk hunter, a member of the Pistol-Packin' Preachers, and lever-gun aficionado. I was hunting with Caz, but Dave and Rob were along in spirit through what they had taught me; I was hunting with a favorite revolver that I had built myself, loaded with bullets that I had designed and cast with my own two hands. Yup, this was going to be a special trip.


Converted .45 Colt Ruger Super Blackhawk.

Caz and I met at the Bunkhouse Friday afternoon and went on up the hill to walk around the ranch a bit and stretch our legs after driving for several hours. We ran into Clark on the way back to the bunkhouse and chatted with him for a while, learning some of the history of the area in general, and of the ranch in particular. We asked him questions about what the general lay of the land was, and where we might find various animals. Clark was downright chatty, and shared this information freely. After this, it was back to the bunkhouse for dinner.


The Mountain Molds 325 grain .45 caliber flat point, loaded in the .45 Colt.

The alarm clock rang at 5:30 the next morning, and soon the sausage was sizzling in the cast iron skillet, with the gurgling of the coffee pot providing an aromatic harmony. We wolfed down breakfast then loaded into Caz's truck and headed up the hill. Our first stop was just over the first ridgeline, overlooking the bowl northwest of the bunkhouse. We worked our way into the bowl on foot, and worked our way through the woods around the pond at the bottom. We found lots of sign there, and there were clearly lots of animals using this pond as their water supply, they just weren't there at the moment. We slowly worked our way back up the hillside back to the truck, and then turned the rig up the ridgeline to the west and headed for the Caterpillar D8 we had been told was about a half mile up the road (it turned out to be farther). It seems that there was a pond in the vicinity of this particular D8, that had a big ol' boar wallowing in it. We stopped along the way a couple of times to get out and walk down a couple of side roads, just to see what was out there, and to bask in the beauty of Creation. It was clear and sunny, with morning temperatures in the 50s, and the scenery in those hills and canyons was spectacular. With the familiar heft of a revolver on my hip, it was the glorious kind of morning that made one thankful to be a hunter. We didn't see anything on these hillside jaunts, but the weather, the countryside, the company and the hiking made them memorable. I believe Thomas Jefferson said something along the lines of "Of all the forms of exercise, those involving the gun are best.". Mr. Jefferson would have enjoyed this morning.

We continued to work our way up the road. At one point, we kicked up a small sow with 4-5 little piglets, that scampered off in that hilarious way that only piglets can. So far this morning, this was the only game that we had seen (other than a couple of small hogs down in the meadows around the entrance gate). As the truck crept up the heavily rutted jeep trail, suddenly a small patch of yellow paint became visible through the trees. "There's the Cat! Pull off." We quietly got out of the truck and swung wide of the clearing so that we could approach from downwind. We worked our way through the trees and sagebrush into the clearing. Sure enough, there was the Cat D8, and there was a drainage ditch, and there was sign of animal activity everywhere, but once again, there were no animals. Right place, wrong time. We scouted the general area to see what we could learn, and then worked our way down the ridgeline and drainage to see if the pond was below the Cat. We saw lots of buffalo sign, but that was all.

Back to the truck. What next? Let's go farther up the hill and see if maybe the pond is up there (but I thought water flowed *downhill*...). A few hundred yards beyond the Cat, the jeep-trail crested out, and as we broke over the top, I immediately knew that this was the place we were looking for. There was a wide open, expansive meadow, that had a couple of modest undulations, one of which had been dammed to form a muddy catch basin. Sign was everywhere; the meadow was heavily grazed, a variety of forms of scat were apparent, there were well-established game trails woven through the grass, and off in the distance we could see half a dozen fallow deer (white, spotted and chocolate). I had a good feeling about this area. We dismounted, and once again swung around to approach from downwind. As we wormed our way through the sage brush and scrawny, wind-twisted junipers of the ridgeline, I spotted a large brown mass, reclining on the far side of the pond, a couple hundred yards away. A massive ear flapped to shoo away a fly. Even from this distance it was obvious that this was a hog, and a very large hog at that. This had to be the old boar that Taffin had told me about. I motioned Caz over to my position, and pointed the boar out to him. "Whoa! That's a big pig!". We side-hilled our way around to get a better look at him. He was stretched out napping in the midday sun, so we had no trouble moving without spooking him. Occasionally he would lift his head and look around, or adjust his position, swish his stump of a tail, or flop an ear, but mostly he just laid there and soaked up the sun. We stumbled onto a young yak carcass (cougar kill?) that did a fine job of masking any scent trail that we might have had (besides, we were downwind of the only animals that we could see; we would soon find out, however, there were in fact animals downwind of us). We sat back and marveled at the size of this old boar, but at this point neither of us was really interested in taking him as we both had planned (and budgeted) for meat hogs. Caz wanted to donate much of his hog to members of his congregation, and my intended trophy for this trip was a black Hawaiian ram, so we just sat and watched the old boar and the fallow deer, off in the distance. Eventually, we swung wide of the old boy and worked our way closer to see what was happening over by the fallow deer, and to get a better look at the woods beyond and the drainage below. The view from that vantage point was spectacular. As I sat there soaking it in, it occurred to me that if I passed on the ram that I could afford the old boar, and that a huge old boar skull, with his heavy tusks, would make a fine trophy to remember this trip by. Besides, I may never get a chance to shoot a boar like this again. The decision was made. "Caz, I'm going to take him."

The wind had shifted somewhat, and so we swung down into the drainage so I could approach from downwind. At about 100 yards, Caz stopped and broke out his camera so he could take pictures of me on the final approach and firing the shot. As I quietly worked my way into the wind, I was feeling an interesting jumble of emotions -- the excitement of making a stalk (I hope I never outgrow that!), a hint of anxiety (I was sneaking up to get up-close and personal with a 500-600 lb critter with large, self-sharpening tusks), and the silliness of the situation (the focus of all this excitement/anxiety was *asleep*!). He was bedded down on the far side of a weather-beaten juniper log, which shielded his vitals from me as I approached. At about 30 yards, I eased the hammer back as gently and quietly as I could. 20 yards. 10 yards. At 15 feet, I finally had a clear shot. The Super Blackhawk came up and the front sight nestled into his left "armpit", to angle the shot down through his heart (he was laid out on is right side, and I was approaching from his belly-side). I remember thinking "Squeeze...", and only vaguely remember the muzzle-blast, but I have no recollection whatsoever of any recoil (Caz captured the shot on film, and I must confess that when I first saw the image, it took me by surprise as it didn't recount the moment the way my mind's eye did, the Ruger was in full recoil with the muzzle pointed skyward above my head). Once the hammer fell, the old boar grunted loudly, and started to flail about mightily, kicking up a sizable dust cloud. My attention was focused on the neat, round .45 caliber red spot, painted exactly where I had intended. He continued to kick mightily. I thumbed the hammer back and kept him covered with the sixgun. If he started to gain his feet, I would shoot again before he stood up. If not, I knew from the shot placement that he was hit hard in the heart and lungs, and would die quickly. It was soon apparent that he would never regain his feet, and his kicks slowly became more and more feeble. A short while later, all was still, and his dust cloud drifted off with the breeze.

I approached him with the Ruger still covering him, and began to marvel at his size. From nose to tail he was longer than I am tall (I'm 5' 10"). His ribcage was the same size as that of a full-grown cow elk. His feet were softball sized. On his back left leg he had a softball sized festering wound, apparently from an earlier encounter with a ricochet. He was clearly well past his prime, and was leaner than most hogs (in fact, sausage made from this guy is so lean that it will stick to the fry pan if the pan is not greased). He was an old man, quietly waiting out the end of his days. His final moments played out in his favorite dust wallow, soaking up the sun on a beautiful fall day.

We took some pictures, but I was still fixated on the size of this guy and his thick, coarse, bristling golden-brown hair along his back; his thick, sharp tusks; his thick, wrinkled and very tough hide (it reminded me of a rhino's). It took awhile, but eventually I stopped admiring him and broke out the knives and started field-dressing him. It took both Caz and me to roll him over and prop him up with rocks so I could gut him. The Mountain Molds bullet had gone right where I had intended (at 1230 fps, with 21.3 grains of H110 and a CCI 350 primer), up through the middle of the left lung, routed out a .45 caliber groove across the backside of the heart, through the right lung, passed a couple of inches under the spine and exited out the top of the right shoulder, after having penetrated approximately 30-32" of tough old boar. It basically punched a .45 caliber hole all the way through. In the lungs, this hole was surrounded by about 3" of severely bloodshot tissue. In other words, it did pretty much exactly what you would expect a 325 grain .45 caliber FP bullet at 1200+ fps to do.


The Old Man of the Mountain and the revolver that killed him.

I was about halfway through the gutting chores, and up to my elbows in innards, when I looked up and saw two hogs coming over the ridge, on a bee-line for the smell of fresh blood (remember me saying that there were animals downwind?). Caz had his back to them and was watching me work, eating an apple. They were about 100 yards off and I could clearly see that at least one of them had a red-tag hanging from its ear (red ear tags are how meat hogs are differentiated from trophy boar at Clover Creek, and it turned out that both of these hogs were red-tagged). "Caz! Get your gun! Red-tags in-coming!". His apple got flung out of the way in a hurry as he grabbed his Winchester 71 and levered a .348 Winchester round home. The hogs turned in all this excitement, and were milling around on the other side of the drainage from us. Finally the larger spotted sow, stepped clear of the second, smaller brown hog and Caz planted a 200 grain Silvertip low in her chest, just behind her right leg. She jumped and squealed, turned around and slowly started to walk back to our left, with her head hanging low. Caz busted her a second time, a little higher up, this time on her left shoulder. She went down hard, with a red geyser erupting from her right shoulder. She died quickly. Congratulations were once again shared and pictures taken. Caz recovered both of these bullets, both perfect mushrooms; one weighed 140 grains, the other 156 grains.


Caz, his .348 Winchester and his spotted sow.

As Caz field dressed his sow, I cut the old boar in half. We loaded the front quarters onto a blue plastic tarp (the kind that every hunter has in the back of their truck), and tried our hardest to lift them into the back of Caz's truck. No go. It was still too heavy for the two of us to lift up to tailgate height. Fortunately, Caz had a couple of 6 foot 2x6's in the back of his rig and we used these to fashion a ramp onto the tailgate. We slid the front quarters about halfway up the 2x6's, then Caz lifted the 2x6's, levering the front quarters up to tailgate height, and then I shoved them onto the bed of the truck. We repeated the exercise with the boar's hindquarters, and then re-positioned the truck and did it one more time with Caz's sow. We had to juggle the pig parts around some to get it to where we could close the tailgate, but we finally found a combination that worked, and then headed down the mountain to the skinning shed.


The recovered .348 Winchester 200 grain Silvertips from Caz's sow (photo by Bill Gilson).

Matt met us down at the skinning shed and had the hogs hanging in no time at all (ah, to be young and strong...). I told Matt that I had my guess of what the old boar weighed (about 600 lbs), but I wanted his estimate (since he did this for a living, I figured that he would have a better sense of an animal's weight). He opined that my boar weighed closer to 500, but he knew the animal and said in his prime the ol' boy had gone between 800 and 850. Matt estimated the sow's weight at 475. Caz and I sat around and re-hydrated ourselves while Matt peeled the hides off of the two hogs, got 'em washed up, split and hung in the cooler, which he did in a most expedient fashion.

We fixed a quick sandwich and since we still had a couple of hours left in the day decided to go back up and sit overlooking the gut-piles in case any coyotes came in. A large flock of crows had almost completely consumed the sow's gut-pile, but much of the old boar's gut-pile was still there, with a couple of magpies working it over. A couple of sparring fallow bucks (chocolate) came within a couple hundred yards of our position, along with lots of crows and magpies flying over, but no coyotes. As the sun dipped below the horizon the temperature started to drop quickly, and I stood up to stretch my stiffening legs. As I did, I spooked a mixed herd of 15-20 hogs and Russian boar, 75 yards to my left, coming in from above the pond. If I had waited another 2 minutes to stretch, they would have walked right into our laps!

As we packed up to head on down the mountain a second time, we gathered a little firewood. When we got to the bunkhouse, we built a small cooking fire in the fire-pit and grilled steaks and sausage for dinner. Man, that was good! Sleep came easily that night (in spite of Caz's snoring!).

The next morning was a lazy morning, spent drinking coffee, soaking up sunshine, discussing religion, philosophy and solving the world's problems. Clark and Matt joined us and the conversation turned to politics and the presidential elections coming this fall. Then folks drifted off and I went over to the skinning shed and boned out the old boar while Caz got showered up and ready to go preach later that afternoon. We got Caz loaded up and on his way, then I settled in and fleshed out the old boar's skull. When I got home I cut and wrapped the back-straps, tenderloins and hams, and ground up the front quarters into a whole bunch of sausage. The old man of the mountain had a good life up in his mountain-top lair. Now he will contribute to the good life of my family and friends. The cycle of life rolls on. Barbeque anyone?

- Glen E. Fryxell

So, you want to be a crack pistol shot?

By: Glen E. Fryxell

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We hear a lot about all sort of shooting events that focus on speed -- IPSC, cowboy action shooting, falling plates, Bianchi Cup, etc. Dynamic targets are always fun and are good at keeping people's attention. Speed is a challenge, and the folks that excel at these events are truly inspirational to watch. But are these the disciplines to work at if one wants to become a crack pistol shot?

No.

These disciplines will teach the draw, the grasp, target acquisition, sight picture and follow through, all important skills, and useful in defensive shooting situations. But they don't teach the most important component of handgun marksmanship.

To learn to become a crack pistol shot, one needs old-fashioned bullseye-style shooting. Yes, it's slow. Yes, the targets are boring. Yes, it requires an attention span that lasts longer than your average rodeo bull ride. But it's the only handgun shooting discipline that is able to teach the shooter how to shoot a handgun with precision. How can I make such a claim? Let me explain...

How many times have you heard the pneumonic, "Sight picture, trigger control."? Shooters in pretty much all of the shooting sports recite this mantra, constantly and repeatedly. What is covered by the concepts of "sight picture" and "trigger control" may vary from discipline to discipline, but those two basic themes pervade the whole of shooterdom. But these things are not enough.

What's really meant by the concept of "trigger control"? Basically, the idea is to manipulate the trigger in such a way as to not disturb the sight picture, so the shot lands where it was intended. That's all well and good, but it doesn't teach us how to do this, or what some of the common pitfalls are. "Trigger control" just says fire the shot and don't disturb the sights. It is *outcome oriented*, not *how-to procedure oriented*.

I have taught handgun marksmanship for the better part of 2 decades, and the one concept that is most awkward for shooters (novice and experienced alike) to learn, and the one most overlooked in most marksmanship courses, is to isolate the trigger finger. The human hand is a wondrous instrument. One that is capable of complex motions and delicate tactile sensation. We use it to grasp, lift, turn, throw, twist and squeeze objects hundreds of times each day. The intricacy and complexity of these motions can be summed up by considering what the hands of a jazz guitarist, a big-league baseball pitcher and a master gunsmith do every day. The fingertips, knuckles, palm and thumb work together as a truly remarkable team.

To become an expert pistol shot we have to break that team up. We are asking the hand to two very different jobs simultaneously. First, it must serve as a stable foundation from which to launch the shot, and secondly it must trigger that shot at the moment that the sights are precisely aligned with the target of interest. The first job is static, the second job is quite dynamic. We want the grip to remain unchanged throughout the shot execution, but we need to have the trigger finger "activate the mechanism". While most shooters recognize (at some level) that these two jobs contradict one another, relatively few can actually pull it off. Learning to do this will make you a better pistol shot.

The key here is to learn how to isolate the trigger finger.

What do I mean by "isolate" the trigger finger? Learn to move the trigger finger without moving anything else in the hand.

Let's do a little drill --

Assume your shooting stance as though you were holding a favorite handgun (this drill actually works better if you're not holding the gun). Hold your shooting hand out, in classic bullseye form and line up a convenient sight picture (I use the knuckle at the base of my thumb as the "sight" and aim at a light switch on the far wall). Now go through 10-15 slow, deliberate "shots" with your trigger finger. A very common outcome at this point is for one (or more) of the fingers (or even the thumb) in the shooting hand to "follow" the trigger finger, closing slightly as the trigger squeeze progresses. This is fine for picking up and peeling an orange, but is counterproductive for handgun marksmanship as that change in finger pressure will change not only where the handgun is pointed, it will also alter how it moves in recoil (thereby impacting the accuracy of follow up shots). Now repeat the 10-15 "shots", this time concentrating on the shooting hand, and keeping everything fixed except the trigger finger. Do not allow anything else to move, or even tense up. This will be awkward at first. That's OK. This is a very un-natural motion for us to ask the hand to make. Keep repeating these virtual dry-fire drills a couple of times a day. In time this task will become more comfortable and feel less awkward.

One needs a means of monitoring progress and seeing how much improvement is being made, and that's where bullseye competition comes in. Regular bullseye shooting (either formal matches or practice rounds) will help a pistol shooter gauge how much his or her skills are improving through these virtual dry-fire drills. Bullseye gives the shooter a permanent record of where each shot landed, allowing an analysis of the root cause for each flyer. This can be very diagnostic, and a powerful teaching tool. Sight picture, trigger control, and isolate that trigger finger!

Addenda by Jim Taylor, Webmaster of leverguns.com

Grip That Pistol!

Single Actions- I grip it high

Double Actions- I get my hand up on the gun where it won't move.

No - don't hold it sideways! Looking from the top, the gun should be in line with your arm. Hold it tight so it don't squirm around in your hand.

Diagnosing Your Trigger Squeeze

Taken from the NRA's "The Basics of Pistol Shooting"

Trigger control is of utmost importance, especially when shooting handguns. Shooting bullseye targets on paper is the only way to properly diagnose your trigger squeeze. It will also keep track of your progress and is an instant reminder if you start making any wrong moves.

To diagnose your trigger squeeze we start with a gun that is properly zeroed and that we know is hitting dead center. If you don't know how to do that then you don't need this article. You should start with something a little more basic. The suggestions below are also based on a right-handed shooter. For a left-handed shooter the target results will be on the opposite side from what is stated.

1. When you fire 5 to 10 shots on the target, if it looks like someone has been using a shotgun - that is, they are a "pattern" and not a "group", this indicates you are not consistently gripping the firearm in the same manner, and most likely are putting your finger on the trigger differently each time. You probably do not have a consistent sight picture either, focusing on the sights for one shot while you focus on the target for another. Probably your hold is not steady either.

2. If your shots group low and to the left most likely you are jerking the trigger instead of squeezing it.

3. If your shots group high to the left - say in the 9 o'clock to 12 o'clock position - you are probably anticipating the recoil and pushing the firearm up. This is called "riding the recoil". Groups in this area are also caused by lack of follow-through.

4. If your group is consistent at about 9 o'clock you most likely do not have your finger on the trigger properly. You are probably squeezing at an angle instead of straight back.

5. If you group is high to the right you may be "heeling" the firearm - anticipating the recoil and pushing with the heel of your hand.

6. If your shots group fairly consistently to the right in the 3 o'clock area you are probably "thumbing" the gun. That is, as the gun goes off you are pushing on the side of the frame with your thumb.

7. If your group is consistently low, say in the 6 o'clock area, you may be "breaking" your wrist, that is, anticipating the recoil and cocking the wrist down. Low shots also come from improper follow-through when the shooter relaxes too quickly.

8. If all the shots are hitting right, low, say in the 4 to 5 o'clock area, you may be tightening your grip just as the gun fires. This is another form of anticipating recoil.

Again, the above is based upon a handgun that is properly zeroed with a right-handed shooter.

Be aware that there are other causes for the above results on target. These are the main mistakes that shooters make, but they are not the only ones.

- Glen E. Fryxell / Jim Taylor

The Origins of Magnum Performance

By: Glen E. Fryxell and Robert L. Applegate

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In 1937 Phil Sharpe published the "Complete Guide to Handloading", which is arguably the single best handloading reference ever published. In this tome, he summarizes his extensive testing in the development of the .357 Magnum, and the dominant role that cast bullets played in that development. The bullets used by Sharpe in this project were primarily the 146 grain Sharpe HP and the 156 grain Sharpe "solid" (what we would call a SWC today), but included a wide variety of others as well. Both of the Sharpe bullets took their inspiration from Elmer Keith's SWC and HP (Ideal 358429 and 358439, respectively), shortened to approximately 5/6 their original length. This was done because Keith had designed his bullets in the 1929-1931 timeframe specifically for the .38/44 .38 Special N-frame guns (the Heavy Duty and Outdoorsman), and the shorter cartridge case left more room in the forward portion of the cylinder for a long-nosed bullet, so Keith designed a long-nosed bullet. Phil Sharpe was working closely with Colonel D. B. Wesson (Vice President of Smith & Wesson) and knew that S&W was going to use the same length cylinder in the soon-to-be-released .357 Magnum, meaning that the bullet nose would need to be shorter, since the cartridge case itself was longer. Sharpe turned to George Hensley, a relative newcomer in the mould-making business (having only been in the business for a few years at this point), to have these moulds made, and Hensley quickly earned Sharpe's respect with his exceptional craftsmanship. The Sharpe HP and solid were both notably lighter than the Keith bullets, and as a result, velocities were considerably higher with the Sharpe bullets. The loads that Sharpe worked up for the new Magnum produced velocities of an unheard of 1500-1600 fps. Bullet performance of the Sharpe HP was both spectacular and explosive. The .357 Magnum was officially unveiled in 1935, and the rest, as they say, is history.

George Hensley #51 -- the "Sharpe solid" used in the development of the .357 Magnum cartridge (this mould pre-dates Hensley's 1937 partnership with James Gibbs, making it contemporary with the introduction of the .357 Magnum).

The whole course of firearms history as we know it might have been very different had Colt developed the .357 Magnum instead of S&W. In a way, Colt did play a role in the development of the .357 Magnum. Colt introduced the .38 Super Automatic cartridge to help fill a need by Police Officers for a cartridge with better penetration capabilities than the standard .38 Special revolver. This in turn caused many of S&W's customers to purchase the new Colt semi-auto pistol chambered for this new "Super" cartridge which would penetrate the WW1 body armor as used by many members of organized crime and would also penetrate the newly introduced bullet proof glass that was being used by the same fraternity. For S&W to maintain their reputation as the manufacturer of the worlds best revolver and their position in industry as a manufacturing giant, it was necessary for them to develop a cartridge and handgun to go with it that would surpass the new requirements of the various law enforcement agencies (not to mention Colt's .38 Super). Thus, began the quest of S&W, which led to the .38-44, and subsequently the still very popular .357 Magnum. Keith's contribution to this effort was to demonstrate that the N-frame .38/44 could safely handle this level of pressures. He did this by developing loads in the early 1930s using DuPont #80 powder and his 173 grain SWC and 154 grain HP cast bullets, loaded to about 1100 fps velocity. When 2400 was released in 1933, Keith quickly found it to be a superior powder for this application, and used it to step his loads up to 1200-1300 fps. He summarized these experiments in "Sixgun Cartridges and Loads", published in 1936.


S&W .38/44 Outdoorsman from 1932.

Generally when we think of the .357 Magnum today, we tend to think in terms of either jacketed bullets or hard-cast SWC's . We commonly think of 158-180 grain bullets at 1200-1350 fps, or 125 grain bullets at 1450 fps for home-defense or law enforcement applications. Savvy silhouetter's have also loaded heavy cast bullets (e.g. 200 grain) to 1200 fps in the .357 Magnum to convince stubborn rams that they needed to fall down. It is strangely ironic however, that the bullet that ushered in the era of magnum performance, an intermediate weight (between 125 and 158 grains) cast HP, is entirely absent from today's handgunning scene.

In general, cast bullets are driven faster than jacketed bullets of the same weight with the same powder charge since less energy is used to engrave the bullet and the cast bullet puts up less frictional resistance as it glides down the barrel. Therefore, cast HP's tend to deliver higher velocities at lower pressures than do JHP's of the same weight, and consequently expand more readily than do jacketed bullets. For many years Keith tirelessly promoted the use of his HP design (Ideal 358439) in the .357 Magnum, but this effort was somewhat dampened by his bullets being too long (when loaded into magnum cases and crimped in the crimp groove) to fit in the cylinders of the most popular .357 of the day: the S&W N-frame .357 Magnum. The only way to make these bullets work was to seat them very deeply and crimp the case over the forward driving band, or to use .38 Special brass (Keith's preferred solution); either way, velocity suffered somewhat due to the loss of case capacity. Keith's 358439 is an exceptional bullet and provides excellent performance out of the more modern guns that it's compatible with. However, it is not the bullet that Phil Sharpe used to develop the .357 Magnum.

The Lyman 358477 dates back to the 1950s and has a shorter nose to be compatible with the shorter cylinders of the early Magnums. This nose is quite similar to the ogive/meplat that Hensley cut for Sharpe (compare Figures 1 and 3; the nose of the 358477 appears to be a little longer and narrower in the photos because the driving bands are a little thinner, in reality the length of the bullets forward of the crimping groove are within about .010" of one another, and both are about .050" shorter than the Keith). The main differences between these two bullets are the shapes of the grease grooves, a small difference in the width of the driving bands and a few grains of bullet weight. Based on the cherry number, the 358477 might have first been made as early as 1952 (cherry number 476 was the highest number listed in 1951), but it wasn't officially cataloged until 1957 (Lyman Handbook #41). The timing of this introduction is significant because the .357 Magnum was quite popular by the mid 1950s, fueled by the 1955 S&W introduction of the immensely popular 4" barreled K-frame Combat Magnum (later known as the Model 19). A lighter, faster bullet that captured the desirable features of the Keith SWC and the extraordinary velocities of Sharpe's early testing was called for. The 150 grain 358477 was Lyman's response.

The 358477 quickly became a popular cast bullet for the .357 Magnum. Lyman's 1958 "Handbook of Cast Bullets" lists shooters' testimonials labeling it as a favorite bullet in both the .38 Special and the .357 Magnum, even western hunters reporting its use over stiff loads of 2400 to take mule deer. Originally, the 358477 weighed 150 grains, but over the years Lyman has altered the 358477 design to make the grease groove smaller, the driving bands wider and the nose shorter, resulting in a 158 grain bullet that is seated more deeply into the cartridge case. I am quite fond of the older 150 grain version. It is an excellent bullet in both .357 Magnum and the .38 Special.

My own experience with the 358477 goes back to the 1980s to when I was getting started in bullet casting. A buddy of mine happened across an older 2-cavity Lyman 358477 mould at a gun show for $5, bought it, and handed it to me, saying, "Here, everybody should have a good .38 SWC mould". That mould sat unused for a while on my casting bench because I had a 6-cavity aluminum mould in a similar bullet weight that made a mountain of bullets in a hurry. Accuracy was acceptable, not great, with these mass-produced bullets, but I just chalked that up to my own inexperience and the limitations of cast bullets. Nope, sorry, wrong answer. Curiosity eventually got the best of me and I sat down and cast up a batch of 358477s and put together some test loads in both .38 Special and .357 Magnum (if memory serves, those loads involved 4.0 grains of Bullseye and 14.0 grains of 2400, respectively).

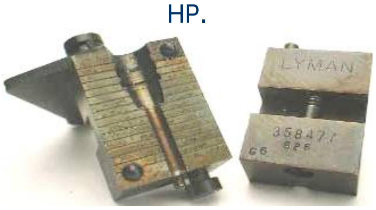
Accuracy improved significantly relative to the mass-produced bullet (group size was basically cut in half), and the leading problems that plagued the other bullet disappeared entirely. Since that time I have bought several more 358477 moulds, both in the original 150 grain design and the more recent 158 grain version. Over time, some of these moulds have moved down the line, and eventually I have ended up with a pair of 4-cavity 358477s. Interestingly, both of these moulds are stamped "Ideal", a practice which I believe was dropped around 1958, meaning that both of these moulds are very early production of this particular design (both in terms of the 358477 cherry used to cut the mould, and in terms of the 4-cavity blocks, which were introduced in 1958). These moulds have cast a pile of bullets for my revolvers over the years, as the 358477 in .38 Special is one of my all-time favorite plinking and varmint hunting combinations.

For many years I was looking for a HP version of the 358477, but was unable to find one (or even find mention of one), so I finally broke down and did a little lathe work to convert an older Ideal single cavity 358477 to drop HP bullets. This 140 grain bullet bears some notable similarities to the 146 grain Sharpe HP in terms of weight, profile and performance. I didn't use Sharpe's original cavity design (.100" diameter and square-cut bottom), preferring instead to use more of a Keith-style cavity that started out at .160" diameter, tapered and rounded off (Keith used tapered cavities between .140" and .170" in his HP mould designs). The tapered/rounded HP pin allows the alloy to flow around the pin with less turbulence, resulting in fewer trapped air pockets and therefore fewer defective bullets. As luck would have it, about a month after I finished this conversion, I stumbled across a factory 358477 HP, so I can now compare my handiwork to the factory version.

Ideal 4-cavity 358477 mould.

Apparently, the Lyman factory was thinking along the same lines I was when I made my mould, as they made their HP channel about .140". The HP pin was missing from this mould and I haven't gotten around to making a new one yet.

The homemade Ideal 358477 HP.



The factory Lyman 358477 HP (missing the HP pin).

OK, so now we've got the moulds, how does the 358477 HP cast, shoot and expand? Bullets were cast of WW alloy with 2% added tin for the .357 Magnum, and 20-to-1 (lead to tin) for the .38 Special. All were sized .358" and lubed with homemade Moly lube (equal parts by weight beeswax and Moly grease). .357 Magnum loads were assembled using 15.0 grains of 2400 and CCI 550 primers. Accuracy was excellent, and velocities were 1571 fps from an 8 3/8" S&W 586, and 1502 fps from a 6" S&W 686 Classic Hunter. These velocities are virtually identical to those reported by Sharpe. The barrels were clean, with no leading observed. Expansion testing was carried out by shooting 2L plastic bottles filled with water, laid on their sides and penetrated lengthwise. This manner of testing usually involves the shooter getting wet (a welcome relief on a hot, dusty July afternoon!), but not this time. Expansion of the 358477 HP was so violent at 1600 fps that it simply misted the entire 2L contents of the water bottles! There were no droplets big enough to make it back to the shooter, just a 20 foot sphere of something that more closely resembled fog than a spray of water. Expansion at these velocities was more vigorous and explosive than any other bullet I have ever used in the .357 Magnum, including Elmer Keith's 358439 (this is not a statement that I make lightly, I am a huge fan of Mr. Keith's HP design). Doubtless, the rapid expansion is due to the higher velocities possible with this lighter bullet, but nonetheless, it's easy to see where Mr. Sharpe's enthusiasm and awe came from during his development of the .357 Magnum cartridge.

4.4 grains of Bullseye was used in the .38 Special evaluation of this HP, which also delivered excellent accuracy, and velocities ran 956 fps from a 6" K-38 Masterpiece and just over 1000 fps from an 8 3/8" Model 14. Tests revealed that expansion is minimal at these speeds when this bullet is cast out of WW alloy, but that it expands beautifully when cast of 20-to-1 alloy (see recovered bullet in Figure 6). Very similar results were reported by Phil Sharpe on page 280 of his "Complete Guide to Handloading".


.38 Special and 358477 HP; loaded round, as-cast bullet, and bullet recovered after being fired into water at 1000 fps.

OK, so who cares about bullet expansion in water bottles? What does this bullet do on living, breathing flesh? Taking this bullet into the field to hunt vermin provided confirmation for the water testing results. When loaded in the .357 Magnum to almost 1600 fps, the 358477 HP delivered a flat trajectory and expanded in highly explosive fashion. When loaded into the .38 Special at 1000 fps and cast of 20-to-1, the 358477 HP hit hard, with reliable, controlled expansion. In summary, this bullet allows the shooter to get every last bit of performance possible out of each of these fine cartridges. This is an excellent bullet and one that defines magnum performance. Just like Mr. Sharpe told us it did back in 1935.

- Glen E. Fryxell and Robert L. Applegate

What Would Elmer Say?

By: Glen E. Fryxell

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In the mid-1920's, Elmer Keith was experimenting with various cast bullet designs using experimental moulds that he had commissioned Belding and Mull to cut for him. In 1928, he refined his ideas and took these new designs to the Lyman Gun Sight Corporation for them to manufacture as a part of their Ideal Bullet Mould line (Lyman had just bought Ideal 3 years before in 1925). Thus was born the Ideal 429421 and the concept of what would later become known as the Keith semi-wadcutter (SWC). A landmark in terms of handgun bullet design had been firmly cemented in place. The .44 Special Keith SWC was quickly followed by the 452423 (for the .45 ACP and .45 Auto-Rim), the 454424 (for the .45 Colt) and the 358429 (for the .38 Special). Each of these bullets was found to be an excellent all-round bullet for target work, plinking and hunting. Keith suggested that if additional shock were desired, his designs could be easily hollow-pointed for rapid expansion and more devastating wound channels. Shortly thereafter (in the early 1930's), Harold Croft and Capt. Frank Frisbie ordered the first hollow-point version of the 358429 (the HP version was given it's own number designation of 358439). This bullet design proved to be so successful, that Elmer went back and had HP versions made for all of his SWC designs. He ultimately settled on an alloy of 16 parts lead to 1 part tin for these cast HP's (BHN = 11), and a muzzle velocity of 1200 fps for the .44 Special and the .38/44 Heavy Duty, and 1100 fps for the .45 Colt. Another landmark was established. The Keith HP's were, and still are, exceptional performers when the moulded metal hits the meat.

Now let's fast forward to the early 1960's -- Elmer had been lobbying the firearms industry (along with Bill Jordan) for a .40-.41 caliber duty revolver for law enforcement personnel. The industry responded with the .41 Magnum in 1964, with S&W producing the guns on their N-frame, and Remington manufacturing the ammunition. Lyman immediately jumped onto the .41 bandwagon , advertising their new ".41 Keith SWC", the Lyman 410459. There was only one problem -- Elmer Keith didn't design the Lyman bullet, he didn't particularly care for the design, and he didn't like his name being used to sell something that he had played no part in developing. Lyman had made the 410459 more aerodynamically streamlined by elongating the nose and making the meplat smaller, and they used a radiused grease groove to insure that bullets would drop from the moulds easily. Keith didn't like these features; he liked a large meplat to create open wound channels and a "square-cut" grease groove to hold more bullet lube. While he grudgingly admitted that the 410459 was an accurate bullet design, it was just not right (in his eyes), and it certainly was not a Keith. He turned to Hensley & Gibbs to capture the concept of the .41 Keith SWC in metal -- 3 equal width driving bands, a broad meplat, a radiused ogive, beveled crimp groove, and a square-cut lube groove. The result was the 220 grain H&G # 258. SAECO soon followed suit with a similar design. In Keith's eyes, the .41 Magnum was now properly endowed.

Handgun hunting has come a long, long ways since the .41 Magnum made its debut in 1964. Various “fashion trends” have come and gone over the years, whether light bullets driven ultra-fast or hard-cast heavyweights at more moderate velocities, the aim always seems to be taking some parameter to extremes, whether muzzle velocity or bullet weight. Each of these approaches has value to the handgun hunter, but neither is a “Universal Truth”. The concept of matching the bullet to the game is just as important today as it has always been (read that sentence again). Just because the SSK .44 320 grain FP has proven itself capable of cleanly killing elephant and Cape Buffalo, doesn’t mean that it’s an optimum choice for smaller animals like pronghorn antelope; it’s designed for maximum penetration through thick skin and heavy bone and leaves a deep, narrow wound channel. In a 125 lb. antelope, a hard-cast heavyweight just doesn’t do that much damage before it runs out of antelope to do damage on and simply exits the far side. The hard-cast heavyweights are better suited to larger animals (elk and up) where 4+ feet of penetration are needed to go through the vital organs, inducing hemorrhage throughout the entire length of the wound channel. For deer/antelope sized game, the hunter only needs 14-15 inches of penetration to make it through the vitals, and so to maximize hemorrhage it is to the hunter’s advantage to use an expanding bullet to make this short wound channel as wide as possible. Yes, complete penetration is a good thing, and an exit wound is always desirable, but it doesn’t take a 300+ grain hard-cast solid to punch through a deer! All that excess bullet weight comes at the cost of velocity, which is precisely what drives expansion, and expansion is what makes wound channels wider. After many decades of development, today’s commercially available JHP’s provide the handgun hunter with useful controlled expansion at typical magnum revolver velocities. For the record, the Keith HP’s were providing this level of performance before there were any Magnum revolvers, and long before the intricacies of joining dissimilar metals into a JHP that would expand reliably without flying apart were understood. When the .357 and .44 Magnum revolvers made their appearance, the Keith HP’s found another natural home, the 358439 as a varmint bullet and the 429421 HP for medium game.

The .41 Magnum would be equally well-served by such a cast HP. The only problem is, I had looked for a HP mould that would be suitable for the .41 Magnum and never even found mention of one. So I resolved to make one. First, a single-cavity Lyman 410459 was located and obtained. A little lathe work converted this mould to cast HP bullets (this conversion will be covered in greater detail in a forthcoming book).

The HP cavity was made roughly the same size as those found on the 358439 and 429421 HP so the expansion properties of this new HP would be midway between these two bullets, since the wall thickness surrounding the HP cavity would be intermediate between the two.

The 358439 is an explosive varmint bullet and the 429421 HP delivers more controlled expansion (of course, both of these properties are dependant on the alloy the bullet is cast with, and the velocity that the bullet is delivered with). Thus the 410459 HP was anticipated to provide rapid, but not explosive expansion at magnum revolver velocities. In other words, excellent performance for deer and antelope sized game.

41 Rem Mag. & Lyman 410459 now a HP.

The bullets drop from this mould at 208 grains when cast with WW alloy + 2% tin (BHN = 11 on my LBT hardness tester). Tin is very important to cast HP's as it helps to attenuate the brittleness induced by the phase segregation of the roughly 3% antimony carried in the alloy. Loaded on top of 21.0 grains of W296 and sparked with a CCI 350 primer they deliver 1320 fps from a 6 ½" S&W 657 Classic Hunter. This is a very flat-shooting and accurate load I had drawn a doe tag in our unit on the Snake River in eastern Washington, and figured this would provide an excellent opportunity to evaluate the 410459 HP in the hunting fields. Opening Day leaked into the eastern horizon gray, colorless and crisp. Slowly the orange hues of sunrise crept into the sky with the stealth of a bullsnake stalking a terrified mouse. In the pre-dawn darkness I worked my way into one of my favorite basalt encrusted canyons, to an outcrop that I have come to know well over the years. As the pre-dawn light levels rose, I spotted 3 bucks feeding across from me, about a quarter of a mile down canyon. A couple hundred yards above them were a father/son team, and from his hand gestures and whispered insights I could tell the father was giving his 12 year-old son his introduction to the art of deer hunting. We have a three-point minimum here in Washington, and as near as I could tell in the gray haze of pre-dawn one of these bucks was legal, but the other two were forkhorns. To tell the truth, I was having as much fun watching the father teach his son as I was having watching the bucks. About 20 minutes later, a single well-placed shot from the boy's rifle folded the distant 3-point in his tracks. Patience, persistence and precise shot placement, what an outstanding recipe for a young man's first buck! Opening Day was off to an excellent start!

As they field dressed the buck and started to pack out the front quarters, an average sized mulie doe (about 160 lbs.) and her yearling worked around the nose of the canyon and slipped in quietly below me. I quietly thumbed the hammer back on the S&W 657 Classic Hunter .41 Magnum, and tracked the doe with the black on black sights as she trotted from my right to left. About 50 yards in front of me she sensed danger and skidded to a halt in order to evaluate her new surroundings. The front sight blade settled in behind her shoulder and the .41 Magnum spoke. She launched herself downhill in that lunge so typical of a heart-shot animal, then turned to her left and circled tightly back around to the spot where I shot her and collapsed. She covered no more than 20 yards in her last dash. The 410459 HP entered just behind her left shoulder, about halfway up. It angled forward and down, exiting low in the point of the right shoulder. Expansion was positive. The 410459 HP had shredded the forward third of both lungs and punched through the heart. The bloodshot tissue in the lungs was approximately 6" in diameter. The exit hole inside the off-side ribcage was the size of a quarter. The exit wound in the right shoulder was roughly a .50 caliber hole. In short, the bullet had performed precisely as hoped, expanding smoothly and punching all the way through. Now it was my turn to field dress and pack my animal out of those rocky Snake River canyons. As I was loading the hindquarters into my pack-frame I had a nice chat with the father across the canyon as he packed up his son's second load. He was rightfully proud of his son's performance on his first buck, and I extended my congratulations, as well as my commendation on his teaching skills. It was a fine morning indeed!

The 410459 SWC isn't truly a Keith, and there are several things about it that Elmer just flat didn't like. But Elmer very much liked cast HP's for hunting deer-sized game, and the 410459 HP lives up to his vision quite nicely. At 208 grains it carries adequate weight to punch through deer-sized critters. The long skinny nose makes for an aerodynamic, flat-shooting bullet, and what the 410459 HP lacks in terms of meplat, it makes up for in terms of expansion. I wonder what Elmer would say about the 410459 HP?

- Glen E. Fryxell

Of Knives and Steel

By: Glen E. Fryxell

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The question gets asked all the time, "What's the best steel to make knives out of?". Well, the answer depends on what you want the knife to *do*...

Yeah, yeah, I know, you want the knife to *cut stuff*, but the key is to think about *how* the knife will be used, and what kind of wear and tear that use will put on the blade. For example, a general utility camp knife may have to slice up summer sausage for lunch one minute, and then chop away branches the next so that the tents can be erected; while a survival knife may be called upon for self-defense, and be subjected to violent stabbing and/or slashing maneuvers, and perhaps even be asked to block another blade. A filet knife needs to combine razor sharpness with flexibility in order to filet that tasty salmon you just caught, while a hunting/skinning knife needs to be able to take a fine edge and hold it throughout the entire gutting, skinning, packing and butchering chores, demanding more endurance than other applications. Blade shape is widely recognized as being very important to a knife's function, but it is also important to recognize that alloy and heat treatment are critical to the knife's function as well. Making a survival/combat knife out of a very hard, brittle alloy makes no sense as such blades can shatter readily when struck or stressed. Likewise, it makes little sense to make a hunting/skinning knife out of a softer, tougher steel that would require the successful hunter to stop and re-sharpen his knife every few minutes while field-dressing a game animal. How do the different alloys stack up for knife applications, and to what hardness are they typically heat treated? Let's review what the different components contribute to the final alloy, and then see which alloys are best suited for which jobs.

The most important constituent in steel is obviously iron (chemical symbol Fe). The bulk of all steel alloys is iron and it provides the matrix for all the other components to work, and it also provides the iron for the iron carbide phases that differentiate steel from iron. Next to iron, the most important constituent in steel is carbon (chemical symbol C). When iron ore is processed, it ends up with a significant amount of carbon (about 4%) in it as a result of the processing used to remove some of the other components of the raw ore. This 4% C alloy is used in making cast iron products. There are several iron carbide phases that are made when iron and carbon are mixed. The key phases responsible for the properties of steel are only accessible when the carbon content is below about 2%, so this cast iron alloy cannot be used directly to make steel, it is necessary to get rid of some of the carbon first. Typical steel alloys have somewhere between about 0.1% carbon to as much as 2% carbon. Alloys that have less than 0.5% carbon are called "low carbon steels", and alloys that have more than 0.5% carbon are called "high carbon steels". The amount of carbon in a steel alloy is important because it is the carbon that allows the alloy to be hardened through heat treatment, and more carbon allows for more hardness (up to a point). However, for simple iron/carbon alloys, increasing hardness also means increasing brittleness, and alloys above about 1.2% carbon can be unacceptably brittle for knife applications (depending on the heat treatment protocol used). Toughness is the ability of the blade to withstand stress without failure (brittle fracture, chipping, etc.), and generally speaking a softer alloys will provide better toughness than harder alloys. Overall, as a general statement, knife alloys will have 0.5% to 1.2% carbon in them (there are a few notable exceptions to this).

The next most important element in steel alloys would be chromium (chemical symbol Cr). The main thing that Cr contributes to steel alloys is corrosion resistance. Moderate Cr content of a few percent increases the corrosion resistance of the alloy, but does not make it a true stainless steel (these alloys are called "stain resistant"). For an alloy to be truly stainless it needs to have a Cr content of 13% or more, and the higher the Cr content the greater the corrosion resistance. It is important to recognize that stainless steels can still rust (especially if left in prolonged contact with blood), this corrosion resistance just means that they are less prone to rusting than are carbon tool steels. Cr also contributes to the "hardenability" of the alloy (by forming carbides), as well as its edge durability, but the main reason its added to the mix is to limit rusting.

Nickel (chemical symbol Ni) also contributes to the corrosion resistance of steel alloys, and it's not uncommon to see small amounts of Ni added to a stainless alloy for this reason.

Other metals from the middle of the periodic table of elements, like molybdenum (Mo), vanadium (V), manganese (Mn), and tungsten (W) are also commonly encountered in the steel alloys used to make knives. Like iron, these metals form carbides when mixed with carbon, and like the iron carbides, these metal carbides make the alloy harder. Each behaves a little bit differently and each contributes in it's own unique way, but the bottom line is that all contribute to the overall hardness of the alloy, as well as enhancing wear resistance. It is important to note that these components can increase the hardness of the alloy without necessarily increasing the brittleness of the alloy (particularly Mo). Mo and V are particularly valuable since they also contribute to the edge-holding durability of the knife, as well as the overall toughness of the alloy.

Silicon improves the strength and wear resistance of an alloy, but it is also added because it improves the properties of the steel during the manufacturing process.

So, in summary, carbon is what makes steel - *steel*, and somewhere between about 0.5% and 1.5% carbon makes for good blades (depending on the alloy and the application). 13% (or more) Cr makes a steel stainless, and helps to minimize corrosion issues, as well as helping hardenability. Ni also aids in corrosion resistance. Molybdenum helps to prevent brittleness, increases hardness, toughness and edge retention. Vanadium forms fine-grained carbides and enhances wear resistance, toughness and hardenability. Manganese contributes to hardenability and wear resistance, but also improves the properties of the steel during the manufacturing process (hot rolling etc.). Silicon improves strength and wear resistance, but it's like Mn in that it improves the properties of the steel during the manufacturing process.

So the bottom line is somewhere around 1% C is good for a knife steel, 13% (or more) Cr makes it stainless, Mo and V aid edge retention, and small amounts of other elements like Mn and Si can also be beneficial.

Heat treating a steel alloy allows for the conversion of the various iron carbides formed in these alloys to one specific phase (martensite) that is harder and more desirable than the others. How this heat treatment is carried out depends on which alloy one is working with, and what final hardness one is aiming for. In a nutshell, the steel is heated to a specific temperature (commonly somewhere around 2000 degrees Fahrenheit for the stainless steels, lower for the carbon tool steels), held at that temperature for a certain period of time, and then taken through a very specific cooling process. For knife applications, a final hardness of somewhere in the range of 50-60 on the Rockwell C (Rc) scale is usually targeted. Blades that are hardened to over 60Rc are difficult to sharpen and tend to chip easily. Softer blades tend to be tougher and withstand stress and abuse better, but will generally have poorer edge retention. As with everything in life, compromises must be made, and the deciding factor is what kind of use the knife will be put to.

Tool Steels:

Historically, one of the traditional favorites for making knives is 1095, a simple tools steel that has 0.95% carbon in it, and 0.4% Mn. Knives made of 1095 take an edge very well, but they rust easily and are commonly coated with some sort of rust resistant coating (e.g. phosphate). It is reasonably tough (depending on what hardness it has been tempered to), but for better toughness lower carbon tools steels (e.g. 1060) are generally used. For those who have made knives from files, file steel is commonly 1095. 1095 can be heat treated up to about Rc 66, and then drawn down to the desired hardness. Ka-bar has been using 1095, heat treated to 56-58 Rc, for over half a century.

Simple water-quenching steels like W-1 and W-2 have 0.7-1.5% C, and less than 0.5% each, of Cr, Mn, Mo, Ni, Si tungsten and V, and are very similar to 1095 in terms of hardness, edge-holding and ease of rusting. Likewise, the simple oil quenching alloys like O-1 and O-2 (both of which contain 0.9% C, and 1.2% Mn; O-1 also has 0.5% Cr, 0.5% tungsten, 0.2% V) can also be heat treated up to about Rc 65, and then tempered down to the desired hardness. All of these steels rust easily.

A number of tool steels that were originally developed for more specialized applications have also been used in the knife-makers art. For example, L-6 is a band saw steel alloy that is composed of 0.7% C, 1.25-2.0% Ni, 0.6-1.2% Cr, 0.5% Mo, 0.25-0.8% Mn, 0.5% Si, 0.2-0.3% V. It has a reputation for having a good balance between workability, cost and good working toughness. L-6 can be heat treated to Rc 60, it is very tough and holds an edge very well, but the low Cr/Ni content leaves this alloy with poor corrosion resistance and it rusts easily. 5160H is a similar alloy (0.6% C, 0.6-1.0% Cr, 0.65-1.1% Mn, 0.15-0.35% Si) which can be hardened up to the mid-50s Rc and is respected for its toughness.

Bob Loveless reported that he made some very nice blades out of S5 (composed of 0.60% C, 0.85% Mn, 0.25% Cr, 0.30% Mo, 0.20% V, and 1.90% Si), that had very good toughness and edge holding properties, but that it was an unpredictable alloy that he never figured out -- about 1/3 of the blades would just shatter. Eventually he just walked away from S5; there was just too much frustration.

S7 is a somewhat similar alloy to S5, but with significantly more Cr and Mo, and less Si (S7 has 0.55% C, 0.70% Mn, 3.25% Cr, 1.40% Mo, 0.25% V, and 0.35% Si). S7 is becoming a popular steel for survival and combat knives as a result of its excellent toughness. While the Cr content makes this alloy somewhat rust resistant, S7 will definitely rust, and so these knives are commonly coated with some sort of rust resistant coating.

52100 is a somewhat harder, but nonetheless similar alloy, used to make ball bearings. 52100 is composed of 1.0% C, 1.5% Cr, 0.35% Mn and 0.35% Si. It requires some specialized (and involved) heat treating/quenching procedures, but can be heat treated up to a hardness of 67 Rc, and then drawn down to Rc 56-61, depending on the tempering temperature used. 52100 is well-liked among knife-makers for its toughness. This alloy is popular with certain makers for survival knives as a result of this trait (Swamp Rat Knife Works uses a variation of 52100 they call SR-101). These knives are also commonly coated with some sort of coating to prevent rusting.

Die Steels:

A-2 is a die steel, composed of 1.0% C, 5.25% Cr, 1.1% Mo, 0.6% Mn and 0.25 V, and makes a very good knife steel, with very good edge durability, and excellent toughness. It has some corrosion resistance but is definitely NOT stainless, and will rust. Note the higher carbon content along with more Mo (relative to the tools steels above), this is where A-2's highly regarded edge durability and toughness come from. A-2 can be heat treated up to Rc 64, and then is readily tempered down to a usable hardness of 60 Rc. Several knife makers (like **Bark River**) use A-2.

D-2 is another die steel, highly regarded for its excellent wear resistance. D-2 is almost (but not quite) a stainless steel, composed of 1.55% carbon, 11.5% Cr, 0.9% V, 0.8% Mo, 0.45 Si, and 0.35% Mn. Because of the high Cr content D-2 has good corrosion resistance, but it's not quite rust-proof. D-2 can be heat treated up to a hardness of 64 Rc, and then drawn down to 55 to 61 Rc, depending on the tempering temperature used (brittleness can be a problem if the alloy is left at 62-64 Rc). Bob Dozier is one of the notable knife makers who uses D-2 extensively in his hunting knives and Dozier's knives have an excellent reputation for taking and holding a fine edge (he heat treats them 60-61 Rc). My friend **Jim Taylor** has one of Dozier's knives and tells me that it will keep a fine edge through 3 or 4 deer without any need for re-sharpening.

Stainless steels:

Given the things that a sportsman's knife gets exposed to during routine usage (rain, sweat, blood, etc.) it's no surprise that stainless steels have gotten popular in order to limit corrosion (stainless steels will still rust, just not as easily as carbon steels). In fact, most knives made today are made with some sort of stainless steel. In this discussion, we'll start with the lower carbon classes of stainless and work our way up.

One of the more popular alloys in recent years for mass-produced knives is 420 High Carbon (HC), which is composed of about 0.5% C, 13.5% Cr, and 0.35-0.90% Mn. 420HC is used by a number of commercial knife manufacturers (e.g. **Gerber,** Buck, Kershaw, etc.), and is typically heat treated up to a hardness in the low 50s Rc. Knife manufacturers like this alloy because it's cheap, has excellent corrosion resistance properties, and is easy to grind (i.e. it isn't hard on tooling like some other alloys can be, this is a significant issue when mass producing thousands of blades and trying to keep costs affordable). It's easy to sharpen, and takes a decent edge, but edge retention isn't all that it could be and these blades typically need to be touched up regularly. 420HC makes a decent general purpose utility blade as it's easy to re-sharpen.

A similar alloy that one also finds in mass-produced knives is called 425 Modified, which is composed of about 0.5% C, 13.5% Cr, 1.0% Mo, 0.35% Mn, and 0.35% Si. As you can see from the C and Cr content this alloy is rather like 420HC, with the exception of the added Mo, which should give it somewhat better edge retention.

Swedish steel has been respected knife steel for many years. Sandvik makes a slightly harder, but similar (to 420HC) stainless alloy, called 12C27, that has been widely used in a number Scandinavian knives. 12C27 contains 0.65% C, 13.5% Cr, and 0.35% Mn. Alloys such as this are commonly heat treated to the mid to upper 50s Rc and have excellent toughness. 12C27 has a reputation for being a very "clean" alloy (i.e. consistent composition, with few impurities).

Perhaps the most commonly encountered stainless steel in commercial knife making today is the 440 class of alloys. This class is composed of three different alloys, 440A, 440B and 440C, all of which have very high Cr content (and hence corrosion resistance). 440A is the softest of this series, and is composed of about 0.55% C, 17% Cr, 1.0% Mn, 0.75% Mo, and 1.0% Si. It is used by several knife manufacturers and is commonly heat treated to the mid to upper 50s Rc. 440B is used by Randall to make their stainless knives, and it is composed of about 0.85% C, 17% Cr, 1.00% Mn, 0.75% Mo, 0.75%, and 1.0% Si. The higher carbon content of 440B allows it to be heat treated up to Rc 59-60, if so desired. Of the three 440 alloys, 440C is arguably the best knife steel, both in terms of edge-holding ability and in terms of corrosion resistance. 440C contains about 1.1% C, 18% Cr, 1.0% Mn, and 1.0% Mo. The higher carbon content allows this alloy to be heat treated as high as 61 Rc (typically only taken up to about 58-60), and the very high Cr content gives 440C the best corrosion resistance of any of the typical knife steels. 440C is a very popular knife steel because it is widely available, has excellent corrosion resistance, is fairly easy to grind and takes a good edge. Edge retention is pretty good (although some have criticized 440C for not holding up under hard use).

A similar group of alloys has come over in recent years from Japan. AUS6, AUS8 and AUS10 have been compared (approximately) to 440A, 440B and 440C. AUS6 is the softer of these alloys and contains about 0.6% C, 14%Cr, 1.0% Mn, 1.0% Si, 0.49% Ni, and .25% V (there is also a variation on this alloy called AUS 6A that has 1.2% Mo in place of the V). AUS6 is typically heat treated to the mid 50s Rc, and it should have good toughness. AUS8 has gotten to be very popular lately and is being used by a number of knife manufacturers (Cold Steel, Spyderco, Kershaw, SOG and many others). AUS8 contains 0.75% C, 14% Cr, 1.0% Mn, 1.0% Si, 0.49% Ni, and 0.25%V (there is a variation on this alloy too, called AUS8A that contains 0.95% C, 14% Cr, 1.0% Mn, 1.0% Si, 0.50% Ni, 0.20% Mo, 0.15% V, 0.40% W, which should be harder and have better edge retention). AUS8 is generally heat treated up to 58-59 Rc and will take an excellent edge. Edge retention is good, but not as good as some of the higher grades of stainless (see below). AUS10 is a harder alloy that has been compared to 440C. AUS10 contains 1.10% C, 14% Cr, 0.50% Mn, 0.30% Mo, 0.49% Ni, 0.27% V. AUS10 doesn't seem to be very widely used at the moment (perhaps because it's competing head-to-head with 440C?), but it looks to be an excellent knife steel nonetheless.

In 1972, a new crucible steel was brought to market that was called 154CM. Bob Loveless was one of the first to use it to make knives, and he liked what this steel gave him and he gave it high marks. 154 CM contains 1.0% C, 14% Cr, 4.0% Mo, 0.6% Mn, and 0.25% Si (note the unusually high Mo content of 154CM; Mo is a key component in alloys used for high speed tooling and contributes wear resistance and durability to the alloy). Loveless made knives out of this alloy for many years, and this alloy helped establish Loveless' reputation as a knife maker. 154CM is now widely used by a number of custom knife makers, in top-quality hunting knives. It is generally heat treated up to about Rc 59-60, and will take an outstanding edge. Edge durability is reported to be excellent.

Japan responded to 154CM with an alloy that they called ATS34, intended to capture the same strengths as 154CM. ATS34 contains 1.04% C, 13.9% Cr, 3.55% Mo, 0.4% Mn, 0.28% Si, and is reputed to be a more uniform and "cleaner" alloy than 154CM (once again, note the high Mo content). Many knife makers (both commercial manufacturers and custom knife makers, Bob Loveless included) went over to using ATS34 as their preferred blade steel after it was introduced to the market. Like 154CM, ATS34 can be heat treated to 59-60 Rc, it takes an excellent edge and has excellent edge durability. Top-quality knives (and knife blanks) made from ATS34 are available from many sources.

Recently, a new alloy has come on the scene, one whose properties are sufficiently appealing that it has lured a few of these knife makers (including Loveless) away from ATS34. This new alloy is called BG-42, which is composed of 1.12% C, 14.5% Cr, 4.0% Mo, 1.2% V, 0.5% Mn, 0.3% Si. Note the BG-42 basically has more of everything than does ATS34 -- most notably more carbon, more chromium, more molybdenum and more vanadium (the fine-grained vanadium carbides add another element of durability to the alloy). Given this composition, one might expect it heat treat easily up to Rc 60, to take an excellent edge, and to hold it for a long time, and indeed it does. There aren't that many people using BG-42 at the moment, but I suspect that that will change in the coming years. It is an excellent knife steel.

A similar high carbon stainless that has gotten to be rather popular recently is CPM S30V. This alloy is composed of 1.45% C, 14% Cr, 2.0% Mo, 4.0% V, 0.40% Mn, and 0.40% Si (note the high carbon content, and while the Mo is lower than ATS 34, it is still pretty high, and is made up for by the unusually high vanadium content). S30V is designed to offer an optimum combination of toughness, wear resistance and corrosion resistance. This alloy is processed differently than typical steel alloys, resulting in a finer grain size and a more uniform distribution of the alloying elements, resulting in the greater toughness and wear resistance. S30V was specially formulated to promote the formation of vanadium carbides, which are harder and more effective than chromium carbides in providing wear resistance. S30V is usually heat treated to 58-61 Rc, and is reputed to have better toughness than highly regarded steels like 440C and D2, and is said to have better edge-holding capability than 440C. S30V is a hard, wear-resistant steel used by knife makers like Spyderco, Benchmade, and others.

Conclusions:

So which alloy makes the best knives? Well, that depends on what you want the knife to do. It also depends on what your taste in steel is like. The following discussion is one interpretation of how these alloys are suited for the different tasks that a knife is asked to do. Others might see things a little differently, but this can serve as a useful starting point.

The survival/combat knife needs toughness, and cannot tolerate brittleness, and so those knives tend to be made from alloys with intermediate carbon content (generally 0.6 to 0.8%), and heat treated to more moderate hardness (mid 50s Rc), as this is most conducive to blade toughness. Corrosion resistance is important since one never knows what kind of weather one might be up against (or for how long) in a survival situation, so some sort of corrosion resistant coating (and there are a number of very good ones out there) or stainless alloy are popular options for these knives. Since a corrosion resistant coating can also dull the glare of a polished blade, these are particularly popular in survival/combat knives. Alloys that fit well in this niche include S7, 52100, and 5160. A-2 and 1095 are also highly regarded in this application, in spite of their higher carbon content (tempered down to 56 or so). Toughness is a key concept for knives in this category.

Filet knives have similar needs, but for very different reasons. A filet knife needs to be flexible and does not tolerate brittleness very well, so once again toughness is a key attribute. Carbon content once again tends to be in the intermediate range (0.6% to 0.8%), since more carbon might lead to unacceptable brittleness. Filet knives tend to be heat treated tends in the mid 50s Rc to provide a good compromise between toughness and the ability to take a fine edge (the narrow blade profile on most filet knives makes them easy to re-sharpen quickly, so edge retention isn't generally a concern). Filet knives will get wet repeatedly (as well as bloody) in the course of their duties, so stainless alloys are a real plus here. Sandvik's 12C27 is an excellent fit for this category, as are 440A and AUS6.

The general utility camp knife needs to be sort of "jack of all trades". The blade needs to be moderately hard to be able to take a good edge, but it must also be tough enough to withstand light chopping. This set of demands suggests an alloy with moderately high carbon content (around 0.8 to 1.1%), heat treated to Rc 56-58. A traditional favorite for this application is good ol' 1095 (just make sure to maintain it and don't let it rust), and many folks would tell you that there's no better camp knife than a Kabar. A-2 is also highly regarded in this role. These days, one tends to see more stainless alloys in this application, and 440C makes a very useful camp knife, as does AUS8. S30V would also make a dandy camp knife.

A hunting/skinning knife needs to take a fine edge and hold it throughout the gutting/skinning/butchering chores. Blade hardness and edge durability are the key parameters here, so high carbon content (preferably over 1%) is called for, and high molybdenum content (2% or more) helps to hold the edge (and added vanadium is also a plus). Blood is three times as salty as seawater and can corrode knife steel very rapidly, so corrosion resistance is particularly valuable for a hunting/skinning knife, making high chromium stainless alloys are very useful here (and added Ni doesn't hurt any). These knives are generally heat treated up to about 60 Rc. Alloys that are particularly well suited to this application include S30V, 154CM, ATS34, and BG-42.

So which steel alloy is best for making knives? You tell me -- what do you want the knife to do?

- Glen E. Fryxell

The Three Dollar Bill

By: Glen E. Fryxell
Photography by Glen E. Fryxell

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Back in the late 1950s and early 1960s Elmer Keith and Bill Jordan were petitioning the American arms community to produce guns and ammunition for a service revolver, roughly .40 or .41 caliber, which was capable of shooting a 180-200 grain bullet at about 1100 fps. Something that offered more thump than the pedestrian .38 Special, and gave better penetration than did the .357 Magnum. The .44 Magnum had just made its bawdy appearance, and the factories had given Mr. Keith even more than he had asked for. The resulting 240 grain bullet at almost 1500 fps generated unprecedented recoil, so recovery was slow and follow-up shots were difficult for most law enforcement officers. Keith and Jordan were asking for moderation -- sufficient bullet weight, diameter and velocity to be effective for law enforcement applications, but not so much power that recoil made mastery of the weapon difficult.

One might ask, “What about the .38-40?”

Well, that’s pretty much what Keith and Jordan were looking to emulate, except without the thin, bottle-necked, balloon-head brass and sloppy chamber tolerances of the older guns. (Keep in mind that this was the early 1960s and the .38-40 was pretty much dead in the water, it wasn‘t revived until Cowboy Action Shooting came along 3 decades later). What they wanted was a new cartridge that embodied a straight, solid-head case, holding a .40 caliber bullet, that operated at moderate pressure and launched a 180-200 grain bullet at 1100 fps. What they got was the .41 Magnum, with a 210 grain bullet at 1400+ fps. Once again, the factories delivered far more than was asked for. The .41 Magnum went on to prove itself a fine hunting cartridge, but recoil recovery continued to be a problem for law enforcement applications. A mid-range load for the .41 Magnum was offered in an attempt to address this need, but it failed to catch on.

Double-action revolvers are best served by straight-cased, rimmed cartridges. Single-action revolvers can handle rimless cartridges with ease, but double-action revolvers are generally favored over single action revolvers by law enforcement and military as a result of their faster reload times and the option of shooting double-action. During the first World War, we had large quantities of .45 ACP ammo, but the factories were at capacity in terms of 1911 production, and capacity was not keeping up with wartime demand. The solution was to modify the large frame S&W and Colt double-action revolvers to accept the .45 ACP round using half-moon (3-round) and full-moon (6-round) clips. Thus was born the Model 1917, a birth of immediacy and need.

OK, now let’s fast-forward to the 1980s -- a variety of new shooting games emerged during the last quarter of the 20th century, one of which was bowling pin shooting. Large caliber revolvers were favored since bullet momentum was critical to sweep the eccentrically balanced bowling pin off the table. Competitors found that the Model 1917 provided adequate power with modest enough recoil that shooters were able to shoot fast and hit the pins hard, and the 1917 had the advantage that it came with its own built in speed-loader! The fit and popularity of the gun to the game were so good that S&W released several special editions of the Model 625 in the late 1980s, aimed specifically at this form of competition.

Also during this time frame, Jeff Cooper was championing the 10mm cartridge and the ill-fated Bren-Ten with which to shoot it. In a sense, Cooper was trying to fill the same void that Keith and Jordan had called to the world's attention two decades earlier, it's just that Cooper, a devout advocate of the Colt 1911, wasn't promoting a service revolver, he wanted to house this new cartridge in a semi-auto. Those who shot the gun sung the praises of both the cartridge and the gun, but there were problems with production and the Bren-Ten died an ignoble death.

The timing of the 3" 610 (1999) was such that it was made before S&W added the lock.

S&W was in a randy sort of mindset during this period, and they were introducing new models left and right. With the popularity of bowling pin shooting, and all the hype surrounding the Bren-Ten and the 10mm, why not take the concepts introduced with the Model 1917 and apply them to the new 10mm cartridge? Their N-frame was certainly up to the task, and if they put a full-lugged barrel on the new revolver (which had just proven to be fantastically popular on their .44 Magnum Classic Hunter) they could tame recoil and make the gun that much more attractive to bowling pin competitors. So in 1990 S&W introduced the Model 610 with a production run of 5000 with either a 5" or 6 1/2" barrel. S&W was afforded a subtle, but very real, luxury with the 10mm -- this was a brand new cartridge, that had no old weak guns with sloppy tolerances that it might get loaded into, and they had a clean slate to start with in terms of design tolerances. The design engineers and production personnel at S&W did not disappoint; chamber dimensions were snug and throat diameter was half a thousandth over nominal bullet diameter, and groove diameter matched bullet diameter quite nicely. Upon its release, the Model 610 was universally reported as being among the most accurate revolvers that S&W had ever produced, and that is a bold statement indeed! That being said, the revolver was received with a collective yawn, and sales figures lagged. It was quietly dropped from the catalog a year later.

Things were looking shaky for the 10mm cartridge with the Bren-Ten effort faltering, the early Delta Elites from Colt being reported to suffer from stress cracking in the slide, and the S&W 610 being dropped from production. In addition, the FBI's experience with the 9mm in the Dade County shoot-out led them to re-evaluate their use of the 9mm and decide to shift gears to a larger caliber, but they decided that the 10mm kicked too much for rapid recoil recovery, so they wanted it loaded down. They knew from past experience with the .45 ACP that recoil recovery was not a problem with 185 grain bullets at about 950 fps, so that's what they aimed for, and amazingly that's exactly what S&W delivered with their brand spankin' new .40 S&W (if they knew a .45 with a 185 wasn't a problem, why didn't they just go with a .45 loaded with 185s?). The 10mm was losing ground.

A selection of cartridges loaded with **Lyman** Devastator cast hollow points. The 10mm cartridge is very well served by cast HPs (in this case, the 401638 HP). My favorite powders for loading the 10mm are HS-7 and AA #7. When loaded on top of 11.5 grains of HS-7, this 152 grain HP delivers 1220 fps from the 3" S&W 610 (1300 fps from the 4" and 1375 from a 6.5"). Expansion on vermin (ground squirrels) is both rapid and explosive.

One of the other fashion trends of the 1980s was that of the "Wonder-Nines", in which competing firms tried to vie for the consumers' dollars by seeing who could cram the most 9mm cartridges into a double stack magazine. One of the clear innovators on this front was a previously little known (here in America anyway) Austrian company, who pioneered the use of polymer grip frames. The Glock Model 17 held 17 rounds of 9mm Parabellum ammo and had several safety innovations, including a unique trigger mechanism designed to prevent accidental discharges. The Glock was immediately controversial because of its plastic grip frame, and to this day shooters either love its blocky profile or loathe it, there seems to be little middle ground when it comes to the Glock.

While the 9mm was an obvious choice for NATO applications, Americans typically want more power, and the 10mm was specifically designed to provide optimum power for semi-autos. Glock had seen the same market opportunities that S&W had seen. In 1990-91 the Glock Model 20 was unveiled here in the states, complete with its 15-round capacity of 10mm ammo. While the 610's sales lagged, the Model 20's sales figures remained steady. When the 610 was quietly dropped from production, the Model 20 stayed on.

After sitting back and watching the solid sales of the Glock Model 20 over the course of the 1990s, S&W decided to test the waters again. Newer production facilities, complete with CNC controlled machinery, meant that smaller batches of guns could be made more easily and with less financial risk. In the spring of 1998, S&W released the 610 Classic Hunter, a 6 ½" version, similar (but not identical) to the original. These newer 610 were just as accurate as the originals. Handgun hunters had another very accurate choice for deer and antelope sized game.

About a year or so later, S&W followed this with a production run of 300 three inch round-butt 610s. These guns sat on distributors shelves for years. It seemed that not even S&W collectors were buying these limited edition guns! Why? Well, in many ways this little revolver amounted to the three dollar bill of the handgun world. Full-moon clips for rimless cartridges were designed as a wartime expediency, but the 10mm is not, and never has been the United States' official sidearm cartridge. The original S&W 610 enjoyed some modest popularity as a bowling pin gun, but who is going to shoot bowling pin competition with a 3" revolver? Law enforcement has almost universally gone over to semi-autos, and while the 10mm cartridge has a modest following within the law enforcement community, there is little interest in a sixgun chambered for the round.

Author is also very fond of his 4" 610 (with key lock).

So does this little half-breed bastard-child that nobody wants have any place to call home? Well, I would argue that it does. My fondness for 3” round-butt S&W revolvers is no secret, so I’ll confess right up front that I’m biased. But then again, it wouldn't surprise me if anybody reading this on Gunblast.com might be just as biased in favor of revolvers over semi-autos, or maybe lever-guns in preference to bolt guns, or perhaps for traditional rimmed cartridges over belted magnums. We all have our personal tastes. So, allow me my foibles and I won’t kick dust on yours. So where does the 3” 610 fit in? I’ll tell you where, ballistically speaking this gun is exactly what Elmer Keith and Bill Jordan were asking the American arms community to make back in the early 1960s. This revolver delivers 200 grain bullets at 1100 fps, is easily carried all day long, and capable of exceptional accuracy. Recoil is modest and follow-up shots are quick and on target. Now I believe that Keith and Jordan would have looked at the rimless case and full-moon clips and said that they were thinking in terms of a longer, rimmed cartridge, and one that operated at somewhat lower pressures. But the point remains that what this gun delivers -- the bullet diameter, bullet weight, velocity, recoil level and accuracy, all wrapped up in the smoothness and reliability of the S&W N-frame -- are exactly what those two grand old gentlemen were asking for. So where does it fit in, now that we live in a world obsessed with semi-autos? It teaches me once again, each time I take it out plinking, how much those two gentlemen really knew, it gives me the satisfaction of actually shooting what they were championing, and it reaffirms that modern revolver manufacturers really can make a production revolver to tighter tolerances than the commonly encountered minute of tin can we’re so used to seeing. That’s where.

That’s reason enough for me.

- Glen E. Fryxell