45-70 U.S Government

History

Few cartridges have retained such long lived popularity as the .45-70 U.S Government. The .45-70 started life as a military cartridge and now, 135 years later remains an ever popular hunting cartridge.

From about 1836 arms designers of the world experimented with breech loading firearms and self-contained cartridges. Although many inventors arrived at successful designs, the muzzle loading percussion rifle reigned supreme throughout the world until the early 1860's. When civil war broke out in North America during 1861, soldiers of both armies adopted muzzle loading rifles. As both the United States and the Confederacy were ill prepared for such a war, soldiers utilized whatever rifles came to hand and well over a dozen brands of rifle found their way into battle. Interestingly, most of these rifles were .58 caliber, a popular bore diameter at that time.

Of the many advantages that the United States of the North had over the South, one great advantage was superior wealth. At the beginning of the war, the U.S army was able to afford the Springfield .58 caliber muzzle loading rifle firing the Springfield minie ball projectile, a conical bullet which was far superior in accuracy and range to the round ball of the day. By 1863 the greater financial strength of the North also enabled units of their Union Army to adopt the new Spencer .44 rimfire caliber 7 shot repeating rifle. The adoption of this rifle, even in limited quantities has been cited numerous times as being paramount in the defeat of the south. Also at this time the Henry Rifle Company produced repeating rifles in .44 rimfire caliber; some were purchased by soldiers of the North but only a few were adopted by the U.S Army itself.

When the war ended in 1865 the U.S military continued to seek improvements to the infantry and cavalry rifle but with an exhausted budget. The following year, in 1866, the U.S Army adopted the Springfield breech loading single shot rifle chambered for the .50-70 cartridge. The new rifle involved recalling and refurbishing Springfield muzzle loaders which were converted to breech load design. This move confused more than a few soldiers who had come to respect the effectiveness of repeating rifles. Winchester had in the same year (1866) designed a slick .44 rimfire repeater but the army had

already decided that repeaters were economically wasteful.

In 1873 the U.S army once again upgraded its rifle and cartridge design. The 1873 Springfield rifle saw minor improvements over the 1868 factory new breech loader. At this time, a new cartridge was adopted, the .45-70 U.S Government. The .45-70 fired a .45 caliber 405 grain projectile over 70 grains of black powder for a muzzle velocity of roughly 1200fps. The official military designation of the new cartridge was the .45-70-405. Caliber was .458" (11.6mm) and rifling consisted of 1 turn in 20". The M1873 Springfield rifle, dubbed "the Trap Door" had to be capable of producing a 4" group at 100 yards for military service. The rifle was generally considered as being effective to about 300 yards but was also used in volley fire out to 600 yards. A later and more ballistically efficient load was adopted in 1879, designated the .45-70-500 (500 grain bullet).

While the .45-70 was a very effective cartridge when it arrived at its target many soldiers still yearned for repeating rifles. In the same year that the .45-70 had been introduced, Winchester had put forwards their new 1873 lever action rifle in .44-40 for military evaluation. Although the Winchester was rejected for its wasteful use of ammunition, many soldiers used their own wages to obtain Winchester 73 rifles regardless of protocol.

Problems with the Springfield .45-70 caliber rifle were compounded dramatically during the Spanish American war of 1898. The U.S had by this time adopted the Krag Jorgenson .30-40 caliber rifle (1892) but not in great numbers. With a great many soldiers still armed with the Springfield .45-70 caliber rifle, these men had a horrendous task of facing an enemy armed with 7x57 caliber Mauser bolt action repeating rifles. This war was the final chapter in the history of the .45-70 as a military cartridge. The .45-70 was completely phased out following the end of the Spanish American war and as finances allowed, replaced by the .30-40 Krag which was in turn replaced by the .30-03 Springfield in 1903.

As a hunting cartridge the .45-70 was well received, without complaint of either the cartridge or breech loading single shot rifles. The Commercial designation of the cartridge was .45 Government but later came to be known as the .45-70 U.S

Government, more recently abbreviated as either the .45-70 Government or simply the .45-70Govt.

The .45-70 was enjoyed for both its adequate power for all North American game producing consistent, predictable performance, a true all-rounder. By the 1880's through 90's the .45-70 was perhaps the most popular big game cartridge in the U.S. When Smokeless powder high velocity sporting cartridges arrived in the 1890's, the first to rival the popularity of the .45-70 was the .30-30 Winchester. While doing research cartridge designers discovered that a high velocity small caliber projectile was capable of producing a large, disproportionate to caliber wound and indeed, wound channels created by a small .30 caliber bullet could exceed the diameter of those produced by the large, slow moving .45 caliber (.458") projectiles. Nevertheless, in the early stages of their development small caliber projectiles had many flaws. On medium game, if the small bore bullet was made too soft it could explode on impact and fail to give adequate penetration when needed, if too hard it would pencil through game without creating a wide, fast bleeding, fast killing wound. Along with this, few designers had much knowledge of the effectiveness of small bores on large heavy animals.

In contrast, the .45-70 was consistent in its manner of killing medium game. Kills may have been slow from time to time but as long as shot placement was reasonable, bleeding was fast and kills were clean. The .45-70 always created a wide diameter wound and always gave deep penetration. On large game the .30-30 was adopted to some extent but was never as reliable as the slow moving heavy weight .45-70 projectile. When Winchester released their 1886 repeater in .45-70 hunters had even more firepower at their disposal. Marlin followed by releasing their lever action repeater in the models M1891 and the M1895 which stayed in production until the U.S entered the first world war in 1917.

While many hunters staunchly defended the .45-70 into the 20th century, the next generation of hunters favored high velocity, often for the practical implications of a flatter trajectory. In 1935 Winchester discontinued its production of the 1886 rifle in .45-70 and as most of the previous generation of hunters had gone into retirement it seemed that the .45-70 might disappear into history altogether. For many years the .45-70 survived as a hobby cartridge of black powder enthusiasts. The .45-70 was finally

revived in 1972 when Marlin adopted it as a chambering for their new model 1895 lever action rifle. Since then, the .45-70 has retained a small but staunch following, particularly in the U.S, Australia and New Zealand. Today, the Marlin M1895 rifle is still one of the simplest and most cost effective ways of obtaining a big bore rifle for use on larger animals.

Performance

The .45-70 is generally divided into three levels of performance, each governed by the strength of rifle actions used. The “trapdoor Springfield’s" and early lever actions being the weakest. Modern replicas are also included in this bracket. To prevent litigation all factory ammunition is loaded to low pressures. To some extent this precaution has limited the popularity of the .45-70 but as many weak arms are still in circulation low pressure factory ammunition is a necessity. Hand loaders are advised to develop low pressure loads for safe operation in these arms. Maximum pressures are usually quoted as either 28,000CUP or 28,000PSI (similar correlation). A typical factory load within this pressure consists of a 300 grain bullet driven at 1800fps (24” barrel).

The second level of performance comes with the use of high pressure hand loads in post 1972 Marlin M1895 rifles. Reloading guides suggest maximum pressures of 40,000CUP or 45,000PSI. The modern Marlin rifle is a very robust; the .444 cartridge can easily be loaded to 47,000PSI without stress to the firearm. As hand loaders have no access to pressure testing equipment, fired brass is the most useful tool in estimating maximum pressures. The reloader’s brass is the weakest link in the firearm and once primer pockets begin to expand or extraction becomes difficult, the hand loader has moved beyond the maximum practical working pressure of the rifle. A typical hand load within 45,000PSI consists of a 300 grain bullet driven at 2400fps.

The third and highest obtainable pressures are derived from the use of the Ruger No.1 single shot rifle as well as various custom built bolt actions. Reloading guides suggest maximum pressures of 50,000CUP or 60,000PSI. A typical load consists of a 300 grain bullet at 2530fps. While 130fps is in itself a negligible difference between bolt actions and the Marlin rifle, it is probably debatable whether the velocity gap within individual rifles is actually this big. As previously stated, the Marlin is a very well made, robust

arm. The three levels of power could in fact quite easily be divided into two - low velocity and high velocity

Loaded with the a fast expanding bullet the .45-70 has the potential to produce hydrostatic shock down to impact velocities of around 2100fps. Having said this, I have on several occasions witnessed nervous trauma at impact velocities as low as 1700fps. It is my belief that these low speed reactions occur due to a combination of appropriate bullet weight (300 grains), appropriate bullet construction (hollow points) and low sectional densities, the result is a massive energy dump on light to medium weight game species. Readers are however urged to not become expectant of or reliant on hydrostatic shock as this phenomenon is unpredictable. The .45-70 is capable of producing broad disproportionate to caliber wounding at close to moderate ranges due to excellent hydraulic action and mechanical forces (particularly when using weight shedding bullets). Penetration on raking shots is not the greatest at impact velocities of between 2500fps and 2000fps however wounds from tail on shots are usually severe enough to anchor game without risk of a wounded animal escaping to die slowly. At 2000fps and below, penetration becomes quite outstanding providing suitable projectiles are used.

Like the .44 caliber the .45's (.452 - .458") are capable of producing extremely large, fast bleeding (killing) wounds on medium game down to impact velocities of around and below 1700fps.

Between the velocities 1700fps and 1500fps, medium game struck with soft fast expanding projectiles tend to react in a drunken manner. Dense animals such as wild pigs tend to soak up so much energy that they are unable to travel far, if at all from the point of the shot. Leaner animals will sometimes drop instantly; try to regain their footing only to fall over again after traveling less than a few yards. In such cases, the hunter is able to witness the lowest end of nervous trauma. In most cases wounding is still quite severe, almost identical to the .308Win with 150 grain soft points at 2400 to 2600fps and is now more proportionate to the expanded caliber. Nevertheless, wounds are typically broad and fast bleeding. Penetration at these velocities is outstanding.

Below 1500fps .45-70 wounds are proportionate to expanded caliber and game may

show no sign of being hit. Shot placement now becomes much more critical and shots that break shoulder bones or destroy the autonomic plexus produce the fastest kills, often within 25 yards. Animals with a high flight response such as deer, if struck in the rear lungs, may run anywhere from 50 to 100 yards or more. In dense brush even though exit wounds may be wider than .5", blood trails from rear lung shots can be difficult to follow. In the first 25 yards blood trails may consist of the tiniest droplets, the trail becoming swarthier as the animal finally slows down and expires.

Stout bullets loaded in the .45-70, regardless of velocity, may fail to produce any form of nervous trauma on light or lean medium game. Shot placement on medium game is critical for fast on the spot killing and rear lung shots will allow animals to travel up to 50 yards or more, even though wounding may be severe. As velocity falls below 2100fps, medium game may be able to escape even further.

On larger animals such as Elk, stout jacketed soft point bullets may produce nervous trauma below 2100fps but again hunters should not place reliance on such unpredictable effects. The .45-70 is especially well suited to animals of this size, and does well when loaded with 350 to 400 grain hand loads in modern arms.

On large bodied game such as moose the .45-70 does its best work when loaded with 400 grain bullets. Unfortunately the .45-70 can not produce a hydrostatic shock on game animals of this size. Without nervous trauma kills may be clean but tend to be slightly delayed.

The .45-70 is not ideally suited to large dangerous game, especially in the hands of less experienced hunters. A major limiting factor of the .45-70 for use on heavy dangerous game is that slow kills can allow animals enough time when hit, to attack the hunter before expiring. This does not mean to say that the .45-70 is not a clean killer of large dangerous game but simply that there are far more effective dangerous game cartridges which offer hunters faster kills without risk of having to take follow up shots on charging animals. Those who wish to use the 45-70 on heavy game have two options. The first is to use an expanding bullet designed for the .458 Winchester. The second option is to use a Keith style hard cast non expanding bullet. In both instances wounds through heavy tissue are generally four times the diameter of the bullet down

to impact velocities of 1700fps. Below this speed and in the absence of expansion of either bullet design wounds become proportionate to caliber.

Factory ammunition

As previously stated, all .45-70 ammunition produced by major U.S manufacturers is loaded to very safe pressures for use in antique arms. Remington, Winchester and Federal each produce 300 grain Jacketed hollow point loads which deliver between 1650fps and 1750fps in 22 to 24" sporting barrels. In the stubby 18.5" barreled Marlin Guide gun velocities tend to average around 1600fps. All three of these loads give similar performance and are intended for medium sized game. At very close ranges, these loads may cause hydrostatic shock, at around 50 yards animals often react in a drunken manner and soon collapse while at ranges beyond 50 yards kills can be delayed. Although each of the loads is designed for maximum expansion with little regard to penetration, all three give quite good results on tougher animals such as boar at close ranges and from all angles.

For larger animals, particularly Elk and Moose, Remington offer a 405 grain Jacketed soft point bullet at a very mild 1330fps which generally produces between 100 and 1200fps depending on barrel length. The low velocity of this load ensures very deep penetration but accordingly, kills can be very slow. For a faster killing load, Winchester offers the 300 grain Partition Gold, with velocities duplicating its conventional 300 grain counterpart. The 300 grain Partition Gold is a pricier premium bullet, capable of much wider wounding than the 405 grain Remington. That said, the Partition Gold does not have the Sectional density or low velocity to out penetrate the 405 grain bullet and penetration is ultimately much the same. Nevertheless, of the two, the Partition is a faster killing bullet and a fine option for those who do not hand load, wanting the best combination of broad wounding versus adequate penetration.

The most recent addition to the .45-70 factory ammunition line up is Hornady's 325 grain FTX Leverevolution. Rather than a flat point, the Hornady bullet features a pointed bullet with a rubber tip to prevent detonation when loaded into tube loading magazines. Hornady advertise a very hot velocity of 2050fps for their FTX load from a 24" test barrel. In 24" sporting length barrels velocities average 1820fps (still good for

factory ammunition), around 1750fps in 22” sporters and 1650fps in the Guide Gun.

Unfortunately, although the FTX bullet is advertised as having a flat trajectory because of its pointed design its BC’s are simply no higher than other round nose .45-70 designs. The result is that this bullet offers nothing over traditional 300 grain factory offerings and the FTX tends to be identical in both wounding, speed of killing and penetration.

Hand Loading

As stated, reloading manuals generally split reloading data for the .45-70 into three categories, Trapdoor Springfield, modern lever action and Ruger No.1 or Bolt action custom rifles. The most versatile powders are those in the H4198, IMR4198 and ADI2207 range however some hand loaders also find good results with slightly slower H322.

Comfortable velocities for 24 to 30” barreled Trapdoor rifles and replicas include 1800fps with 300 grain bullets, 1600fps with 350 grain bullets, 1400fps with 400 grain bullets and 1100fps with 500 grain bullets. That said, some hand loaders have safely worked up loads 200fps higher than those listed here. The key to developing higher velocity loads for older arms is to use slower burning powders including IMR4064 and Varget as well as careful inspection of brass after firing and as always, a chronograph is very useful. The slower powders are quite capable of delivering high velocity without powder compression. In modern rifles powder compression occurs with IMR 4064 and Varget, well before maximum velocities and pressures are reached.

In Modern lever action rifles safe working velocities for 24” barrels include 2400fps with 300 grain bullets, 2200fps with 350 grain bullets, 2000fps with 400 grain bullets and 1700fps with 500 grain bullets. Although factory ammunition loses little velocity in shorter barrels, top hand loads lose around 25fps per inch of barrel removed due to the higher charges of powder. This equates to a loss of around 137fps in the 18.5” Marlin Guide Gun as opposed to full length 24” barrels. To obtain maximum velocities in short barrels hand loaders may wish to experiment with magnum primers to alter powder burning rates.

While some Marlin owners tend to view full power loads as over kill, the benefits of high pressure loads in lever actions are outstanding. The greatest difference between Trapdoor loads and full power lever loads is that the lever loads are capable of producing fast emphatic kills on medium game out to 200 yards along with a usable trajectory out to this range. As an example, the 300 grain Hornady or Sierra sighted roughly 2.5” high at 100 yards will strike around 2.5” low at 200 yards at which range velocity is still above 1600fps. In contrast, the same bullet loaded to a mild 2000fps and sighted in 2.5” high at 100 yards strikes 6.5” low at 200 yards while velocity for fast killing falls below 1600 at just over 100 yards.

The down side of full pressure loads is of course the heftier recoil and closer attention required towards matching bullets to game to avoid poor penetration. Nevertheless, full power loads are very effective. Ultimately, hand loaders should view PSI and CUP ratings as irrelevant as few hand loaders actually have the means to test their rifles accordingly. Instead, as always, brass is the reloader's key to studying pressure. Users may in fact be surprised when after carefully working up loads to find just how well their brass handles Hodgdon maximum listed loads with seemingly endless case life. Along with this, the Marlin action is very good at showing the hand loader where to stop as extraction becomes sticky and easy to ‘feel’ with unsuitable loads. Please note, hand loaders who are seriously interested in investigating pressures may wish to obtain and employ the Pressuretrace strain gauge manufactured by shootingsoftware.com.

For the Ruger N0.1 and custom bolt actions, from 24” barrels safe working velocities include 2500fps with 300 grain bullets, 2300fps with 350 grain bullets, 2100fps with 400 grain bullets and 1800fps with 500 grain bullets. Case life seems endless at these velocities whether using Winchester or Remington Brass. Some rifles may handle velocities higher than those listed here, however, cartridges such as the .458 Lott offer much more flexibility for those wanting the highest possible velocities from the .458” bore.

As a bulk buy bullet the 405 grain Remington soft point projectile has for a long time been popular for its low cost versus excellent killing performance. Loaded to lower velocities this bullet gives relatively deep penetration and broad wounding. At high velocities the 405 grain Remington is, like the 400 grain Speer, a fast and emphatic killer

producing very wide wounding. Because this bullet is designed primarily for Remington factory loaded ammunition at true velocities of 1100fps to 1200fps, excessive weight loss and jacket core separation occur at high impact velocities when used on large bodied game. In essence, the 405 grain Remington is an economical bullet for use on medium game.

For light bodied game Hornady offer a 300 grain jacketed hollow point bullet, giving very fast, vivid expansion. At impact velocities of above 2100fps this projectile is very forgiving with shot placement and game struck in the rearmost ribs often go down immediately. Penetration of the Hornady at impact velocities of above 2100fps is not ideal for tail on shots but wounding is so severe as to anchor light to medium weight game immediately. However, in these circumstances the Hornady maintains its integrity with retained weights of between 200 and 210 grains. In high pressure loads the 300 grain bullet is best suited to game weighing under 180lb (80kg) and up to a maximum of around 220lb (100kg). At lower velocities this bullet is quite suitable for game weighing between 330 and 400lb (150 to 180kg), again with respect to the superior integrity of the Hornady.

In the .45-70 the 350 grain bullet weight provides a great balance of high velocity for fast killing, optimum trajectory plus adequate weight and sectional density for use on medium weight game. Hornady offer the 350 grain round nose Interlock and flat point Interlock Bullets. The 350 grain RN Hornady Interlock was originally designed as a fast expanding medium game load for the .458 Winchester. Although various authorities suggest that round nosed bullets should not be used in tube magazines and insist on the use of flat point bullets, the 350 grain round nose Interlock has very soft lead. Even if an empty primed .45-70 case is placed in a vice and the 350 grain Interlock is held against the primer and struck with a hammer, the soft nose of the Interlock does not ignite the primer. This bullet has very large scores in the jacket to promote rapid but uniform controlled mushrooming. The 350 grain round nose Interlock produces deeper penetration than its 300 grain counterparts but is just as good at producing fast kills down to impact velocities of 1600fps. For those wanting an all round load for light through to Elk sized game of up to 700lb (320kg), the 350 grain round nose Interlock is a good performer.

The 350 grain FP Interlock is a relatively new bullet, designed specifically for the .450 Marlin cartridge in order to ensure safe operation in the tube magazine of the Marlin rifle. Like the round nose this is a good all round performer, the only real difference being the omission of scores in the jacket which help the round nose to shed energy and eventually frontal area in a controlled manner.

The Hornady FTX 325 grain bullet is now available as a hand loading component. The FTX is very effective when hand loaded to modern rifle velocities. The FTX is an incredibly spectacular medium game killer, producing very dramatic wounds several inches in diameter. Unfortunately though, the increase in velocity takes the FTX bullet outside of its design parameters and penetration is only mild and as such, should never be used on large animals.

Sierra offer a 300 grain jacketed hollow point bullet. The performance of this bullet is almost identical to that of the 300 grain Hornady. The most notable difference between the Sierra and Interlock is that on tail on shots at high impact velocities the Sierra expands then gradually disintegrates until it has a retained weight of 65 to 70 grains, very light indeed! Nevertheless, like the Hornady 300 grain projectile, at impact velocities of above 2100fps, Sierra bullets are very forgiving with shot placement and when striking the rearmost ribs will generally cause game to go down immediately. Velocities of above 2100fps are not ideal for tail on shots with this bullet but; like the Hornady 300 grain bullet, wounding is so severe as to anchor game immediately. As a high pressure load this bullet is best suited to game weighing less than 180lb (80kg) up to a maximum of around 220lb (100kg). At lower velocities the Sierra 300 grain HP bullet is suitable for game weighing between 330 and 400lb (150 to 180kg). This is the only projectile Sierra produce for the .45-70.

The 350 grain Speer Mag-Tip SP, like the Hornady RN was designed primarily for the .458 Win Mag. The Mag-Tip's flat nose profile enables it to be used in tube magazine rifles. This bullet is much tougher than the 350 grain Hornady bullets. On medium game, unless shot placement is exact, the Mag-Tip generally fails to produce hydrostatic shock or any sign of a hit for that matter. Game struck with the Mag-tip at impact velocities of up to 2300fps usually run at least 50 yards before showing any signs of succumbing to blood loss. In the .45-70 the 350 grain Mag-Tip is primarily designed

for Elk, on which it meets much more resistance which may promote hydrostatic shock. One interesting factor is that at impact velocities of above 2000fps both the Interlock and Mag-tip often produce identical penetration on tail on shots. A dramatic change occurs just below 2000fps at which point the Speer retains around 325 grains weight along with most of its shank. On Elk this bullet is quite capable of penetrating vitals with tail on shots at impact velocities below 2000fps. From a muzzle velocity of 2300fps this equates to a range of 75 yards.

The 400 grain Speer flat point is a very soft, fast expanding, fast killing bullet. This bullet is just as soft and fast expanding as the 350 grain Hornady projectiles but does not suffer jacket core separation on Moose sized game. One interesting aspect of the 400 grain Speer design is that it has the widest flat meplat of all mass produced designs which may well be the reason for its excellent killing. Major differences between the 350 grain Hornady round nose and the Speer are that the Hornady remains above 1600fps for fast killing out to 210 yards as opposed to 150 yards for the Speer. The Hornady also has a slightly flatter trajectory, however the Speer gives slightly deeper penetration, ideal for raking shots on large medium game. On Moose sized game penetration and expansion are quite outstanding for such an economical projectile. This certainly is not a projectile for tail on shots but does handle quartering shots with ease.

Speer also offer the 300 grain Uni-Cor, this is a tough, light weight premium bullet. The Speer Uni-Cor is essentially a core bonded design and for all practical purposes can be considered the same bullet as the Gold Dot. Unfortunately the 300 grain Uni-Cor has only a dimple rather than a full hollow point and is closer in performance to a hard cast bullet rather than a fast expanding, wide wounding projectile, making it a little too stout to display hydrostatic shock on lean animals. Readers are advised to experiment with deepening the Uni-Cor hollow point to find optimum results on local game.

The 300 grain Nosler Partition is the broadest wounding, fastest killing premium bullet available to hand loaders. In recent years this projectile has developed a small but staunch following among .45-70 users. The 300 grain Nosler features a soft nose, rather than the hollow nose found on the Hornady and Sierra. While sectional density is very low this projectile is quite reliable in comparison to other low SD Partition bullets. That said, at all velocity parameters the 300 grain Partition PP is best utilized on medium

game and perhaps up to game no larger than Elk as its low SD does limit penetration on heavily raking shots.

For large animals the 400 grain Swift A-Frame flat point is a tough bullet. Penetration is very similar to the 300 grain Barnes TSX regardless of the extra bullet weight carried by the Swift, both being ideal for Elk and adequate for Moose and Brown Bear. Neither projectile can match the penetration of a hard cast solid but both create much wider wounds. Like the Barnes, this bullet is too stout to expect hydrostatic shock on light or lean animals and should be reserved for dedicated big game hunting.

Barnes 'Original' brand bullets include a 300 grain flat nose soft point, a 300 grain pointed bullet for single shot pistols, a 400 grain flat nose soft point and a 400 grain pointed single shot pistol projectile. Unfortunately I have not had the opportunity to test these bullet designs.

Barnes homogenous copper bullets include the 250 and 300 grain TSX hollow points. These bullets do not shed weight and are therefore very much reliant on bullet expansion and hydraulic force (speed) to promote disproportionate to expanded caliber wounds. Fortunately the 250 grain TSX can be driven at 2500fps in the Marlin and up to and above 2600fps in the Ruger No.1. Both the 250 and 300 grain TSX produce broad wounds down to impact velocities of around 1700fps. The 250 grain TSX is an adequate medium game bullet while the 300 grain Barnes TSX does its best work on game weighing between 200 and 400kg (440 to 880lb) but is adequate for game weighing up to 600kg (1320lb). Readers please note- as of 2020, I cannot promote the use of Barnes bullets due to what appears to be a reduction in quality control. Unfortunately, I have been unable to determine whether this is due to changes in manufacturing processes or due to a drop in material quality as a result of increased copper demand following so many hunting law changes.

While flat point bullets for the .45-70 typically go up to a weight of 400 grains, the Ruger No.1 and custom bolt action rifles are quite capable of handling heavier bullets designed for the .458 Win Mag and .458 Lott. Many hunters will obviously be wondering about the benefits of the greatly increased sectional density when using these projectiles. Generally speaking, the 450 grain bullet weight is about as heavy as

the .45-70 will handle while still producing uniform wounding and penetration when using expanding bullets. The .45-70 does not have enough velocity (from 1800fps) to initiate reliable expansion when loaded with 500 grain expanding bullets. Some brands of projectile may expand but then fail to form a uniform frontal area, losing stability thereafter.

Hard cast bullets for the .45-70 are manufactured by several companies with Beartooth bullets being a prime example at this time of writing. Best results are achieved when using a bullet with a meplat (flat point) diameter of at least .300". As previously suggested, optimum wounding is achieved at impact velocities of around 1700fps and faster while penetration can be enhanced by focusing on bullets weighing at least 400 grains. Beyond this, as has been reiterated many times within this knowledge base, the key to fast killing when using non-expanding bullets is to keep shots well forwards and aim to break bone.

Casting equipment is also readily available from Lyman, RCBS and Lee. Lyman produce an exhaustive book for those who wish to cast their own bullets titled 'The cast bullet Handbook' which also gives very descriptive information on obtaining optimum bullet tempers. As an aside, one of the more interesting Lyman bullet molds is a direct copy of the original 330 grain HP Gould Express, a bullet that was noted for its ability to produce faster kills on medium game than contemporary .45-70 bullet designs of the early 20th century. Lyman also produce flat nose bullet molds in the weights 385, 400 and 405 grains but none have the huge meplat found on true Keith style (Beartooth) bullets.

Closing comments

The .45-70 is certainly a fascinating cartridge. It is hard to believe that after all of these years it can still boast what can only be described as wow factor. There are just so many reasons to love the big 45 - its history, as a long range silhouette cartridge, as a brush hunting round or pushed to its limits on large bodied game. The .45-70 is simply a joy to own and shoot.

Suggested loads: 45-70 U.S Government					Barrel length: 24”	
No	ID		Sectional Density	Ballistic Coefficient	Observed MV Fps	ME Ft-lb’s
1	FL	Rem/Win/Fed 300gr	.204	.210	1700	1925
2	FL	Rem/Win/Fed 300gr	.204	.210	1700	1925
3	FL	Hornady FTX	.238	.230	1820	2390
4	HL	325gr FTX*	.238	.230	2300	3523
5	HL	400gr Speer FP*	.272	.259	2000	3552

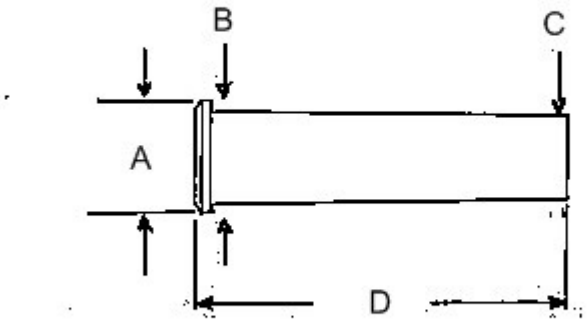
Suggested sight settings and bullet paths									
1	Yards	50	100	150	200				
	Bt. path	+1.9	0	-7	-20.3				
2	Yards	50	100	150	200				
	Bt. path	+1.3	0	-6.5	-19.2				
3	Yards	50	125	150	200				
	Bt. path	+2	0	-3	-13.5				
4	Yards	50	150	200	225	250			
	Bt. path	+1.5	0	-5.6	-10.2	-15.9			
5	Yards	50	100	150	200	225	250		
	Bt. path	+2.2	+2.9	0	-7.2	-12.7	-19.6		

No	At yards	10mphXwind	Velocity	Ft-lb’s
1	150	8.6	1285	1100
2	150	8.6	1285	1100
3	150	7.6	1365	1344
4	150	6	1713	1953
5	150	5.9	1554	2145

Load 1 sight height is .5”. All other loads have a sight height of 1.6”

*Modern rifles only

.45-70 U.S Government



.45-70	Imperial	Metric
A	.608	15.44
B	.505	12.82
C	.480	12.19
D	2.105	53.47
Max Case	2.105	53.47
Trim length	2.093	53.17